Kurukshetra University, Kurukshetra

Master of Education in Special Education (Visual Impairment)

{M.Ed. Spl. Edu. (V.L.)}

Syllabus

Effective from Academic Session 2017-19 in Phased Manner. Two Years Duration (04 Semesters)

Course	Course Title	Credits	Hours	Page No.
	SEMESTER I			05-17
Ι	Developments in Education and	4	60	5
	Special Education			
II	Psychology of Development and	4	60	8
	Learning			
III	Identification, Assessment and	4	60	11
	Needs of Children with Visual			
	Impairment			
IV	Curriculum And Teaching	4	60	14
	Strategies for Children with Visual			
	Impairment			
V	Practical related to Visual	4		17
	Impairment			
	SEMESTER II			18-29
VI	Research Methodology and	4	60	18
	Statistics			
VII	Curriculum Design & Development	4	60	21
VIII	Inclusive Education	4	60	23
IX	Application of advanced	4	60	26
	technology and persons with visual			
	impairment			
X	Practical related to Visual	4		29
	Impairment			
SEMESTER III				
XI	Perspectives in Teacher Education	4	60	30
	– In-service & Pre-service			
XII	Educational Evaluation	4	60	32
XIII	Adulthood and Family Issues	4	60	35
XIV	Elective Course(Any One)	4	60	
XIV A	Educational Management			37
XIV B	Educational Technology			39
XIV C	Guidance and Counseling			41
XV	Dissertation*	2		43
XVI	Field Engagement/ Internship as a	4		44
SEMESTER IV				
XVII	Dissertation*	14		45
XVIII	Field Engagement/ Internship as a	4		46
	Teacher Trainer			
Total		80		

Semester wise structure

Semester I

Course	Course title	Credits	Internal	External	Total	Duration
code			marks	Marks	Marks	of Exam
Ι	Developments in Education and Special	4	20	80	100	3 Hour
	Education					
II	Psychology of Development and	4	20	80	100	3 Hour
	Learning					
III	Identification, Assessment and Needs of	4	20	80	100	3 Hour
	Children with Visual Impairment					
IV	Curriculum And Teaching Strategies for	4	20	80	100	3 Hour
	Children with Visual Impairment					
V	Practical related to Visual Impairment	4	20	80	100	
	Total	20	100	400	500	

Semester-II

Course	Course title	Credits	Internal	External	Total	Duration
code			marks	Marks	Marks	of Exam
VI	Research Methodology and Statistics	4	20	80	100	3 Hour
VII	Curriculum Design & Development	4	20	80	100	3 Hour
VIII	Inclusive Education	4	20	80	100	3 Hour
IX	Application of advanced technology and persons with visual impairment	4	20	80	100	3 Hour
Χ	Practical related to Visual Impairment	4	20	80	100	
Total		20	100	400	500	

Semester-III

Course	Course title	Credits	Internal	External	Total	Duration
code			marks	Marks	Marks	of Exam
XI	Perspectives in Teacher Education – In-	4	20	80	100	3 Hour
	service & Pre-service					
XII	Educational Evaluation	4	20	80	100	3 Hour
XIII	Adulthood and Family Issues	4	20	80	100	3 Hour
XIV	Elective Course(Any One)	4	20	80	100	3 Hour
XIV A	Educational Management					
XIV B	Educational Technology					
XIV C	Guidance and Counseling					
XV	Dissertation*(synopsis)	2	50		50	
XVI	Field Engagement/ Internship as a	4	20	80	100	
	Teacher Educator					
	Total	22	150	400	550	

* Teacher Educators need to select a problem for investigations and provide the necessary supportive and explanatory information as needed. Teacher Educators need to present the synopsis of their work. Synopsis and presentation will be evaluated by Departmental Research committee (DRC).

Course	Course title	Credits	Internal	External	Total	Duration
code			marks	Marks	Marks	of Exam
XVII	Dissertation*	14	150	200	350	
XVIII	Field Engagement/ Internship as	4	20	80	100	
	a Teacher Trainer					
Total		18	170	280	450	

Semester-IV

* Note: Suggestive/As per the University Regulations

• Complete a review of related research literature in accordance with the research problems.

• Explain and describe the methodology used to conduct the research problem.

• Explain the significance of the results obtained after conducting the research study.

• Summarize the results, explain the corresponding conclusions derived and the subsequent recommendations formulated for further research and practice.

• Provide a list of references, other supportive documentation used for the study.

• Make an oral presentation on the completed work.

Area E- Practical Related to Disability

1. Elicit information from parents and professionals the relevant information about one child with Specific Disability.

2. Assess the child with Specific Disability, using formal and informal tools and identify the specific learning problems.

3. Write a comprehensive assessment report by analyzing and interpreting the data.

4. Develop an appropriate educational plan (current level, annual goals, short term objectives, methods and material and evaluation).

5. Collaborate with the class teachers and related professional to implement the IEP.

6. Implement IEP for a period of minimum 15 sessions (each session lasting for not less than 45 minutes).

7. Make class visits to support the student when the regular teacher teaches and collaborate with the class teachers.

8. Evaluate the child and write a report.

Area F- Field Engagement/ Internship as Teacher Educators

Each student trainee is expected to teach 10 lectures in Third & Fourth Semester to student trainees undergoing training in B.Ed.Spl.Ed. level in topics from the curriculum of B.Ed. Spl. Edu.

DEVELOPMENTS IN EDUCATION AND SPECIAL EDUCATION

Course Code: I

Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

This course will enable learners to explore education both general and special from historical perspective leading to contemporary India. The course also includes various commissions and policies and issues and trends in the field of education, special education and inclusive education in the national and international contexts covering all aspects of quantity and quality.

Objectives

After completing the course teacher educators will be able to

• Trace development of general and special education system (PwDs) in India.

•Appreciate implications of recommendations made by the various Committees and Commissions for educational (General and Special) developments in India.

•Develop insight into the issues and challenges of present day education system.

•Understand important quality related issues which need to be taken into account for revision/ development of new education policy.

Unit 1: An Overview of Development of Education System

1.1 Shaping of Education in Pre-Independence India

1.2 Shaping of Education in Post-Independence India

1.3 Emerging Education in India and in the Global Context

1.4 Perspectives of Education for the Persons with Disabilities

1.5 Constitutional Provisions and Directive Principles Related to Education and Special Education

Unit 2: Issues in Indian Education with Special Reference to Persons with Disabilities

2.1 Accessibility to School, Curriculum & Learning Resources and Attitudinal Barriers

2.2 Analysis of the Status of Elementary & Secondary Education for All. (SSA, RMSA,) and Issues for Bridging Gaps

2.3 Ensuring Equity Principles across Disabilities, Gender, Caste, Socially Disadvantaged Groups, Marginalized and their Specific Educational Problems

2.4 Challenges of Special Education, Inclusion, Systemic Reforms, Provisions and Support System, Public Private Partnership & NGO Initiatives

2.5 Support Systems to Meet Diverse Learning Needs- Family, Community, School, Peer, Administrative and Resource Support

Unit 3: Policies and Legislations for Education & Special Education Development of Special Education in India

3.1 National Legislations (RCI Act 1992, PWD Act 1995, National Trust Act, Biwako Millennium Framework)

3.2 International Legislations for Special Education and International Organisations (UNESCAP, UNCRPD, WHO, UNICEF, NESCO, UNDP, Action Aid, CBM)

3.3 National Policies (POA 1992, SSA, RMSA and RUSA) & Government Schemes and Provisions for Persons with Disabilities

3.4 Role of Governmental and non-governmental agencies in general and special education

3.5 Current issues– Identifications, Labelling, cultural and linguistic diversity & advocacy

Unit 4: Quality Issues in Education

4.1 Indicators of quality related to teaching - learning strategies, classroom environment, and Student Assessment

4.2 Linking pedagogy with curriculum, contextual constructivism

4.3 Ensuring standards in Open & Distance Learning system – Non-formal education, face-to-face vs. Distance mode

4.4 Special and Inclusive education - Adopting flexible strategies for the acquisition and use of inputs and monitoring performance in inclusive set up

4.5 Quality enhancement in service delivery and community rehabilitation

Unit 5: Current Trends and Future Perspective

5.1 Education as a development indicator, and enhancer of development indicators

5.2 Education for sustainable development & Right based approach

5.3 International curriculum framework in the light of changing priorities and international perspectives

5.4 Education for conservation of environment and social change

5.5 Education for individual and national development

Course Work/ Assignments

• Trace development of education in India during pre-Independence

• Identify Constitutional provisions ensuring equity and protection of human rights as well as nondiscrimination

• Study factors influencing special education as a discipline in India

• Identify quality related issues of your State and suggest strategies to address them

Suggested Readings

• Anand, C.L. et.al. (1993). Teacher and Education in Emerging Indian Society, NCERT, New Delhi.

•Compendium of Schemes (2014). Department of Empowerment of Persons with Disabilities, Ministry of Social Justice and Empowerment, Govt. of India.

• Education Commission. (1964-1966). Ministry of Education, Government of India, New Delhi.

•Julka, A. (2014). Evaluation of the Implementation of the Scheme IEDSS in India. Department of Education of Groups with Special Needs. NCERT, New Delhi.

•Julka, A., Mukhopadhyay, S., Vyas, S., Sharma, M, Anupriya, C., & Salin, D. (2014). Including Children with Special Needs: Primary Stage. NCERT, New Delhi.

•Kumar, A. (2003). Environmental challenges of the 21st century, APH Publishing Corporation, New Delhi.

• Mohanty, J., (1986). School Education in Emerging Society, sterling Publishers MacMillan, New Delhi.

• National Policy on Education (1986). Ministry of Human Resource Development Govt. of India, New Delhi.

• National University of Educational Planning and Administration (2014). Education for All Towards Quality with Equity: INDIA. NUEPA, New Delhi.

- Ozial, A.O. (1977). Hand Book of School Administration and Management. Macmillan, London.
- Programme of Action (1992). Ministry of Human Resource Development. Govt. of India, New Delhi.
- Report of Core group on value orientation to education (1992). Planning commission, Govt of India.
- Salamatullah, (1979). Education in Social context, NCERT, New Delhi.
- School Education in India Present Status and Future Needs (1986). NCERT, New Delhi.
- Seventh All India School Education Survey (2002). NCERT, New Delhi.
- UNDP (1996). Human Development Reports. Oxford University Press. New York.
- UNESCO (2004). Education for All: The Quality Imperative. EFA Global Monitoring Report. Paris.

• UNESCO (2009). Report on Education for sustainable development.

• Varghese, N.V. (1995). School Effects on Achievement: A Study of Government and Private Aided Schools in Kerala. In Kuldip Kumar (Ed.) School effectiveness and learning achievement at primary stage: International perspectives. NCERT. New Delhi.

PSYCHOLOGY OF DEVELOPMENT AND LEARNING

Course Code: II Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

This course exposes learners to the critical understanding of theoretical perspectives of development and implications for in teaching learning process. Through close observation of children in their natural environments would situate the theoretical knowledge within realistic frames. This course would also be able to equip them to reflect and critique the cognitive and information processing.

Objectives

After completing the course teacher educators will be able to

• *Explain the psychological principles and their application in specific context of education and special education.*

- Explain the principles and their implication for growth and development.
- Critically analyse the process from the point of view of cognitive psychology.
- Explain role of motivation in learning, learning processes and theories of personality.
- Apply psychological aspects to teaching learning situations.

Unit 1: Overview Educational Psychology

- 1.1 Nature and scope of educational psychology
- 1.2 Principles of educational psychology
- 1.3 Methods of Educational Psychology
- 1.3.1 Observation
- 1.3.2 Experimental method
- 1.3.3Correlational
- 1.3.4 Clinical
- 1.3.5 Case Study
- 1.4 Applications of educational psychology to person with disabilities

1.5 Contemporary trends

Unit 2: Understanding the Development of the Learner

2.1 Concept of Growth and Development

- 2.2 Methods of studying development: Longitudinal, Cross-sectional, Cohort sequence
- 2.3 Physical, social, emotional, moral development, play and language development

2.4 Cognitive Development: Piaget, Vygotsky and Kohlberg

2.5 Factors affecting Growth and Development

Unit 3: Cognition and Information Processing

3.1 Sensation, Perception and Attention

- 3.2 Memory Nature and types, factors affecting memory
- 3.3 Thinking: Concept Formation, Reasoning, Problem solving
- 3.4 Intelligence: Nature, types, theories and assessment
- 3.4.1 Creativity
- 3.5 Individual differences and its educational implications for children with disabilities

Unit 4: Motivation, Learning and Personality

4.1 Concept, definition and theories of Motivation

4.2 Classical and Contemporary Learning Theories: Behavioural, Cognitive and Social

- 4.3 Concept, definition and principles of personality development
- 4.4 Personality Theories-
- 4.4.1 Psychoanalytic-Freud & Neo-Freudians, Trait, Humanistic
- 4.4.2 Assessment of Personality
- 4.5 Implications in teaching-learning with reference to children with disabilities

Unit 5: Psychological Aspects of Teaching

- 5.1 Individual differences in cognitive and affective areas and its educational Implications
- 5.2 Classroom climate, group dynamics
- 5.3 Peer tutoring, co-operative learning, self-regulated learning
- 5.4 Teacher effectiveness and competence

5.5 Guiding children with disabilities

Course Work/ Assignments/ Practicum

• Plan and conduct a survey about attitudes/ practices regarding one or more of the following: children with disabilities, prenatal development, prenatal hazards, school drop-out, motivation of children

• Conduct an experiment with Piagetian methods of evaluating cognitive development and submit a report

• Analyze any autobiography to explain human development

- Design a behaviour modification plan for a specific child
- Present information on cognitive styles and their effects on learning

Transaction

Lecture Method, Seminar, Group Discussion, Practical and Field work

Essential readings

• Agarwal, I.J.C (1994). Essentials of Educational Psychology. Vikas Publishing House, Pvt.Ltd., New Delhi.

• Chatterjee, S.K. (2000). Advanced Educational Psychology. Arunabhasen Books and ALLIED(P) Ltd.,

- Freud, S (1935). A general Introduction to psychoanalysis. Live right, New York.
- Mangal, S.K. (1997). Advanced Educational Psychology. Prentice Hall of India Pvt., Ltd., New Delhi.
- Maslow, A.M. (1954). Motivation and Personality. Harper Press, New York.
- Morgan, C.T. (1961). Introduction to Psychology. McGraw Hill, New York.

• Mussen, P.H., Conger, J.J., & Kagan, J.(1969). Child development and personality. Harper & Row, New York.

Suggested Readings

- Bernard, H.W. (1972). Psychology of Learning and Teaching. Mc Grow Hill, New York.
- Chauhan, S.S. (1996). Advanced Educational Psychology. Vikas Publishing House, New Delhi.

• DeCecco, J.P., & Crawford, W. (1977). Psychology of Learning and Instruction. Prentice Hall, New Delhi.

- Driscoll, P.M. (1994). Psychology of Learning for Instruction. Allyn & Becon, Boston.
- Hurlick, E.B. (1992). Child Development. Mc Grow Hill, New York.
- Joyce, M., & Others (1992). Models of Teaching. Holt Rinehart and Winston, New York.
- Lindgren, H.C. (1976) Educational Psychology in the Classroom. John Wiley, New York.

• Mildred, C.R.F. (1978). Infants, Children: Their Development and Learning. Gran Hill, New York. (Indian Reprint).

- Panda, K.C. (1997). Elements of Child Development. Kalyani Publishers, New Delhi.
- Sharma, P. (1995). Basics on Development and Growth of a Child. Reliance Publication, New Delhi.

• Slavin, E.R. (2003). Educational Psychology: Theory and Practice (7th ed.). Allyn & Becon, Boston.

• Wilson, A.R., Rockbeck, M.C., & Michael, N.B. (1979). Psychological Foundations of Learning and Teaching. Mc Grand Hill, New York.

IDENTIFICATION, ASSESSMENT AND NEEDS OF CHILDREN WITH VISUAL IMPAIRMENT

Course Code: III Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

Assessment is a multifaceted process of gathering information by using appropriate tools and techniques in order to make educational decisions about placement and the educational programme for that student. A comprehensive functional assessment employs a combination of tools and techniques selected to be consistent with the purposes of the assessment. The interpretation and integration of information gathered from these various sources is a key factor in comprehensive assessment of visually impaired children to make informed decisions about their individualized education programme. To participate fully in this process, the learners must have an understanding of the needs of children with visual impairment and those with additional disabilities, at different stages of the growth and development; knowledge of the potential impact of the visual impairment on behaviour and functioning; and a thorough understanding of the assessment instruments and procedures.

Objectives

After completing the course teacher educators will be able to

• Trace the historical development of visual impairment and discuss the attitudinal change of society over time.

• Describe the causes and implications of different eye disorders.

• Critically examine the needs arising at different stages of persons with visual impairment.

• Develop skills to identify and assess children with blindness, low vision, and children with VIMD.

• Develop skills to plan and implement vision efficiency training for children with low vision.

Unit 1: Evolving Concept and Definition of Visual Impairment

1.1 History of visual impairment

1.2 Attitudinal and behavioural change of the society towards the persons with visual impairment

1.3 Paradigm shift from charity through medical and social to right based approach

1.4 Factors affecting changing societal attitude and policy perspectives with reference to persons with visual impairment: Self-help movements, Service delivery organizations, Judiciary and quasi-judicial bodies, UN Bodies, and media

1.5 Classification of visual Impairment: WHO, International Classification of Functioning, Disability and Health (ICF), and domestic legislations

Unit 2: Eye Disorders: Etiology and Implications

2.1 Neurological causes of visual impairment: cortical visual impairment

2.2 Disorder related to refraction: myopia, hyperopia, presbyopia, astigmatism

2.3 Disorders related to receptive aspects of the eye: retinal detachment, retinitis pigmentosa, Retinipathy of prematurity,optic atrophy, aninidia, and macular degeneration, and albinism

2.4 Muscular and related disorders: nystagmus, strabismus, amblyopia

2.5 Vitamin A deficiency, cataract, glaucoma, corneal ulcer, trachoma, and colour blindness

Unit 3: Identification and Assessment Procedures of Children with Blindness and Low Vision

3.1 Methods and tools for assessment of children with blindness: Functional Skills Inventory for the Blind, Oregon project for visually impaired and Pre-schoolers, A short Scale IQ measure for the

visually impaired based on WISC-R, Adapted EPQ, Adapted Blind Learning Aptitude Test, Concept development for blind Children, Reading Preference Test, Cornell Medical Index on Visually Handicapped children

3.2 Identification of children with low vision and psychosocial implications of low vision

3.3 Functional vision assessment: selection of methods and tools for functional vision assessment of persons with low vision: low vision assessment by Jill Keeffe, Lea Tests

3.4 Concept and methods of visual efficiency training

3.5 Preparation of teacher made tools for functional assessment of vision and skills

Unit 4: Identification and Assessment Procedures of Children with Visual Impairment and Multiple Disabilities

4.1 Concept of VIMD

4.2 Role of multidisciplinary team of professionals in assessment of children with VIMD

4.3 Functional assessment methods and tools for VIMD: physical, vision, hearing, tactual, and communication skills assessment

4.4 Implications of vision loss in adapting available tools of assessment for persons with Visual impairment

4.5 Preparation of teacher made tools for functional assessment of VIMD

Unit 5: Needs of Persons with Visual Impairment

5.1 Infancy and early childhood: early stimulation and early intervention

5.2 School age: placement alternatives, collaboration of special and regular teacher

5.3 Transition Period: self-identity, self-esteem, and self-image

5.4 Vocational Development: emerging job opportunities

5.5 Adulthood issues: sexuality and marriage, recreation and leisure; geriatric groups: disintegrating family system, social security, CBR and community support

Course Work/ Practical/ Field Engagement (Any Three)

• Prepare a questionnaire to identify the approach followed by an inclusive school towards the education of children with disabilities

• Visit an eye hospital/primary health centre/ compository rehabilitation camp and observe persons with different eye disorders and write a report

• Prepare and administer a teacher made tool for functional assessment of vision and visual skills of a child with low vision and submit a report

• Prepare and administer a teacher made tool for functional assessment of Vision, Hearing, Tactual, Communication and functional skills of children with VIMD and submit a report

• Critically analyse any psychological test you have studied for its applicability and identify items to be adapted for the persons with visual impairment in Indian context

Essential Readings

• Barraga, N. C. (1980). Sequences of Visual Development. University of Texas. Austin.

• Bhan, S., & Swarup, S. (2010). Functional skills inventory for the blind. National association for the blind, Mumbai.

• Bhandari, R., & Narayan J. (2009).Creating learning opportunities: a step by step guide to teaching students with vision impairment and additional disabilities, including deafblindness. Voice and vision: India.

• Corn, A. L., & Koenig, A.J. 2000. Foundation of Low Vision: Clinical & Functional Perspective. AFB Press, New York.

• Dimri, A. (2002). Prepration of Norms of WISC-R (Verbal) for the Visually Handicapped. NIVH, Dehradun.

• Hyvarinen, L., & Jacob, N. (2011). What and how does this child see: assessment of visual functioning for development and learning. Vistest Ltd. Finland.

• Leat, S.J., Shute R.H., & Westall, C.A. (1999). Assessing children's vision: A Handbook. Butterworth-Heinemann: Oxford.

• Lueck, A. H. (2004). Functional Vision- A practitioner guide to Evaluation & Intervention, AFB Press. New York.

• Mani, M.N.G. (1992). Concept development of blind children. SRK Vidyalaya. Coimbatore.

• Mani, M.N.G. (1993).Concept Development of Blind Children: A Research Study. Shri Ramakrishna Mission Vidyalaya. Printing Press. Coimbatore.

• Mani, M.N.G. (2001). Reading Preference Test (REPT) for Children with Low Vision. Coimbatore: International Human Resource Development Centre for the Disabled.

• Mukhopadhyay, M., Jangira, N.K., Mani M.N.G., & RoyChoudary, M. (1988). Source Book For Training Teachers Of Visually Impaired. NCERT. New Delhi.

• Reynolds, C.R., & Janzen, E.F. (Ed.)(2007). Encyclopaedia of Special Education. Vol. I A-D, John Wiley, Canada.

• Sacks. S. Z., & Silberman, R.K. (2005). Educating Students who have Visual Impairments with other Disabilities, Paul H Brookes, Maryland.

• Salvia, J., Ysselduke, J.E., & Bolt, S. (2007), Assessment in Special & Inclusive Education. Houghton Mifflin: USA.

• Scheiman, M., Scheiman, M., & Whittaker, S.G. (2007). Low Vision Rehabilitation, SLACK Incorporated: USA.

• Scholl, G. T. (Ed.) (1986). Foundations of the education for blind and visually handicapped children and youth: Theory and Practice. AFB Press. New York.

• Singh, T.B. (1986). A short Scale I.Q Measure for the Visually Handicapped. NIVH, Dehradun.

• Singh, T.B. (1986). Eyssenck Personality Questionnaire (EPQ) for the Visually Handicapped. NIVH, Dehradun.

• Singh, T.B. (1986).Standardisation of Cornell Medical Index on Visually Handicapped children. NIVH, Dehradun.

• Singh, T.B., & Sati, G. (1992). Use of Blind Learning Aptitude Test as a performance measure for the assessment of Visually Handicapped Children in India. NIVH Dehradun.

• Warren, D.H. (1983). Blindness and Early Childhood Development.: AFB Press, New York.

Suggested Readings

• Aitken, S., Buultjens, M., Clark, C., Eyre, J.T. (2000), Teaching Children who are Deaf blind. David Fulton Publisher: London,

•Batshaw, M.L., Pellegrino, L., & Roizen, N.J. (2007), Children with Disabilities. Paul. H. Brookes: Maryland,

•Holbrook M. C. &Koenig A. J. (Eds.) (2000). Foundations of Education, Vol I: History and Theory of Teaching Children and Youths with Visual Impairments, (2nd Ed): AFB Press, New York.

• Kundu, C.L. (2000). Status of Disability in India. Rehabilitation Council of India, New Delhi.

• National Institute for the Visually Handicapped (1990). Handbook for Teachers of the Blind, NIVH Dehradun.

• Punani, B., & Rawal, N. (1993). Handbook: Visual Impairment. Ashish Publishing House, New Delhi.

CURRICULUM AND TEACHING STRATEGIES FOR CHILDREN WITH VISUAL IMPAIRMENT

Course Code: IV Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

The purpose of the curriculum is encapsulated in the four capacities - to enable each child or young person to be a successful learner, a confident individual, a responsible citizen and an effective contributor. The general education curriculum should be universally designed to meet the educational needs of most students, including those with visual impairment. However, some adaptations to the learning materials and the teaching approaches have to be made so that the learning needs of visually impaired children can be met. This course prepares the learners to develop a balanced curriculum with due consideration given to the children's intellectual, personal, emotional and social developments. Learners will acquire skills to adopt a consistent, realistic and flexible approach in curriculum planning and implementation. They will be able to plan possible adaptations to the curriculum, taking into account the children's visual impairment, their abilities and learning needs.

Objectives

After completing the course teacher educators will be able to

- Appreciate the importance of various basis to curriculum development.
- Develop an expanded core curriculum for children with visual impairment on the basis of situational analysis.

• Adapt the school curriculum keeping in mind the principles of curriculum adaptation in different curricular skill areas.

- Demonstrate appropriate teaching strategy in teaching reading, writing, and math
- Critically examine approaches to curriculum development for VIAD.

Unit 1: Basic Curriculum Areas and Skills

- 1.1 Curricular skills related to cognitive domain
- 1.2 Curricular skills related to psychomotor domain
- 1.3 Curricular skills related to affective domain
- 1.4 Core curriculum, collateral curriculum, and support curriculum
- 1.5 Curriculum adaptation: Need and principles

Unit 2: Introduction to Expanded Core Curriculum

2.1 From plus curriculum to expanded core curriculum and Introduction and Orientation to Unified English Braille

- 2.2 Philosophical basis
- 2.3 Psychological basis
- 2.4 Sociological basis
- 2.5 Ethical considerations

Unit 3: Steps in Expanded Core Curriculum Development

3.1 Assessment of needs with reference to accessing school curriculum

3.2 Designing a need based curriculum: situational analysis for selection of skills and method of teaching

- 3.3 Developing a collaborative curriculum
- 3.4 Implementation of the curriculum

3.5 Critical evaluation of the curriculum

Unit 4: Strategies for Teaching

4.1 Specific teaching strategies: task analysis, co-activity, pre teaching, self verbalization, direction giving, generalization, feature enhancement, and use of kinaesthetic movement

4.2 Teaching reading to students with visual impairment: Reading aloud, peer reading, organic reading, and whole language approach

4.3 Strategies for writing skills: guided and independent writing

4.4 Strategies for teaching math: concrete, experiential, role play, and origami

4.5 Strategies for teaching use of ICT: demonstration, verbal instruction, and peer tutoring

Unit 5: Approaches to Curriculum Development for VIAD

5.1 Ecological

5.2 Multisensory

5.3 Thematic

5.4 Functional

5.5 Experiential

Course Work/ Practical/ Field Engagement (Any Two)

• Identify and present various curricular domains in the given chapter from a text book

• Adapt the school curriculum in any one subject keeping in mind the principles of curriculum adaptation

• Design the curriculum for a child with visual impairment

• Develop a thematic curriculum for a child with VIAD

Essential Readings

• Aggarwal, J.C. (2005). Curriculum development 2005. Shipra Pub. Delhi.

• Bhandari, R., & Narayan J. (2009).Creating learning opportunities: a step by step guide to teaching students with vision impairment and additional disabilities, including deaf-blindness. Voice and vision: India.

• Biwas, P.C. (2004). Education of children with Visual Impairment: in inclusive education. Abhijeet Publication, Delhi.

• French, S., & Swain, J. (1997). From a different view point: the lives and experiences of visually impaired people. Jessica Kinsey Pub, London.

• Grover, U., & Chaudhari. M. (2009). Curricular Strategies. Kanishka Publication, New Delhi.

• Hodapp, R. M. (1998). Developmental and disabilities: Intellectual, sensory and motor impairment. Cambridge Uni. Press, New York.

• Jain, P. (2006). Curriculum & teaching. Kanishka Publication, New Delhi.

• Joyce, B., Weil, M., & Calhoun, E. (2009). Model of teaching. PHI learning Pvt. New Delhi.

• Lowenfeld, B. (1973). The Visually Handicapped Child in School. John Day Company, New York.

• Mangal. S.K. (2007). Educating exceptional children-an introduction to special education. PHI Learning Pvt. New Delhi.

• Rao, V. (2009). Curriculum development. Saurabh Pub, New Delhi.

• Scholl, G.T. (1986). Foundations of the education for blind and visually handicapped children and youth: Theory and Practice. AFB Press, New York.

• Sharma, R.A. (2011). Curriculum development and instruction. R. Lal Book Depot, Meerut.

• Shrivastava, N. (2010). Blind and mentally handicapped children: problems and coping strategies. Ritu Publication, Jaipur.

• Srivastava, H.S. (2011). Curriculum & method of teaching. Shipra Pub., Delhi.

• Vijayan, P., & Victoria, G. (2009). Education of visually impaired children with additional disabilities. Kanishka Publication, New Delhi.

Suggested Readings

• Agrawal, S. (2004). Teaching mathematics to blind students through programmed learning strategies. Abhijeet Publication, Delhi.

• Baratt, S. H. (2008). The special education tool kit. Sage Publication, New Delhi.

• Bhan, S., & Swarup, S. (2010). Functional skills inventory for the blind. National association for the blind, Mumbai.

• Maitra, K. (2010). Inclusion: Issues and Perspective. Kanishka Publication, New Delhi.

• Mani, M.N.G. (1992). Concept development of blind children. SRK Vidyalaya: Coimbatore.

• Mani, M.N.G. (1992). Techniques of teaching blind children. Sterling Publishers Pvt. Ltd. New Delhi.

• Mukhopadhyay, M., Jangira, N.K., Mani M.N.G., & RoyChoudary. M. (1988). Source Book For Training Teachers Of Visually Impaired. NCERT. New Delhi.

• Niemann, S., & Jacob, N. (2009). Helping children who are blind. California: The Hesperon/ Chetana Charitable Trust, Chennai.

• Pandey, V.P. (2004). Teaching of mathematics. Sumit Publication, New Delhi.

• Punani, B., & Rawal, N. (2000). Handbook for Visually Impaired. Blind Peoples' Association, Ahmedabad.

• Adaptations to the curriculum for the visually impaired children, Retrieved on May 28th 2015, from URL: https://cd.edb.gov.hk/la_03/chi/curr_guides/Visually/ev-3.htm

PRACTICAL RELATED TO VISUAL IMPAIRMENT

Course: V

Credit: 4

Marks: 100

Internal: 20; External:80

Learning of Unified English Braille(UEB) literary code and use of advance Braille mathematics and science code.

Semester II

RESEARCH METHODOLOGY AND STATISTICS

Course Code: VI Time of Examination: 3 Hours Credits: 04 Marks: 100

Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

This course aims to develop within the student a temperament for scientific thinking and research. It orients the student to the methods of conducting research, analysis of data, and enables him/her to prepare research proposal and report subscribing to the standard norms and criteria.

Objectives

After completing the course teacher educators will be able to

- Develop a conceptual understanding of research, its need and ethical research practices.
- Describe the types, methods and process of research.
- Apply statistical techniques for analysis of data.
- Explain the methods and techniques of qualitative research.

• Prepare research proposal and report.

Unit 1: Scientific Knowledge and Research

- 1.1 Sources and philosophy of knowledge
- 1.2 Scientific thinking and research
- 1.3 Role of theory in research
- 1.4 Need for research in Education and Special Education
- 1.5 Ethics in research

Unit 2: Types and Methods of Research

2.1 Types of research- Quantitative, Qualitative, Fundamental, Applied, Action

- 2.2 Methods of Research:
- Descriptive
- Correlational
- Ex-post facto

• Experimental; Designs (i) Pre-experimental, (ii) Pre-Post designs, (iii) Quasi Experimental design, (iv) single subject design

2.3 Variables- Types and threats

2.4 Process of research- Selection of problem, Review of literature, Sampling; Types and selection process, Hypothesis

- Instruments; tests, questionnaire, interview, observation schedule, rating scale
- Data collection and analysis

2.5 Standardization of research instrument- Selection of items, reliability and validity and norms

Unit 3: Methods of Quantitative Analysis

- 3.1 Parametric and non-parametric tests: Concept and difference
- 3.2 Descriptive Statistics:
- Measures of Central Tendency

- Correlations; Product-moment, Biserial-r, Point-biserial, Phi-coefficient, Regression analysis

3.3 Inferential statistics

- Underlying concepts: Sampling error, standard error of mean, confidence level, degrees of freedom, one tail-two tail test, type I and type II errors

- Student t- test, ANOVA, Ancova, Chi-square, Sign Test, Mann Whitney U test, Kruskal-Wallis test

3.4 Computer applications for analysis

3.5 Tabulation and graphic representation

Unit 4: Qualitative Research Methods and Analysis

- 4.1 Grounded theory
- 4.2 Ethnography and case study
- 4.3 Narrative/discourse and visual methodologies
- 4.4 Mixed method
- 4.5 Themes, coding and presentation

Unit 5: Preparing Research Proposal & Report

- 5.1 Components of research proposal
- 5.2 Presentation of proposal
- 5.3 Writing of thesis/dissertation
- 5.4 Writing technical paper for publication
- 5.5 Research management

Assignments/ Course Work/ Practicum

- Review a research paper published in refereed journal
- Prepare and present a research proposal
- Review a text book and submit a report
- Analyze a set of data using computer application

Transaction

The research concepts and processes included in this course should be taught using examples from special education and disability studies. The topics from statistics should be explained through variables, hypothesis and type of data collected in selected research studies. Evaluation may be done by asking students to select and apply suitable statistical measure to a given set of data.

Essential Readings

- Agarwal, A.N. (2002). Quantitative Methods. Vrinda Publishing, New Delhi.
- Best, J.W., & Kahn, J.V. (1996). Research in Education. Prentice-Hall, New Delhi.
- Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. Academic Press, New York.
- Desu, M.M., & Raghavarao, D. (1990) Sample Size Methodology. Academic Press, Boston.
- Dooley, D. (1997). Social Research Methods. Prentice-Hall, New Delhi.
- Gaur, A.S., & Gaur, S. S.(2009). Statistical Methods for Practice and Research: A Guide to Data Analysis Using SPSS. Sage Publishers, New Delhi.
- Greene, S., & Hogan, D. (2005). Researching children's experience. Sage Publication, London.
- Grewal, P.S. (1990). Methods of Statistical Analysis. Sterling Publishers, New Delhi.
- Guptha, S. (2003). Research Methodology and Statistical Techniques. Deep & Deep Publishing, New Delhi.
- Hegde, M. N. (2003). Clinical research in communicative disorders. PRO-ED: Austin, Texas
- Khan, M.S. (2005). Educational research. Ashish Publishing House: New Delhi
- Koul, L. (1996). Methodology of Educational Research. Vikas Publishing House, New Delhi.
- Potti, L.R. (2004). Research Methodology. Yamuna Publications, Thiruvananathapuram.
- Siegel, A., & Castellen, N.J. (1988). Non Parametric statistics for Behavioural Sciences. McGraw-Hill, New York.
- Silverman, D. (2012). Qualitative Research. Sage Publication, London.

Suggested Readings

• Berg, B.L., & Lune, H. (2011). Qualitative Research Methods for the Social Sciences

Pearson Publication, Boston.

• Bogdan, R. C., & Biklen, S. K. (2007). Qualitative research for education: An introduction to theory and methods (5th ed). Pearson, Boston.

• Lipsey, M.W. (1990). Design Sensitivity: Statistical Power for Experimental Research. Sage Publications, Newbury Park, CA.

• Singh, A. K. (2004). Tests Measurement and Research Methods in Behavioural Science. Tata McGraw-Hill Publishing, New Delhi.

CURRICULUM DESIGN & DEVELOPMENT

Course Code: VII Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

Changes in society constantly demand new knowledge and skills and require the continuous development of our educational system. This course will provide the trainee the foundational knowhow and theoretical underpinning of curriculum development from design and implementation to evaluation and an informed and critical understanding about curriculum differentiation

Objectives

After completing the course teacher educators will be able to

- Define and identify different components of curriculum.
- Understand and analyse various approaches to curriculum development.
- Explain and demonstrate curriculum differentiation.

Unit 1: Nature of Curriculum

1.1 Definition and scope of curriculum

1.2 Bases of Curriculum-philosophical, sociological and psychological

1.3 Principles of curriculum transaction

1.4 Fundamentals of curriculum development: knowledge based, activity based, skill based and experience based

1.5 Historical and contemporary evolution of curriculum

Unit 2: Approaches & Types of Curriculum Development

- 2.1Developmental Approach
- 2.2 Functional Approach
- 2.3 Eclectic Approach
- 2.4 Ecological Approach
- 2.5 Expanded Core Curriculum
- 2.6 Hidden Curriculum

Unit 3: Principles of Curriculum Construction

- 3.1 Curriculum & Ideology
- 3.2 Curriculum as a Social Construct
- 3.3 Differentiating between Curriculum Design and Curriculum development
- 3.4 Theories of Curriculum Development

3.5 Universal Design of Learning for Curriculum Development

Unit4: Curriculum Development & Instructional Design

- 4.1 Differentiation of Curriculum
- 4.2 Pedagogical Theories and curriculum transaction
- 4.3 Material and Instructional Adaptations
- 4.4 Assessment and Evaluation

Unit 5: Critical Issues in Curriculum

- 5.1 Organisation of learning opportunities for diverse needs
- 5.2 Designing integrated and inter-disciplinary learning experiences
- 5.3 Collaborative curriculum
- 5.4 Alignment of curriculum and modes of assessment

5.5 Curricular trends

Transaction

Group discussion, lecture-cum-discussion, panel discussion, school visits and teaching observations, individual assignment of lesson planning based on learning needs in the classroom.

Course Work/ Practical/ Field Engagement

• Write a 2000 word essay describing a curriculum in action in an inclusive school

• Adapt any one lesson in collaboration with a regular teacher within a secondary school text book (using one of the approaches to curriculum development) to meet the needs of children with disabilities

Essential Readings

• Aggarwal, D. (2007).Curriculum development: Concept, Methods and Techniques. Book Enclave, New Delhi.

• Alexander, R. J. (2001). Culture and pedagogy: International comparisons in primary education. Oxford and Boston, Blackwell.

• Daniels, H., & Goodland, J. (1979). Curriculum Enquiry the Study of Curriculum Practices. McGraw Hill, New York.

• Daniels, H., & Porter, J. (2011). Educational theories, cultures and learning: A critical perspective. Routledge, London.

• Ornstein, A. C., Pojak, E. F., & Ornstein, S. B. (2006). Contemporary issues in curriculum. Allyn & Bacon, Boston.

• Wiles, J. (2009). Leading Curriculum Development. Corwin Press, New Jersey.

• Wiles, J.W., & Joseph, B. (2006). Curriculum Development: A Guide to Practice. Pearson Publication, London.

Suggested Readings

• CIET(2006). The process of Making National Curriculum Framework-2005: A Video documentary both in Hindi and English, CIET, NCERT, New Delhi.

• Jacobs, H. H. (1997). Mapping the Big Picture: Integrating Curriculum and Assessment K-12 (Professional Development). Association for Supervision & Curriculum Development, Alexandria.

• Westbrook, J., Durrani, N., Brown, R., Orr D., Pryor J, Boddy, J., & Salvi, F. (2013). Pedagogy, Curriculum, Teaching Practices and Teacher Education in Developing Countries. Final Report. Education Rigorous Literature Review. Department for International Development.

• Wiggins, G., & Mc Tighe, J. (2005). Understanding by Design. Association for Supervision and Curriculum Development, Alexandria.

• Wiles, J. W., & Bondi, J. C. (2010). Curriculum Development: A Guide to Practice. Prentice Hall, New Jersey.

INCLUSIVE EDUCATION

Course Code: VIII Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

This course will prepare teacher trainees to develop insights into models, evolution, current issues and strategies for developing inclusive learning environments. This course will promote collaborative skills in the trainees in order to address special learning needs in the classroom.

Objectives

After completing the course teacher educators will be able to

• Explain the philosophical, sociological and rights perspective of inclusive education.

•Develop skills in using a wide range of tools, instructional strategies, and social supports to assist students with disabilities learn effectively.

•Develop the skills associated with inter-personal relationships, managing relations in educational settings, problem-solving in educational settings, leadership and working in teams to promote inclusion.

Unit 1: Perspectives in Inclusive Education

1.1 Historical perspective of Inclusive education globally and in India

1.2 Approaches to disability and service delivery models

1.3 Principles of inclusive education

1.4 Key debates in special and inclusive education

1.5 Research evidence on efficacy and best practices associated with inclusive education

Unit 2: Covenants and Policies Promoting Inclusive Education- A Critique

2.1 International Declarations: Universal Declaration of Human Rights (1948), World Declaration for Education for All (1990)

2.2 International Conventions: Convention Against Discrimination (1960), United Nations Convention on Rights of a Child (1989), United Nations Convention of Rights of Persons with Disabilities (UNCRPD) (2006), Incheon Strategy (2012)

2.3 International Frameworks: Salamanca Framework (1994)

2.4 National Commissions & Policies: Kothari Commission (1964), National Education Policy (1968), National Policy on Education (1986), Revised National Policy of Education (1992), National Curricular Framework (2005), National Policy for Persons with Disabilities (2006)

2.5 National Acts & Programs: IEDC (1974), RCI Act (1992), PWD Act (1995), National Trust Act (1999), SSA (2000), RTE (2009) and amendment 2012, RMSA (2009), IEDSS (2013)

Unit 3: Building Inclusive learning Environments (I)

3.1 Identifying barriers to Inclusion- Attitudinal, Systemic and Structural

3.2 Ensuring Physical, Academic and Social Access

3.3 Leadership and Teachers as Change Agents

3.4 Assistive Technology

3.5 Whole School Development

Building Inclusive Learning Environments (II)

3.6 Classroom Management

3.7 Effective Communication

3.8 Promoting Positive Behaviour

3.9 Reflective Teaching

3.10 Peer mediated instruction: Peer tutoring, Co-operative learning

Unit 4: Planning for Including Diverse Learning Needs

4.1 Universal design of learning

4.2 Adaptations and accommodations for sensory impairments

- 4.3 Adaptations and accommodations for children with multiple disabilities
- 4.4 Adaptations and accommodations for children with neuro-developmental disabilities
- 4.5 Adaptations and accommodations for children with intellectual impairment
- 4.6 Adaptations and accommodations for gifted children

Unit 5: Collaborations

- 5.1 Models of collaboration
- 5.2 Working with Parents
- 5.3 Managing Conflict
- 5.4 Co-teaching

5.5 Mentoring and Coaching

Transaction

Interactive course with discussion as well as field work to get first-hand experience of coteaching mainstream classrooms with children with disability

Course Work/ Practical/ Field Engagement

• Study the impact of UNCRPD on RTE's provisions for children with disabilities

• Review of research in any one area in inclusive education and highlight its implications for the practitioner

- Develop a differentiated lesson with content, process, and products adapted to suit a specific learner
- Implement the lesson plan above in a regular school using one of the models of collaborative teaching. Write your reflections in a journal

Essential Readings

- Clough, P., & Corbett, J. (2000). Theories of Inclusive Education. Paul Chapman Publishing, London.
- Constitution of India (1950). Article 41, Ministry of Law and Justice, New Delhi.
- Jha, M. M. (2002). School Without Walls: Inclusive Education for All. Oxford, Heinemann.

• Jorgensen, C. M., Mc Sheehan, M., & Sonnenmeier, R. M. (2009). Essential best practices in inclusive school. Institute on Disability/UCE, University of New Hampshire

• Mukhopadhyay, S., & Mani, M. N. G. (2002). Education of Children with Special Needs, in Govinda, R. (2002) (Ed) India Education Report. Oxford University Press, New Delhi.

• Peterson, M., & Hittie, M. (2009). Inclusive teaching: The journey towards creating effective schools for all learners. Merrill, New Jersery.

• Skidmore, D. (2004) Inclusion: The Dynamic of School Development, Open University Press, Buckingham.

• Villa, R. A., & Thousand, J. S. (2005) Creating An Inclusive School, Association for Supervision and Curriculum Development. ASCD, Alexandria.

• Wade, S. E. (2000). Inclusive Education: A Casebook and Readings for Prospective and Practicing Teachers. Lawrence Erlbaum Associates, New Jersery.

Suggested Readings

• Berry, B., Daughtrey, A., & Weider, A. (2010). Teacher leadership: Leading the way to effective teaching and learning. Centre for Teaching Quality, Washington, DC.

• Carr, J. F., Herman, N., & Harris, D. E. (2005) Creating Dynamic Schools through Mentoring, Coaching, and Collaboration. ASCD, Alexandria.

• Carter, E. W., Cushing, L. S., & Kennedy, C. H. (2009). Peer support strategies: Improving all students' social lives and learning. Paul H. Brookes, Baltimore.

• Kunc, N. (2000). Rediscovering the right to belong. In R. A. Villa & J. Thousand (Eds.), Restructuring for caring and effective education: Piecing the puzzle together Brookes. Baltimore.

• Mastropieri, M. A., & Scruggs, T. E. (2006). The inclusive classroom: Strategies for effective instruction. Prentice-Hall, New Jersery.

• Odom, S. L., McConnell, S. R., Ostrosky, M., Peterson, C., Skellenger, A., Spicuzza, R., Chandler, L. K., McEvoy, C. A., & Favazza, P. C. (1993). Play time/social time: Organizing your classroom to build interaction skills. Communication Skill Builders, Tucson, AZ.

• UNESCO (1994). The Salamanca statement and framework for action on special needs education. Paris.

APPLICATION OF ADVANCED TECHNOLOGY AND PERSONS WITH VISUAL IMPAIRMENT

Course Code: IX Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

Developments in the sphere of assistive technologies and ICT have opened up a wide array of exciting opportunities and possibilities for persons with visual impairment. These technologies must, now, form the basis of all activities for effective empowerment of the visually impaired. It is, therefore, in the fitness of things that technology solutions should form the subject matter of the present course. The course familiarizes the M.Ed. students with devices in the fields of education, independent living, employment and related aspects. So extensive, in fact, is the scope and range of technology applications for the visually impaired, today that it is well-neigh impossible to list each and every solution here. Therefore, the course seeks to present a representative sampling with a view to providing the students an indication of the trends and developments in the field. It is hoped that the students would find the devices most fascinating and would be motivated to move further ahead on their own to know of various other technology applications.

The course also focuses on enabling the students to develop the capacity of ascertaining the efficacy of these devices in the Indian conditions. It also provides them an insight on how they could help in resource-mobilization for the acquisition of these technologies, many of which are extremely costly from the Indian perspective.

Objectives

After completing the course teacher educators will be able to

• Explain the relevance of technology for persons with visual impairment.

• Illustrate various devices to facilitate the education of persons with visual impairment.

• Describe various technological devices for promoting quality of life of persons with visual impairment.

• Critically analyse suitability/ appropriateness for various technological devices for persons with visual impairment.

• Discuss various trends in research on technology for persons with visual impairment.

Unit 1: Introduction to Technology for the Visually Impaired

1.1 Historical perspective of assistive technology in the rehabilitation of persons with visual impairment

1.2 Concept, need and importance of assistive technology with specific reference to the Indian context 1.3 Types of Assistive Technologies

1.4 Special roles of technology for facilitating empowerment of persons with visual impairment

1.5 Hardware, software, cybernetics and systems, with special reference to persons with visual impairment- an overview

Unit 2: Technological Devices- Traditional and Modern for the Education of the Visually Impaired

2.1 Writing Technologies: Braille Slates of different types, Brailler– mechanical and electrical, computers with screen readers and computer-based screen magnifiers and screen readers for Indian languages, Braille Note takers and Smart Brailler

2.2 Reading Technologies: Braille, Refreshable Braille Displays, Stand-Alone reading machines, OCR systems, scanner/ camera-based OCR systems, Indian languages scanning software and Text to Speech (TTS), screen readers for phones and tablets, Smart Phone and DAISY players

2.3 Technology for Mathematics and Science Education: Abacus, Taylor Frame, Geo Kit, measuring tapes-- strengths and limitations; softwares for accessing Mathematics and Science text, hardwares and softwares for making Science Lab accessible: Automatic Stir Station (hardware), Drop Counter(hardware), Sci-Voice (software), Talking Interferential Therapy Machine(hardware), Talking Lab Quest and Talking Logger

2.4 Braille Production Technologies: Stero typing Machines- mechanical and electrical, Braille translation software with special reference to Indian languages, embossers and printers, Braille labeling systems, tactile diagrams and graphics production devices

2.5 Critical analysis of the devices mentioned under Unit 2.1 to 2.4 in the context of the Indian situation

Unit 3: Technologies for Facilitating Independent Living for Persons with Visual Impairment

3.1 Mobility Devices: canes - rigid, collapsible, folding and Smart Canes; Global Positioning Systems (GPS), ultra sonic devices, vibrating technologies

3.2 Fitness and Health: Thermometer - tactile and audio, Talking Blood Glucose Meter, Talking Blood Pressure Device, Talking Medcenter Pill Organizer System, Talking Pedometer, weighing machine-Braille and Talking

3.3 Recreational Devices - Chess Board, playing cards, adapted Ludo and Snakes and Ladders, adapted Scrabble, adapted puzzles, Talking Chess, audio Cricket Ball and audio Football, adapted Table Tennis/ Show Down, Goleball, adapted Volley Ball

3.4 Home management Devices: audible/ vibratory Liquid Level Indicator, Talking Measuring Cup, Talking Food Thermometer, Talking Kitchen Scale, Talking Microwave Oven, Talking Timer, Braille and Talking Alarm Clocks and Watches, Needle Threader

3.5 Critical analysis of devices mentioned under Unit 3.1 to 3.4

Unit 4: Employment-related Technologies for the Visually Impaired

4.1 Braille Shorthand Machine

4.2 Dictaphone

4.3 Dictation Software

4.4 Application of screen reading technologies for promoting/ diversifying employment opportunities

4.5 Making workplaces and available workshop equipment and other machines accessible to persons with visual impairment– Guidelines and Principles

Unit 5: Procurement and Assessment of Technological Devices for Persons with Visual Impairment

5.1 Sources of availability and maintenance of technology devices

5.2 Resource mobilization for procurement of devices

5.3 ADIP scheme of the Government of India, Department of Empowerment of Persons with Disabilities

5.4 Parameters for assessing efficacy/ suitability of devices in the Indian context

5.5 Recent trends in research on technology for visually impaired

Course Work/ Practical/ Field Engagement

• Analyze critically the efficacy of any two traditional/modern devices from Unit 2 to Unit 4

• Draw up a list of addresses of suppliers of technological devices for persons with visual impairment

• Survey the availability and use of technology in one special school and one inclusive school and prepare a critical report

Essential Readings

•Taraporevala, S., & D'Sylva, C. (2014). Equip Your World: A Synoptic View of Access Technology for the Visually Challenged. Joint Publication of NIVH, Dehradun & XRCVC, Mumbai.

• Mani. M.N.G. (1997). Amazing Abacus. S.R.K. Vidyalaya Colony, Coimbatore.

• Singh, J.P. (2003). Technology for the Blind- Concept and Context, Kanishka Publication, New Delhi.

•Proceedings: Asian Conference on Adaptive technologies for the Visually Impaired (2009). Asian Blind Union, New Delhi.

Suggested Readings

• Fernandez, G., Koening. C., Mani. M.N.G., & Tensi, S. (1999). See with the Blind Books for Change, Banglalore.

• Scheiman, M., Scheiman, M., & Whittaker, S.G. (2007). Low Vision Rehabilitation. SLACK Incorporated, New Jersey.

- https://www.afb.org/prodmain.asp
- http://www.independentliving.com/products.asp?dept=141&deptname=New-Products
- http://shop.rnib.org.uk
- http://shop.lighthouseguild.org

PRACTICAL RELATED TO VISUAL IMPAIRMENT

Course: X	Credits: 04	Marks: 100
		Internal:20; External:80
• 5 lectures with B.Ed. student	s (1 in pedagogy subject, 1 in inclusive e	education, and 3 in specialization
papers)	50 Mark	as (@ 10)

• Teaching of ICT to B.Ed. students 5 classes

-- 50 marks

SEMESTER III PERSPECTIVES IN TEACHER EDUCATION - IN-SERVICE AND PRE-SERVICE

Course Code: XI Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

This course intends to orient the student about the aims and purpose of teacher education and critically reflect on its' status in India with specific reference to the developments in the field of special and inclusive education as well as identify the issues and challenges. A critical understanding of pre-service and in-service education of teachers in special and inclusive education would promote skills of designing and evaluating curriculum as well as capacities in transacting teacher training programs with essential inputs.

Objectives

After completing the course teacher educators will be able to

• Gain insight and understand development of Teacher Education with reference to education of children with disabilities.

• Reflect on issues and problems related with teacher preparation for education of children with disabilities.

• Familiar with responsibilities of different organisations in preparation of competent teachers and critically examine it.

• Appreciate importance of in-service programmes and develop capacity to plan and execute it as per specific need and purpose.

• Appraise the existing teacher education curriculum and its relevance, issues and challenges.

Unit 1: Understanding Teacher Education (TE)

1.1 Concept, Aims and Objectives of TE

1.2 Significance of TE in India

1.3 Types of TE: Pre-service and In-service; Continued development of Teacher as a Professional

1.4 Structure of TE in India and Organizations/Agencies involved

1.5 Factors influencing the practices in TE and quality

Unit 2: TE and Education of Children with Disabilities

2.1 Early Initiatives in preparing teachers for children with disabilities in India

2.2 Establishment of various national institutes and development of TE in special education

2.3 Establishment of RCI as a statutory body in standardizing and promoting TE in special education

2.4 Changes in School Education for Children with Disabilities and its Impact on TE

2.5 Paradigm shift from Segregation to Inclusion Impacting TE

Unit 3: Pre-service TE in Education of Children with Disabilities

3.1 Changing scenario of teacher education curriculum and evolving priorities

3.2 Characteristics of TE framework developed by RCI, structure and organisation of different components of TE Curriculum

3.3 Components of Pre-service TE: overview of courses at different levels, weight age of course work and evaluation

3.4 Various components of TE curriculum and their transactional modalities

3.5 Organisation, transaction and evaluation of different components of TE curriculum including school based practicum, and internship

Unit 4: Continued Teacher Development Program

4.1Need and modalities for continuing professional development of a teacher (Continuing Rehabilitation Education (CRE), Workshop, Seminar, Conferences, Projects, Exchange programmes) and their advantages and limitations

4.2 Structures and models of in-service teacher education- sub-district, district, State, regional and national level organisations and their role, voluntary efforts

4.3 Modes (face to face, distance modes, on line and mixed modes) and models (induction, one shot, recurrent, cascade, multi-site, school based, and course work) of in-service TE

4.4 Planning an in-service TE programme- preliminary considerations (purpose, duration, size of group, activities and budget)

4.5 Designing and organizing an in-service TE programme- assessment of training needs, identifying essential components, guidelines

Unit 5: Issues and Challenges in TE for Education of Children with Disabilities

5.1 Teacher motivation and working conditions; opportunities for professional development

5.2 Organizing TE: Conventional versus ODL

5.3 Collaboration/linkage between MHRD/ NCTE and MSJE/ RCI

5.4 Single disability versus cross disability approach in TE and addressing disability issues in general education curriculum

5.5 ICT and TE

Course Work/ Practical/ Field Engagement

• Prepare a checklist/schedule to collect information about curriculum transaction either in Diploma or B.Ed. in Special Education Courses in any Training Institute. Take interview of at least 10 student teachers and analyses the data to suggest improvement in quality of training

• Prepare a checklist/schedule to collect information from employer about competency of passed out student teachers. Take interview of at least 5 principals of schools having children with disabilities and analyses the data to suggest improvement in quality of training and the need for in-service training **Suggested Readings**

• NCTE (1998). Policy Perspectives in Teacher Education: Critique and Documentation, New Delhi.

• Saxena, N.R., Mishra, B.K., & Mohanty, R.K. (1998). Teacher Education, R-Lall Book Depot, Meerut.

• Sharma, R.A. (2002). Teacher Education. International Publication House, Meerut.

EDUCATIONAL EVALUATION

Course Code: XII Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

Education is a continuous process which begins with evaluation and ends with evaluation. This course intends to orient the learners with the foundation, scope and practices followed in educational evaluation and undertaking adaptations to suit the needs of children with disabilities. The course also takes the learners one step ahead by building an understanding of the contemporary evaluation practices as well as programme evaluation.

Objectives

After completing the course teacher educators will be able to

- Explain the key concepts of evaluation and describe the developments in evaluation.
- Describe the scope of evaluation in education.
- Describe the use of evaluation as an effective tool in teaching-learning process.
- Describe the ways & means of evaluation of programmes.
- Explain the current trends in evaluation.

Unit 1: Foundations in Evaluation

- 1.1 Concept of testing, measurement, assessment and evaluation
- 1.2 Difference between investigation, auditing, monitoring & evaluation
- 1.3 Principles of Evaluation
- 1.4 Areas of Evaluation

1.5 The evolution of the evaluation function; i) Measurement/ comparison, Transparency/ accountability, ii) Understanding/ learning/ decision making/ positive accountability

Unit 2: Scope of Evaluation

- 2.1 Problem-solving and decision-making
- 2.2 Positive accountability and excellence in education
- 2.3 Knowledge construction and capacity building of learners
- 2.4 Organizational learning and change, and strategic planning
- 2.5 Advocacy & communication

Unit 3: Teaching-learning and Evaluation

- 3.1 Evaluation of learning, for learning and in learning- Contexts, Need & Nature
- 3.2 Tools for evaluation and process of standardization
- 3.3 Equity & fairness in evaluation including adaptations & Accommodations
- 3.4 Report writing: Format, Content & Mechanics
- 3.5 Mastery Level Learning

Unit 4: Programme Evaluation & Review

- 4.1 Concept, need, goals and tools
- 4.2 Evaluation of instructional programmes
- 4.3 Techniques of programme evaluation
- 4.4 Reliability, validity and sensitivity in programme evaluation
- 4.5 Reviewing outcomes

Unit 5: Current Trends in Evaluation

5.1 Knowledge based evaluation

5.2 Performance Based Evaluation: Role play, Concept maps

5.3 Authentic Evaluation: Interviews, Writing samples, Projects, Exhibitions, Reflective Journals

5.4 Self evaluation: Rubrics & Rating scales

5.5 Exams: Online, On-demand, Take-home Power Tests & Open book

Transaction & Evaluation

• Lecture-cum-demonstration, Workshops on developing tools for content and programme evaluation

• Assignments, Presentations and Class Tests

Practicum

• Observe and prepare a report on evaluation practices at any two levels in (i) a Mainstream and (ii) a Special school. Critically analyze the evaluation practices.

• Develop a format for self evaluation for teachers in special or mainstream.

• Develop tools one each for Knowledge based, Performance based & Authentic evaluation for children with disabilities studying in a class or a subject of your choice.

Essential Readings

• Airasian, P.W. (1991). Classroom Assessment. Mc Graw-Hill, New York.

• American Educational Research Association, American Psychological Association, and National Council on Measurement and Education. (1999). Standards for educational and psychological testing. Washington, DC: American Educational Research Association.

• American Federation of Teachers, National Council on Measurement in Education, and the National Education Association. (1990). Standards for teacher competence in educational assessment of students. Washington, DC: Author.

• Gipps, (1996). Assessment for learning. In Little, A. and Wolf, A. (eds) Assessment in transition: Learning, monitoring and selection an international perspective. Oxford Pergamon Press, London.

• Gronlund, N.E., & Linn, R. (1990). Measurement and evaluation in teaching (6th Edition). Macmillan, New York.

• Hamayan, (1995). Approaches to alternative assessment. "Annual Review of Applied Linguistics," 15, 212-226.

• Headington (2003). Monitoring, Assessment, Recording, Reporting & Accountability. II-Ed, David Fulton Pub. , London.

• Hibbard, K. M. and others. (1996). A teacher's guide to performance-based learning and assessment. Alexandria, VA: Association for Supervision and Curriculum Development.

• Mathew, S. (2005). Evaluation: curricular strategies and adaptations for children with hearing impairment. Kanishka: New Delhi.

• Mathew, S. & Mishra, A. (2010). Knowledge based evaluation of students with hearing impairment. Journal of NCED, 2(1), 26-33.

• Mathew, S. (2010). Educational Evaluation .Curriculum and teaching strategies for CWHI. MED SEDE (HI) Manual, IGNOU, New Delhi.

• Mehrens, W. A., & Lehmann, I. J. (1991). Measurement and evaluation in psychology (IVED). Harcourt Brace College Publishers, New York.

• NSW syllabuses: Assessment for, as and of Learning. Retrieved from syllabus.bos.nsw.edu.au/support.../assessment-for-as-and-of-learning on 10.4.2015

•Programme evaluation and review technique. Retrieved from http://www.inc.com/encyclopedia/program-evaluation-and-review-techniquepert. html on 10.4.2015

•School self-evaluation. http://www.education.ie/en/Schools-Colleges/Services/Quality-Assurance/SSE-Primary-and-Post-Primary/School-Self-Evaluation.html on 10.4.2015

•School self-evaluation. Retrieved from <u>http://schoolself-evaluation.ie/postprimary/index.php/what-</u>school- selfevaluation/?doing_wp_cron=1429505616.9318289756774902343750 on 10.4.2015

•UNICEF (2006). New trends in development evaluation. Retrieved from http://www.unicef.org/ceecis/New_trends_Dev_EValuation.pdf on 16.4.2015

• Wiggins, G. (1993) Assessing studentsperformance.SanFrancisco:Jossey-Bass.

Suggested Readings

• Braden, J. (2001). The clinical assessment of deaf people's cognitive abilities. In clark, M. D.; Marschark, M., & Kretchmer, M.(Eds.). Context, cognition and deafness, Galludet University press, Washington. Pg.14-37.

• Elliot, S.N., Kratochwill, T. R., & Gilbertson, A. G. (1998). The Assessment Accommodation Checklist: Who, What, Where, When, Why and Who? Teaching Exceptional Children, 31(2), 10–14.

• Eriksen, S.C. (1969). The teacher made test. Memo to the Faculty, no.35. AnnArbor: Centre for Research on learning and teaching, University of Michigan.

• Fernandez, H. (2008). Knowledge based achievement of students with hearing impairment on different types of assessment. Unpublished Master Dissertation, University of Mumbai.

• Frechtling, J.A. (1991). Performance assessment: Moonstruck or the real thing? Educational Measurement: Issues and Practices, 10(4), 23-25.

• Jacob, L. C., Chase, C. N. (1992). Developing and using tests effectively: A guide for faculty. Josse-Bass Publishers, San Francisco.

• Junaid, I.M., & Muhammad, D. N. (2002). Assessing nomadic children's learning achievement: what tools and which strategies? Retrieved from curriculum.pgwc.gov.za/resource_files/22153409_16.doc

• Linn. R.L, Baker, E. L., & Dunbar, S. B. (1991). Complex Performance based assessment. Educational Researcher, 20(8), 15-21.

• Mathew, S. (2010). Impact of Knowledge Based Evaluation on Achievement of Students with Hearing Impairment: An Experimental Study. A PhD Thesis (Unpublished), MJP Rohilkhand University.

• Meyer, C.A. (1992) .What is the difference between Authentic and Performance assessment? Educational Leadership,49(8),39-40

• Mountain, A. (2005). Science assessment of deaf students: Considerations and implications of state accountability. Measurements. MSSE Masters Project. Submitted to the National Technical Institute for the Deaf, Rochester Institute of Technology, New York.

• Musselman, C.R., Lindsey. P. H., & Wilson A. K. (1988). An evaluation of recent trends in preschool programming for hearing impaired children. Journal of Speech and Hearing Disorders, 53, 71-88.

• Nair, P. (2005). A study of the effectiveness of individualized instructional material on mastery of mathematical concepts related to time in children with hearing impairment. Unpublished Master Dissertation, University of Mumbai.

• Stiggins, R.J. (1994). Student-Centered classroom assessment. MacMillan, New York

• Tannenbaum, J.E. (1996). Practical Ideas on Alternative Assessment for ESL Students. ERIC Clearinghouse on Languages and Linguistics Washington DC, ERIC Identifier ED395500, 1-6.

ADULTHOOD AND FAMILY ISSUES

Course Code: XIII Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

Parents are advocates, teachers, and nurturers for their children. Family members of any person with visual impairment are at a risk for emotional difficulties if their support systems or coping skills are inadequate. Learners must understand the challenges that are often associated with a family of a person with visual impairment from birth till adulthood focusing on periods of transition. Learners should be able to empower the parents with information regarding the array of educational services and supports available to the families of children with visual impairment.

Objectives

After completing the course teacher educators will be able to

- Analyze the role of family as a support system from birth to adulthood.
- Discuss the concerns of the family of a person with visual impairment.
- Meet the challenges faced at different stages of transition of a person with visual impairment.
- Develop the skills to prepare an ITP and IFSP.
- Develop a critical understanding of schemes for equal opportunities.

Unit 1: Role of Family in the Continuum of Support System

- 1.1 Adjustment and accommodation to the birth of a special child
- 1.2 Organization and family functioning
- 1.3 Family involvement in infancy and early childhood
- 1.4 Family involvement in school age
- 1.5 Family involvement in transition to adulthood

Unit 2: Transition Issues

- 2.1 Transition from home to school
- 2.2 Transition from school to college
- 2.3 Transition from education to work
- 2.4 Meaning and Definition of Individualized Transition Plan (ITP)
- 2.5 Role of family in developing ITP

Unit 3: Family Issues in Adulthood

- 3.1 Higher Education
- 3.2 Career Education
- 3.3 Life Skills Education
- 3.4 Marriage and home skill management
- 3.5 Rehabilitation of adventitious visually impaired

Unit 4: Planning Family Support Services

- 4.1 Concept and objectives of family support services
- 4.2 Components of family support services
- 4.3 Identifying family needs
- 4.4 Individualized Family Service Plan (IFSP) under PL 99-457
- 4.5 Preparing an IFSP in Indian context

Unit 5: Equal Opportunity Provisions: Schemes and Facilities

5.1 Schemes for education of children from pre-school to higher and tertiary education

5.2 Schemes and facilities for vocational training and skill development

5.3 Schemes and statutory provisions to promote employment, self-employment, and livelihoods

5.4 Concessions for persons with visual impairment

5.5 Concept and types of parent family partnerships

Course Work/ Practical/ Field Engagement (Any Two)

• The teacher trainees should develop an individualized transition plan for a given person with visual impairment

• The teacher trainees should develop an individualized family service plan for a family of a person with visual impairment

• The teacher trainees should critically examine any two schemes under equal opportunity schemes **Essential Readings**

• Bhandari, R., & Narayan, J. (2009).Creating learning opportunities: a step by step guide to teaching students with vision impairment and additional disabilities, including deafblindness. Voice and vision: India.

• Educational Concessions and Facilities for Blind Students. National Association for the Blind: Mumbai Foundation for the Blind.

• Kirk, S.A., Gallagher, J.J., & Anstasiow, N.J. (2000). Educating Exceptional Children. Houghton Mifflin Company: New York

• Lowenfeld, B. (1973).Visually Handicapped Child in School. American Foundation for the Blind. New York.

• Lowenfeld, B. (1975). The Changing Status of the Blind from Separation to Integration. Charles C. Thomas, Springfield.

• Narayan, J., & Riggio, M. (2005). Creating play environment for children Hilton/Perkins: USA.

• Patil, H.J. (2008). (5 Ed). Concession for the Blind. National Association for the Blind: Mumbai

• Shah, A. (2008). Basics in guidance and Counselling. Global Vision Publishing House, New Delhi.

• Smith, D. D. & Luckasson, R. (1995). Introduction to Special Education – Teaching in an age of Challenge. (2 Ed). Allyn & Bacon, Boston.

Suggested Readings

• Fernald, L.D. & Fernald, P.S. (2001). Introduction to Psychology (5th ed.). A.I.T.B.S Publishers, New Delhi.

• Morgan, C.T., King, R.A., Weisz, J.R., & Schopler, J. (2002). Introduction to Psychology. (7Ed.). Tata McGraw Hill Publishing, New Delhi.

• Kundu, C.L. (2000). Status of Disability in India 2000, RCI: New Delhi.

• Lowenfeld, B. (1971). Psychological problems of children with impaired vision, Prentice-Hall, New Jersey.

• Furlong, M.J., Gilman, R. & Huebner, E.S. (2014). Handbook of Positive Psychology in Schools. Routledge, New York.

• Hilgard, E.R., Atkinson, R.C. & Atkinson, R. L. (1975). Introduction to Psychology (6th ed.) Oxford, New Delhi.
EDUCATIONAL MANAGEMENT

Course Code: XIV A Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Introduction

Educational management is a field of study and practice concerned with the operation of educational organizations. The field draws links from diverse disciplines such as economics, general management & Information technology. The course content included in the present program hence includes inputs from varied disciplines and is envisaged to equip the learners to understand the know- how's of managing educational institutes on the basis of total quality management principles.

Objectives

After completing the course teacher educators will be able to

- Explain the basic fundamental areas of management.
- Describe the skills required for enhancing institutional quality for sustained development.
- Enumerate the skills required for capacity building of human resources.

• Explain the skills needed to manage data for various information management processes.

• Prepare cost effective budgets, proposals and describe ways of managing financial resources.

Unit 1: Foundations in Educational Management

1.1 Definition & Concept: Management as an art, science, organization, person & a discipline

1.2 Approaches to management; a) Classical approach, b) Human relation approach, c) Systems approach, d) Contingency approach

- 1.3 Principles & processes of management
- 1.4 Styles of management; autocratic, laissez-faire, transactional, contingency

1.5 Leader vs. Manager; role competencies

Unit 2: Total Quality Management in Education

- 2.1 Concept of Quality and issues in Quality management of educational institutes
- 2.2 Educational applications
- 2.3 Assessment of educational institutions
- 2.4 Strategic planning & Sustainable development
- 2.5 Implementing TQM

Unit 3: Human Resource Management

- 3.1 Manpower planning, talent acquisition & management
- 3.2 Employee benefits, welfare & Performance appraisals systems- 360 degree approach
- 3.3 Training, development & capacity building
- 3.4 Organisational behaviour; climate & culture
- 3.5 Individual & group dynamics, conflict management & negotiations

Unit 4: Educational Management Information Systems (EMIS)

- 4.1 Need, relevance and National agencies for EMIS
- 4.2 Internal & external stakeholders of EMIS
- 4.3 Tools & process for collecting and disseminating data & using information
- 4.4 Constituting indicators & data monitoring plans
- 4.5 Dissemination, distribution & publication of data

Unit 5: Financial Management

5.1 Need &Importance of financial management in educational institutes

- 5.2 Basic concepts in accounting
- 5.3 Importance & types of budgeting
- 5.4 Resource mobilisation& allocation
- 5.5 Proposal writing for funding in educational institutes

Transaction

Lectures, Field visits, Self-study

Course Work/ Field Work

• Proposal writing for fund raising of an educational institution

• Review performance appraisals from 2 educational institutions one each from a teacher training college and other from special school

Suggested Readings

• Bhardwaj, K. S., (2014). Human Resource Development in Education. Partridge Publication, Gurgaon.

• Bush, T., & Paul, L. S. (2006). Principles and Practice of Educational Management Chapman A Sage Publications Company, London.

- Chatterjee, B. K. (2011). Finance for Non Finance Managers. Jaico Publishing House, New Delhi.
- Deshmukh, A.V., & Naik. A. P. (2010). Educational Management. Himalaya Publishing House Pvt. Ltd., Mumbai.
- Dessler, G. (2012). Human Resource Management. Prentice Hall, London.
- Dimmock, C. (2012). Leadership in Education: Concept, Themes and Impact. Routledge, New York.

• Leithwood, K., & Jantzi, D. (1999). Changing Leadership for Changing Times. Open University Press, London.

- Lewls, T. (2012). Financial Management Essentials: A Handbook for NGOs.
- Mathis, R. L., & Jackson, J. H. (2010). Human resource management (13th ed.).

• Mukhopadhya, M. (2011). Total Quality Management in Education. Sage publications India Pvt. Ltd. New Delhi.

• Nkomo, S. M., Fottler, M. D., & McAfee, R. B. (2010). Human resource management applications: Cases, exercises, and skill builders (7th ed.).

• Pande, S., & Basak, S. (2012). Human Resource Management. Text and Cases. Amazon Digital South Asia Services, Inc.

• Rayner, S. (2007). Managing Special and Inclusive Education. Sage Publications Ltd. London.

• Senge, P. (2007). A Fifth discipline Resource. Schools that lead: Nicholas Brealey Publishing, London.

• Senge, P.M. (1994). The fifth Discipline; The Art & Practice of The Learning Organization. Currency Doubleday, New York.

• Shapi, J. (N.K). Writing a Funding Proposal.

• Ulrich, D., & Brockbank, W. (2005). The HR Value Proposition. Boston: Harvard Business School Press. (ISBN-13: 978-1591397076 or ISBN-10: 1591397073).

EDUCATIONAL TECHNOLOGY

Course Code: XIV B **Time of Examination: 3 Hours**

Credits: 04 **Marks: 100 Extranal-80; Internal-20**

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks.

Objectives

After completing the course teacher educators will be able to

- Discuss roles of Educational Technologists in various contexts.
- Apply appropriate instructional strategies.
- Develop appropriate instructional media.
- Integrate suitable ICT effectively in teaching-learning-evaluation.
- Suggest suitable modality of instruction (Online, Blended, etc.).

Unit 1: Educational Technology

- 1.1 Concept, Definition and Scope of Educational Technology
- 1.2 Need and Role of Educational Technologists in India
- 1.3 Growth of conceptual framework of Educational Technology: ET1, ET2, ET3 ...
- 1.4 Systems Approach; Meaning, Scope and Components
- **1.5 Communication Process**
- 1.5.1 Meaning and components
- 1.5.2 Models of communication: Simple, Osgood and Schramm, Gerbner's mode
- 1.5.3 Interaction analysis: Equivalent Category System and Flander's Interaction Analysis System

Unit 2: Instructional Technology

2.1 Concept and Definition of Instructional Technology

- 2.2 Theories and Models of ISD: Dick & Carrey, Gagne, Kirk and Guftason
- 2.3 Steps in developing Instructional design :Learner analysis, Content analysis, Deciding entry and terminal behaviour, Preparing test, Selection of method, Selection of media, Development of material, Tryout, Formative and summative evaluation
- 2.4 Methods & Models Instructional designs for Large Group and Individual Instructions

2.5 Co-operative and Individual Learning Strategies for children with disabilities

Unit 3: Instructional and Interactive Learning

- 3.1 Interactive learning: concept, need and components
- 3.2 Instructional Media for children with Special needs
- 3.3 Interactive learning Material for children with disabilities
- 3.4 Development of Interactive learning Material

3.5 Integrating ICTs for children with special needs (e.g. Social Media, Collaborative tools and techniques such as Blogging, ICT tools for research, bibliography, etc)

Unit 4: ICT For Inclusion

- 4.1 ICT for 21st century learning
- 4.2 Dilemmas and Realities about applications in ICT in inclusive education

4.3 Potentials of ICT in inclusive education-Access, equity, participation, Skill development and lifelong learning

- 4.4 ICT for teaching-learning
- 4.5 Role of ICT in curriculum transaction

Unit 5: Recent Trends in Technology

5.1 Online Learning

5.2 Blended Learning

5.3 M-Learning

5.4 MOOC

5.5 OER

Course Work/ Practical/ Field Engagement

• Prepare an observation report of classroom teaching based on Flanders Interaction analysis

• Prepare and plan an edcational display on a bulletin board using charts, diagrams, graphs, posters, cartoons and comics

- Prepare a story board in any one unit of a subject for a child with disability
- Present a research paper on appilcation of any one recent trend in inclusive education
- Seminar on issues in application of ICT in inclusive education

Suggested Readings

• Bhatt, B. D., & Sharma, S. R. (2003). Educational Technology concept and Technique (Modern Education Series). Kanishka Publisher, New Delhi.

• Diana, L. O. (2001). Multimedia – Based Instructional Design: Computer – Based Training. Jossey – Bass

• Horton, W. (2001). Designing web-based Training. John Wiley & Sons. New Jersey.

• Kumar, K., Kumar, S. (2004). ICT Skill Development. GBD Publications, Gurusar Sadhar.

• Mukhopadhyay, M (1990). Educational Technology Challenging Issues. Sterlings Publisher's Pvt. Ltd. New Delhi.

• Rosenberg, M.J. (2001). E-Learning. McGraw Hill, New York.

- Sallis, E., & Jones, G. (2002). Knowledge Management in Education London: Kogan Page Ltd.
- Santhosh, V. (2009). Information communications technology for teacher education. Kanishka Publisher, New Delhi.
- Schank, R.C. (2001). Virtual Learning. McGraw Hill. London.
- Shehzad, A. (2007). Teacher's Handbook of Educational Technology. Anmol, Pubishing Pvt. Ltd., New Delhi.
- Singh, T. (2009). ICT Skill Development. Tandon Brothers, Ludhiana.
- Venkataiah, N. (2002), Educational Technology. APH Publication Corporation, New Delhi.

GUIDANCE AND COUNSELLING

Course Code: XIV C Time of Examination: 3 Hours

Credits: 04 Marks: 100 Extranal-80; Internal-20

NOTE: Paper setter will set 10 questions in all i.e. two from each unit. The students will be required to attempt five questions, selecting one from each unit. All questions carry equal marks. **Objectives**

After completing the course teacher educators will be able to

- State the basic concepts in Guidance & Counselling.
- Discuss Educational, Vocational and Personal Guidance.
- Describe testing devices and non-testing techniques of guidance.
- Analyze the problems faced by students in the contemporary world.
- Discuss the problems faced by children with disabilities.

Unit 1: Education and Career Guidance

- 1.1 Concept, principles, Objectives and need for guidance at various educational levels
- 1.2 Types of Guidance: Individual and group, Personal, Educational and Vocational
- 1.3 Career Development needs of students. Changing scenarios in a global world
- 1.4 Tests and Techniques for Guidance: Testing techniques (Aptitude, Interest, Achievement & Personality) Non-testing techniques (Interview, Case study, observation, Diary, anecdotal and commutative record)
- 1.5 Essential services in a school guidance program

Unit 2: Vocational Guidance

- 2.1 Factors influencing choice of career
- 2.2 Theories: Vocational Choice, Vocational development and Career development theories
- 2.3 Assessment of Vocational maturity
- 2.4 Occupational information in Guidance
- 2.5 Guidance for students with disabilities.

Unit 3: Fundamentals of Counselling

- 3.1 Concept and nature of counselling
- 3.2 Scope and objectives of counselling
- 3.3 Stages of the counselling process
- 3.4 Counselling techniques
- 3.5 Ethical principles and issues

Unit 4: Group approaches in Vocational Counselling and Guidance

- 4.1 Types, areas and approaches of Counselling
- 4.2 Steps and skills in the counselling process
- 4.3 Advantages and Disadvantages of Group Guidance techniques
- 4.4 Essential services in school and community based guidance programs

4.5 Placement, research, evaluation services and Job study- i) Job description, ii) Job specification, iii) Job analysis, iv) Job satisfaction

Unit 5: Assessment in Educational and Vocational Guidance and Counselling

- 5.1 Assessment of underachievement and challenges
- 5.2 Assessment of giftedness and special strengths
- 5.3 Career test construction, administration, scoring and interpretation
- 5.4 Crisis Intervention; Grief, relationships, depression, Academic, stress, violence, abuse
- 5.5 Role of counsellor in the contemporary context

Course Work/ Practical/ Field Engagement

- Visit different Guidance Centres and write a report
- Review a film for counselling
- List the resources required and their optimum use in managing a school guidance programme
- Develop a career choice assessment tool in view of personal characteristics of any
- · Child with disabilities and available opportunities
- Prepare a brochure on career opportunities for children with different disabilities

Essential Readings

- Naik, P.S. (2013). Counselling Skills for Educationists. Soujanya Books, New Delhi.
- Nayak, A.K. (1997). Guidance and Counselling. APH Publishing, Delhi.
- Rao, V. K., & Reddy, R.S. (2003). Academic Environment: Advice, Counsel and Activities. Soujanya Books, New Delhi.
- Shah, A. (2008). Basics in Guidance and Counselling. Global Vision Publishing House.

• Sharma, V.K. (2005). Education and Training of Educational and Vocational Guidance. Soujanya Books, New Delhi.

Suggested Readings

• Kapunan, R.R. (2004). Fundamentals of Guidance and Counselling. Rex Printing Company, Phillipines.

• Pal, O.B. (2011). Educational and Vocational Guidance and Counselling. Soujanya Books, New Delhi.

DISSERTATION Total Credits: 2

COURSE: XV

Marks: 50(Internal)

Synopsis will be compulsory for all regular students. The students will work under the guidance of a supervisor to be allotted by the HOD of the Department of Education.

Synopsis Submission

The students have to develop the Research proposal (Synopsis) and present the same in the Faculty Seminar at the end of the semester.

NOTE: Synopsis and Presentation will be evaluated by Departmental Research committee (DRC)

FIELD ENGAGEMENT / INTERNSHIP AS A TEACHER EDUCATOR Credits: 04

Course: XVI

Marks: 100 Internal: 20; External:80

One Month Internship

• Internship 15 days in B.ED special education (VI). During this period the students will teach two lectures on core papers, 4 lectures in specialization papers and 2 lectures each in 2 pedagogy papers. (50 Marks)

• Plan and demonstrate co-operative teaching strategy 7 lessons in inclusive School. -- (50 Marks)

• Submit a comprehensive report on challenges faced during internship and strategies followed to address them.

SEMESTER IV

COURSE: XVII

DISSERTATION Total Credits: 14

Marks: 350

Internal: 150 External: 200 (Dissertation:150+ viva-voce:50)

Dissertation will be compulsory for all regular students. The students will work under the guidance of a supervisor to be allotted by the HOD of the Department.

- Review of Literature and Development of Tools: The student have to conduct review of literature and develop relevant tools for their research projects. Students have to present a seminar on collected review of literature and tools developed in the faculty seminar and seek feedback and incorporate suggestions given by the faculty.
- > Data collection: Students must complete data collection and data analysis.
- Data analysis, Results Discussion and Thesis Submission: Students must complete Data analysis, Results and Discussion and report writing and submit the final report at the end of the semester. The students have to submit three typed copies of Dissertation to the Department by the end of IV Semester. The viva-voce will be held on a date to be fixed by the University. Dissertation will be evaluated & viva-voce conducted by an External examiner.

NOTE: Synopsis is completed in semester III.

Field Engagement/ Internship as a Teacher Trainer

Course: XVIII

Credits: 04

Marks: 100 Internal:20; External:80

Field engagement

Prepare community participatory programme (workshops for awareness programmes for public using multimedia/charts/street plays etc.)
 -- (50 Marks)
 -- (25 Marks)

• Guide and observe B.Ed. trainees in their practice lessons (at least 5 lessons) – (25 Marks @5)

OR

Work out a critical study of the teachers' training institute on quality management, resources, time table, etc. -(25 Marks)

• Prepare a Report

Rectified Scheme

(March 2018) w.e.f. 2016-17

SEMESER-IV

PAPER INTERNAL	NOMENCLATURE	EXTERNAL					
CODE	(Compulsory)						
MABE 401	TIME SERIES AND BUSINESS FORECASTING	60 (Theory)	(Practical 20, Internal 20)				
MABE 402	INDIA IN THE CONTEMPORARY WORLD ECONOMY	80	20				
MABE 403	ECONOMICS OF GROWTH AND DEVELOPMENT	80	20				
MABE 404	COMPREHENSIVE VIVA VOCE	50					
CHOOSE ANY ONE OF THE FOLLOWING GROUPS							
GROUP-I	ECONOMICS OF MARKETING						
MABE 411	MARKETING OF SERVICES	80	20				
MABE 412	INTEGRATED PROMOTIONAL MANAGEMENT	80	20				
GROUP-II	ECONOMICS OF FINANCE						
MABE 421	FINANCIAL DERIVATIVES AND RISK	80	20				
MABE 422	FINANCIAL INSTITUTIONS AND MARKETS	80	20				
GROUP-III	ECONOMICS OF HUMAN RESOURCES						
MABE 431	CROSS CULTURAL AND GLOBAL HRD	80	20				
MABE 432	ORGANISATIONAL CHANGE AND DEVELOPMENT	80	20				
GROUP-IV	ECONOMICS OF AGRICULTURE AND RESOURCES						
MABE 441	AGRIBUSINESS MANAGEMENT	80	20				
MABE 442	AGRICULTURAL TRADE AND POLICY	80	20				
GROUP-V	ECONOMICS OF TAXATION						
MABE 451	DIRECT TAXES-II	80	20				
MABE 452	CORPORATE TAX PLANNING	80	20				
	TOTAL		550				

Department of Political Science Kurukshetra University Kurukshetra

Syllabus of M.A. Political Science (Choice Based Credit System) w.e.f.2016-2017

Time	:	03 Hours				
Maximum Marks	:	100 Marks				
Theory	:	80 Marks				
Internal Assessment	:	20 Marks, Division of Marks as given below:-				
		One Test/ Seminar: 5 One Class Test:25%	0% (For Each Paper) (One Period Duration)			
		Attendance: 25%, Ma	arks of attendance will be given as	under:-		
	*	91 % onwards	: 05 Marks			
	*	81% to 90%	: 04 Marks			
	*	75% to 80%	: 03 Marks			
	*	70 % to 74%	02 Marks			
	*	65 % to 69%	01 Marks			
	*	For students engaged	in co-curricular activities of the	Universi		

* For students engaged in co-curricular activities of the University only/ authenticated medical grounds duly approved by the concerned Chairperson.

Scheme of Examination for M.A. Political Science

The M.A. Examination in Political Science has been divided into four Semesters spread over two years. Every student has to pass 84 Credits (48 Compulsory + 32 Optional) Credits and 4 Credits - 2 in Semester-II and 2 in Semester-III from Optional Elective Paper from Other Department) out of 168 Credits as necessary to earn the degree under the new scheme i.e. Choice Based Credit System.

In each semester, 20 (Compulsory + Optional) Credits shall be offered to the students. In addition to this One Optional Elective Paper from Other Department of 2 Credits each in Semester-II & III are required to earn the Master Degree in Political Science. However, the choice of Optional Credits is subjected to the availability of teaching faculty in the Department. The semester-wise details of the paper scheme are as follows:-

Course No.	Name of the Subject/Paper	No. of	f Teaching Scheme			Examination Scheme		
		Credit	т	(Hrs/week)		(Sem	(Mark	S) Tatal
			L	1	Р	Theory	Assess-	Total
						Exam)	ment	
M.A. (Previous) Sem	nester-I Political Science	n			-			
POL(C) - 01	Western Political Thought	4	4	1/2 hrs/G	-	80	20	100
POL(C) - 02	Indian Government and Politics-I	4	4	1/2 hrs/G	-	80	20	100
POL(C) - 03	International Relations-Theory	4	4	1/2 hrs/G	-	80	20	100
POL(C) - 04	Public Administration-I	4	4	1/2 hrs/G	-	80	20	100
One paper to be chose	en from any of the following (the correspondi	ng optior	n has	to be taken	in Se	mester-II)	
POL(E) - 05-i	Research Methodology-I	4	4	1/2 hrs/G	-	80	20	100
POL(E) - 05-ii	Political Geography	4	4	1/2 hrs/G	-	80	20	100
POL(E) - 05-iii	Political Leadership-Special Reference	4	4	1/2 hrs/G	-	80	20	100
	to Nation Building Process							
M.A. (Previous) Sem	nester-II Political Science							
POL(C) - 06	Indian Political Thought	4	4	1/2 hrs/G	-	80	20	100
POL(C) - 07	Indian Government and Politics-II	4	4	1/2 hrs/G	-	80	20	100
POL(C) - 08	International Relations-Issues	4	4	1/2 hrs/G	-	80	20	100
POL(C) - 09	Public Administration-II	4	4	1/2 hrs/G	-	80	20	100
One paper to be chose	en from any of the following (from the corres	ponding of	option	ı was taken	in Se	emester-I)	
POL(E) - 10-i	Research Methodology-II	4	4	1/2 hrs/G	-	80	20	100
POL(E) - 10-ii	Geo-Politics and World Affairs	4	4	¹ / ₂ hrs/G	-	80	20	100
POL(E) - 10-iii	Media and Politics	4	4	¹ / ₂ hrs/G	-	80	20	100
	Candidate is required to take one							
	option elective, other than Political							
OESS	Sciences, from the Common lists of	2	2	-	-	-	-	50
	Papers of Social Sciences (Syllabus							
	enclosed in the end)							
M.A. (Final) Semest	ter-III Political Science		1					
POL(C) - 11	Political Theory-I	4	4	¹ / ₂ hrs/G	-	80	20	100
POL(C) - 12	Comparative Politics-I	4	4	¹ / ₂ hrs/G	-	80	20	100
Paper-13, 14 & 15	, Candidate has to choose any one grou	p from t	he fo	ollowing G	rou	os :		
Group A : Paper 13	3. 14 & 15	-		0				
POL(E) –(Gr-A)-	India's Foreign Policy & Relations-I	4	4	¹ / ₂ hrs/G	-	80	20	100
13-i								
POL(E) –(Gr-A)-	International Law-I	4	4	1/2 hrs/G	-	80	20	100
14-ii								
POL(E) –(Gr-A)-	International Organization and Global	4	4	1⁄2 hrs/G	-	80	20	100
15-iii	Order Studies-I							
Group B : Paper 13	8, 14 & 15							
POL(E) –(Gr-B)-	Political Sociology : The Indian	4	4	1/2 hrs/G	-	80	20	100
13-i	Context-I							
POL(E) –(Gr-B)-	State Politics in India (with special	4	4	1/2 hrs/G	-	80	20	100
14-ii	reference to Haryana)-I							
POL(E) –(Gr-B)-	Democracy in India-I	4	4	1/2 hrs/G	-	80	20	100
15-iii								
Group C : Paper 13	9, 14 & 15	I	1	[
POL(E) –(Gr-C)-	Government & Politics of USA-I	4	4	1/2 hrs/G	-	80	20	100
13-i		4	4	1/ 4		00	20	100
POL(E) –(Gr-C)-	USA and the World-I	4	4	¹ ∕2 hrs/G	-	80	20	100
T-4-11								

POL(E) – (Gr-C)- 15-iii	USA and South Asia	4	4	1/2 hrs/G	-	80	20	100	
Group D : Paper 13, 14 & 15									
POL(E) –(Gr-D)- 13-i	Ancient Indian Political Thought-I	4	4	1/2 hrs/G	-	80	20	100	
POL(E) –(Gr-D)- 14-ii	Modern Indian Political Thought-I	4	4	1⁄2 hrs/G	-	80	20	100	
POL(E) –(Gr-D)- 15-iii	Liberal Political Theory	4	4	1/2 hrs/G	-	80	20	100	
OESS	Candidate is required to take one option elective, other than Political Sciences, from the Common lists of Papers of Social Sciences of the same subject as taken in Semester-II (Syllabus enclosed in the end)	2	2	-	-	-	-	50	
M.A. (Final) Semest	ter-IV Political Science							100	
POL(C) - 16	Political Theory-II	4	4	1/2 hrs/G	-	80	20	100	
POL(C) - 17	Comparative Politics-II	4	4	1⁄2 hrs/G	-	80	20	100	
Paper-18, 19 & 20,	Candidate has to choose any one group fr	om the f	ollov	ving Group	os :				
Group A : Paper 18	3, 19 & 20	r							
POL(E) –(Gr-A)- 18-i	India's Foreign Policy & Relations-II	4	4	1⁄2 hrs/G	-	80	20	100	
POL(E) –(Gr-A)- 19-ii	International Law-II	4	4	¹∕2 hrs/G	-	80	20	100	
POL(E) –(Gr-A)- 20-iii	International Organization and Global Order Studies-II	4	4	¹∕2 hrs/G	-	80	20	100	
Group B : Paper 18	. 19 & 20								
POL(E) – (Gr-B)- 18-i	Political Sociology : The Indian Context-II	4	4	1/2 hrs/G	-	80	20	100	
POL(E) –(Gr-B)- 19-ii	State Politics in India (with special reference to Haryana)–II	4	4	1/2 hrs/G	-	80	20	100	
POL(E) –(Gr-B)- 20-iii	Democracy in India-II	4	4	1⁄2 hrs/G	-	80	20	100	
Group C : Paper 18	, 19 & 20								
POL(E) – (Gr-C)- 18-i	Government & Politics of USA-II	4	4	1/2 hrs/G	-	80	20	100	
POL(E) – (Gr-C)- 19-ii	USA and the World-II	4	4	1⁄2 hrs/G	-	80	20	100	
POL(E) – (Gr-C)- 20-iii	USA and Asia Pecific	4	4	1/2 hrs/G	-	80	20	100	
Group D : Paper 18	3, 19 & 20								
POL(E) – (Gr-D)- 18-i	Ancient Indian Political Thought-II	4	4	1⁄2 hrs/G	-	80	20	100	
POL(E) –(Gr-D)- 19-ii	Modern Indian Political Thought-II	4	4	1/2 hrs/G	-	80	20	100	
POL(E) – (Gr-D)- 20-iii	Recent Trends in Liberalism	4	4	1⁄2 hrs/G	-	80	20	100	

Department of Political Science Kurukshetra University Kurukshetra

Syllabus of M.A. Defence and Strategic Studies (Choice Based Credit System) w.e.f. 2016-2017

Time	:	03 Hour					
Maximum Marks	:	100 Marks					
Theory	:	80 Marks					
Internal Assessment	:	20 Marks, Division of Marks as given below:-					
		One Test/ Seminar: 50% (For Each Paper) One Class Test:25% (One Period Duration)					
		Attendance: 25%, M under:-	larks of	attendance will be given as			
	*	91 % onwards	:	05 Marks			
	*	81% to 90%	:	04 Marks			
	*	75% to 80%	:	03 Marks			
	*	70 % to 74%		02 Marks			
	*	65 % to 69%		01 Marks			

* For students engaged in co-curricular activities of the University only/ authenticated medical grounds duly approved by the concerned Chairperson.

Scheme of Examination for M.A. Defence & Strategic Studies

The M.A. Examination in Defence & Strategic Studies has been divided into four Semesters spread over two years. Every student has to pass 84 Credits (80 Compulsory and 2 in Semester-III and 2 in Semester-III from Optional Elective Paper from Other Department) to earn the degree under the new scheme i.e. Choice Based Credit System.

In each semester, 20 Compulsory Credits shall be offered to the students. In addition to this One Optional Elective Paper from Other Department of 2 Credits each in Semester-II & III are required to earn the Master Degree in Defence & Strategic Studies. However, the choice of Optional Credits is subjected 10(51) to the availability of teaching faculty in the Department. The semester-wise details of

the paper-scheme are as follow:-

Course No.	Name of the Subject/Paper No. of Teaching		aching Sche	eme	Examination Scheme			
		Credit (Hrs/Week)		(Mark	(s)			
			L	Т	Р	(Sem. Theory	Internal Assess-	Total
M A (Previous) Semester-I Defence & Strategic Studies					Exam)	ment	
DSS(C) - 01	Fyolution of Strategic Thought-I	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 02	National Security: Conceptual	4	4	$\frac{1}{2} hrs/G$	-	80	20	100
222(0) 02	Aspects			/2 11 5/0		00		100
DSS(C) - 03	International Relations-I	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 04	Theory and Practice of War-I	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 05	Research Methodology-I	4	4	1/2 hrs/G	-	80	20	100
M.A. (Previous) Semester-II Defence & Strategic Studies							
DSS(C) - 06	Evolution of Strategic Thought-II	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 07	National Security: Indian Context	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 08	International Relations-II	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 09	Theory and Practice of War-II	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 10	Research Methodology-II	4	4	1/2 hrs/G	-	80	20	100
	Candidate is required to take one							
	option elective, other than Defence							
	& Strategic Studies, from the							
OESS	Common lists of Papers of Social	2	2	-	-	-	-	50
	Sciences (Syllabus enclosed in the							
	end)							
M.A. (Final) S	emester-III Defence & Strategic Studies		1					
DSS(C) - 11	Defence Economics-I	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 12	Psychological Dimensions of War	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 13	Area Studies- Pakistan	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 14	Science & Technology in Relation	4	4	1/2 hrs/G	-	80	20	100
	to Warfare-I							
DSS(C) - 15	International Law –I	4	4	1/2 hrs/G	-	80	20	100
	Candidate is required to take one							
	option elective, other than Defence							
	& Strategic Studies, from the							
OESS	Common lists of Papers of Social	2	2	-	-	-	-	50
	Sciences of the same subject as							
	taken in Semester-II (Syllabus							
	enclosed in the end)							
M.A. (Final) S	emester-IV Defence & Strategic Studies		1					
DSS(C) - 16	Defence Economics-II	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 17	Sociological Dimensions of War	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 18	Area Studies-China	4	4	1/2 hrs/G	-	80	20	100
DSS(C) - 19	Science & Technology in Relation	4	4	1/2 hrs/G	-	80	20	100
	to Warfare-II							
DSS(C) - 20	International Law –II	4	4	1/2 hrs/G	-	80	20	100

Rectified Scheme of Examinations w.e.f. the session 2016-17.

Existing	Amended						
Group-I Human Resource Management,	Group-I Human Resource Management,						
Industrial Relations and Labour Welfare	Industrial Relations and Labour Welfare						
Paper Code – MSW(E)305 Human Resource	Paper Code – MSW(E)305 Human Resource						
Management and Industrial Relations- I	Management and Industrial Relations- I						
Paper Code – MSW(E)306 Labour Welfare and Labour Legislations- I	Paper Code – MSW(E)306 Labour Welfare and Labour Legislations- I						
Group-II Family and Child welfare.	Group-II Family and Child welfare.						
Paper Code – MSW(E)305 Family Dynamics :	Paper Code – MSW(E)307 Family Dynamics :						
Issues & Needs-I	Issues & Needs-I						
Paper Code - MSW(E)306 Developmental	Paper Code - MSW (E)308 Developmental						
Services for Women and Children-I	Services for Women and Children-I						
Group-III Medical and Psychiatric Social Work	Group-III Medical and Psychiatric Social Work						
Paper Code – MSW(E)305 Policy and	Paper Code – MSW(E)309 Policy and						
Development of Health Care-I	Development of Health Care-I						
Paper Code – MSW(E)306 Psycho-social	Paper Code – MSW(E)310 Psycho-social						
Perspectives on Mental Health-I	Perspectives on Mental Health-I						
Group-IV Community Development	Group-IV Community Development						
Paper Code – MSW(E)305 Rural Community	Paper Code – MSW(E)311 Rural Community						
Development: Policies and Programmes-I	Development: Policies and Programmes-I						
Paper Code – MSW(E)306 Urban Community	Paper Code – MSW(E)312 Urban Community						
Development: Policies and Programmes-I	Development: Policies and Programmes-I						
Group-V Criminology and Correctional	Group-V Criminology and Correctional						
Administration	Administration						
Paper Code – MSW(E)305 Crime and Criminal Justice-I	Paper Code – MSW(E)313 Crime and Criminal Justice-I						
Paper Code – MSW(E)306 Institutional Services & Rehabilitation of Criminals-I	Paper Code – MSW(E)314 Institutional Services & Rehabilitation of Criminals-I						
Paper Code – MSW (C) 307 Field Work	Paper Code – MSW(C)315 Field Work						
Practicum	Practicum						

Master of Social Work (MSW) 3rd Semester

Master of Social Work (MSW) 4th Semester

Existing	Amended
Group-I Human Resource Management,	Group-I Human Resource Management,
Industrial Relations and Labour Welfare	Industrial Relations and Labour Welfare
Paper Code – MSW(E)405 Human	Paper Code – MSW(E)405 Human
Resource Management and Industrial	Resource Management and Industrial
Relations- II	Relations- II
Paper Code – MSW(E)406 Labour	Paper Code – MSW(E)406 Labour
Welfare and Labour legislations- II	Welfare and Labour legislations- II
Group-II Family and Child welfare.	Group-II Family and Child welfare.
Paper Code – MSW(E)405 Family	Paper Code – MSW(E)407 Family
Dynamics : Issues & Needs-II	Dynamics : Issues & Needs-II
Paper Code - MSW(E)406 Developmental	Paper Code - MSW(E)408 Developmental
Services for Women and Children-II	Services for Women and Children-II
Group-III Medical and Psychiatric Social	Group-III Medical and Psychiatric Social
Work	Work
Paper Code – MSW(E)405 Policy and	Paper Code – MSW(E)409 Policy and
Development of Health Care-II	Development of Health Care-II
Paper Code – MSW(E)406 Psycho-social	Paper Code – MSW(E)410 Psycho-social
Perspectives on Mental Health-II	Perspectives on Mental Health-II
Group-IV Community Development	Group-IV Community Development
Paper Code– MSW(E)405 Rural	Paper Code– MSW(E)411 Rural
Community Development: Policies and	Community Development: Policies and
Programmes-II	Programmes-II
Paper Code – MSW(E)406 Urban	Paper Code – MSW(E)412 Urban
Community Development: Policies and	Community Development: Policies and
Programmes-II	Programmes-II
Group-V Criminology and Correctional Administration	Group-V Criminology and Correctional Administration
Paper Code – MSW(E)405 Crime and	Paper Code – MSW(E)413 Crime and
Criminal Justice-II	Criminal Justice-II
Paper Code – MSW(E)406 Institutional	Paper Code – MSW(E)414 Institutional
Services & Rehabilitation of Criminals-II	Services & Rehabilitation of Criminals-II
Paper Code – MSW(C)407 Field Work	Paper Code – MSW(C)415 Field Work
Practicum	Practicum

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KURUKSHETRA UNIVERSITY KURUKSHETRA

Proposed Draft Syllabi w.e.f session 2019-20

Course: Bachelor of Science (B.Sc.) Subject: Electronics Examination Scheme

B.Sc Electronics Course Study Cum Examination Scheme Sem III & IV

Sem	Paper Code	Nomenclature Of Paper	Internal Assessment	Max. Marks	Total Marks	Pass Marks	Exam Duration	Work load	Exam System
	Code	orruper	7 1550 55110110	WHAT K 5	WHAT K 5	Marks	Duration	loud	bystem
III	Paper-	Op-amp and Linear	10	40	50	18	3 Hrs	3	
	1	Integrated Circuits						periods	C
	Dopor	Digital	10	40	50	10	2 Ura	/week	Sem
	Paper-	Electronics-II	10	40	30	10	5 118	5 periods	
	_							/week	
IV	Paper-	Oscillators and	10	40	50	18	3 Hrs	3	
	1	Multivibrators						periods	
	_			1.0		1.0		/week	
	Paper-	Advance Digital	10	40	50	18	3 Hrs	3	
	2	Electronics						periods	Sem
								/week	
Common	Paper-	ELECTRONICS	-	100	100	35	3+3 Hrs	6	
for	3							periods	Annual
Sem III &								/week	
Sem IV									

- 1. Practicals classes to be conducted during odd as well as even semester.
- 2. The Practical examination will be held at the end of even semester in two sittings of three hours each with First sitting starting in the evening session of the first day and second sitting in the following morning session.
- 3. A candidate is required to perform minimum of 6 experiments in each section out of the list provided during course of study in odd and even semester in corresponding session and is required to perform one experiment from each section in examination. Experiment from one section in First Sitting and experiment from other section in Second Sitting.
- 4. Distribution of Marks :
 - I. Paper III 100 Marks of 3+3 Hours duration
 - II. Lab Record: 20
 - III. Experiments: 20 + 20
 - IV. Viva/Voce : 20+20
- 5. Maximum 10 students in one group during course of study and also in Examination.

KURUKSHETRA UNIVERSITY KURUKSHETRA Semester-III Course: B.Sc Subject: Electronics Paper: I (Theory) Nomenclature: - Op-amp and Linear Integrated Circuits Max. Marks: 40+10*

Time: 3hrs.

<u>Unit-I</u>

Operational Amplifier- I:

Double ended differential Amplifier, differential gain, Common-mode gain, CMRR, ideal operational amplifier, Basic Concept of Feedback in Op amp, Inverting & non-inverting configuration, Summing amplifier, Difference amplifier.

<u>Unit-II</u>

Operational Amplifier- II:

Error sources in OP-Amp: Offset Voltages, input bias Current, input offset current, scalar multiplier, Division and Multiplication, effect of error sources on inverting, non-inverting configuration, integrating circuit, differentiating circuit, 1st order active filter using op-amp: LPF, HPF, Band Pass Filter.

I.C. Fabrication Technology:

Basics of Integrated Circuit Technology, Monolithic fabrication technique, Different Fabrication Processes: Crystal growth, , epitaxial growth, Oxidation, Masking and Etching, Diffusion of Impurities, Metallization, Transistors for Monolithic Circuits (NPN & PNP), Monolithic Diodes, Integrated Resistors, Classification of ICs (SSI, MSI, LSI and VLSI).

<u>Unit-IV</u>

Unit-III

Regulated Power Supply:

Principle of voltage regulation, Zener diode shunt regulator, BJT shunt regulator and BJT series voltage regulator, power supply regulation using op-amp, load regulation, short circuit protection ,current regulation using op. amp., Block Diagram of three terminal IC regulator(78xx, 79xx,), Boosted power supply

Ref: 1) Electronics for Scientist & Engineers by Vishwanathan, Mehta

- 2) Op-amp and Linear Integrated Circuit by Ramakant A Gayakward
- 3) Integrated Electronics by Millman & Halkias
- 4) Electronic Devices and Circuits Discrete and Integrated by Y N Bapat.

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

Semester-III Subject: Electronics Paper: II (Theory) Nomenclature:-Digital Electronics-II

Max. Marks: 40+10* Time: 3hrs.

<u>UNIT -I</u>

Combinational Circuits and Applications:

Multiplexers, Demultiplexer, Decoder, Encoder, Parity bit generator and checker, Code Converter: BCD to Seven Segment, BCD to Cyclic Code, Binary to Decimal, Binary to Gray, Binary to Excess-3, Application of combinational circuit: adder circuit using Multiplexers, Boolean expression implementation using Multiplexer, Boolean expression implementation using Demultiplexer,

UNIT -II

Sequential Circuits:

Basic Sequential circuit, Asynchronous and Synchronous circuits, RS FF and JK Flip Flop, Race Around Condition, Master Slave JK flip flop, T and D Flip Flop, Excitation Table, Conversion of Flip Flop, State Diagram.

UNIT -III

Counters:

Asynchronous Binary Counters, Asynchronous Mod-N Counter, Synchronous counter: Design principle of Modulo- N Counters, UP-Down counters, Decade Counter, BCD Counter.

<u>Unit IV</u>

Shift Registers and its Applications:

2.

Shift Registers, Serial-in serial out (SISO), Serial-in-parallel out (SIPO), parallel-in-serial-out (PISO) parallel-in-parallel-out (PIPO), Bi-directional shift register, Applications of shift register: Ring counter, Johnson Counter, Time delay, Sequence Generator

Ref:

- 1) Digital Electroqics & Micro computers R. K. Gaur (4 th edition)
- 2) Modern Digital Electronics R.P. Jain (4th edition)
- 3) Digital Principles and Applications by Leach Donald, Malvino AP (6 th Edition)
- 4) Digital fundamentals by R.P. Jain & Floyd.

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.

Use of simple calculator is permissible.

- 3. Instructions should be imparted using SI
- system of units. Familiarity with CGS system of units should also be ensured.
 4. Distribution of Marks: 40+10.

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

Semester-IV Course: B.Sc Subject: Electronics Paper: I (Theory) Nomenclature: - Oscillators and Multivibrators

Max. Marks: 40+10* Time: 3hrs.

<u>Unit-I</u>

Feedback in Amplifier: Classification of Amplifiers (voltage, current, Transconductance, Transresistance amplifier), Feedback concept, calculation of transfer gain in degenerative and regenerative feedbacks, Feedback topologies, Effect of negative feedback on gain, Non-linear distortion, Frequency response, Effect of negative voltage shunt feedback on input and output resistance, Effect of negative voltage series feedback on input and output resistance, Effect of negative current shunt feedback on input and output resistance, Effect of negative current series feedback on input and output resistance.

Unit-II

<u>Power Amplifier</u>: Basic Circuit and working only of: Class A large scale amplifier, push pull amplifier, transformer coupled amplifier, Class B amplifier, Class AB amplifier, Darlington-pair, efficiency.

<u>Unit-III</u>

Sinusoidal Oscillators:- Principle of oscillations, condition for sustained oscillation (Barkhansen criterion), stability of oscillator, Principle, working and frequency calculation of RF oscillators (Hartley oscillator, Colpitts oscillator, crystal oscillator) and AF Oscillators (Wien Bridge oscillator, R-C Phase-shift oscillator)

Unit-1V

<u>Multivibrator, Switching Devices & Circuits</u>:- Astable Multivibrator, Bistable Multivibrator, Monostable Multivibrator using BJT, Silicon controlled Rectifier (SCR), Triac, Diac, Triangular waveform generator, Schmitt Trigger, 555 Timer: Block diagram of 555 and its application as Astable & Monostable Multivibrator.

Ref: 1) Basic Electronics Solid state by B.L. Theraja.

- 2) Opamp and linear circuits by Ramakant A Gayakward.
- 3) Electronics for Scientist & Engineers by Vishvanathan & Mehta.

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.

Use of simple calculator is permissible.

2. 3.

4.

Instructions should be imparted using SI

system of units. Familiarity with CGS system of units should also be ensured.

Distribution of Marks : 40+10

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

Semester-IV Course: B.Sc Subject: Electronics Paper: II (Theory) Nomenclature: - Advance Digital Electronics

Max. Marks: 40+10* Time: 3hrs.

<u>Unit -I</u>

<u>Digital to Analog conversion</u>: DAC conversion, Types of DAC conversion, Weighted Resistor Type DAC, R-2R Ladder Type DAC, The Switched Current source type DAC, The Switched Capacitor type DAC, DAC accuracy and resolution.

<u>Unit II</u>

<u>Analog to Digital Conversion</u>: ADC conversion, Types of ADC conversion, The Counter Type ADC, The Tracking type ADC, Flash type ADC, The Successive Approximation ADC, ADC accuracy and resolution

Unit III

<u>Memories</u>: Parameters of memory, Volatile and non volatile memories, Memory organization & operation, ROM, PROM, EPROM, EEPROM, RAM (Static and dynamic), Expanding the size of memory, Content addressable memory/ associative memory,

Unit IV

Programmable Logic Devices (PLDs): Introduction, ROM as a PLD, Programmable Logic Array(PLA), Programmable Array Logic(PAL), Features of PLD, Complex Programmable Logic Devices(CPLDs), Field Programmable Gate Array(FPGA).

Ref:

- 1. Modern Digital Electronics R.P. Jain
- 2. Digital Principles and Applications by Leach Donald, Malvino AP (6 th Edition)

Note

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
- IV. All questions carry equal marks. 2. Us
 - Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.

4. Distribution of Marks: 40+10.

*Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

SEMESTER III & IV Course: B.Sc SUBJECT: ELECTRONICS PAPER: III (PRACTICAL)

Note: A candidate is required to perform minimum of 6 experiments in each section out of the list provided during course of study in odd and even semester in corresponding session.

List of Practical:

Section-A

- 1. Measurement of offset voltage, bias currents & CMRR of an operational amplifier.
- 2. Operational amplifier as (1) units gain buffer (I) inverting amplifier (3) Non-inverting amplifier.
- 3. Operational amplifier as (1) summing amplifier (2) difference amplifier.
- 4. To study & design Hartley oscillator & measure its frequency.
- 5. To study & design Colpitts oscillator & measure its frequency.
- 6. To study the design of phase shift oscillator & measure its frequency.
- 7. To study the condition for sustained oscillation for Wein bridge oscillator.
- 8. To study the working of Schmitt trigger using operational amplifier.
- 9. Study of characteristic of UJT.
- 10. To design saw tooth wave generator using UJT.
- 11. To design a transistorized Astable multivibrator and measure its frequency.
- 12. To study the operation of transistorized Monostable multivibrator circuit and measure its delay lime.
- 13. To study and design Astable multivibrator using IC 555.
- 14. To study and design Monostable multi vibrator using IC 555.
- 15. To study the frequency response of 1st and 2nd order active High pass filter & compare their result.
- 16. To study the frequency response of 1st and 2nd order active Low pass filter & compare their result.
- 17. Study of different type of IC's: functions, pin diagram, block diagram of 741,555.

Section-B

- 1. Half adder/Full adder.
- 2. Multiplexer and Demultiplexer Circuit (4: 1)
- 3. JK, D &T Flip-Flops.
- 4. Divide by N Counter.
- 5. Shift register
- 6. DAC
- 7. Ripple binary counter.
- 8. Synchronous binary-counter.
- 9. Up. Down counter
- 10. ADC
- 11. Code Converter.
- 12. Parity generator
- 13. CMOS Decade Counter
- 14. Study of different type of IC's: functions, pin diagram, block diagram of 7400, 7402, 7404,7408,7432,74153,74155,4001,4011,4081,4071,4077,4009.

- i) The Practical examination will be held at the end of even semester in two sittings of three hours each with First sitting starting in the evening session of the first day and second sitting in the following morning session.
- ii) A candidate is required to perform minimum of 6 experiments in each section out of the list provided during course of study in odd and even semester in corresponding session and is required to perform one experiment from each section

in examination. Experiment from one section in First Sitting and experiment from other section in Second Sitting.

- iii) Distribution of Marks :
 - I. Paper III 100 Marks of 3+3 Hours duration
 - II. Lab Record: 20
 - III. Experiments: 20 + 20
 - IV. Viva/Voce : 20+20
- iv) Maximum 10 students in one group during course of study and also in Examination.
- v) Work Load 6 periods per week per group.

Proposed w.e.f. Session 2019-20 <u>UPDATED SCHEME & SYLLABI FOR B.Sc. (Hons.)-I.T.</u> Course: B.Sc. (hons.) Information Technology Examination Scheme

I. Theory Papers (Semester System of Examination)

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - i. A student is required to attempt 5 questions in all.
 - ii. Question No. 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - iii. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - iv. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks:
- $40+10^* = 50$ marks of 3 hours duration for each Theory Paper.
- * For each paper question paper will be of 40 marks and 10 marks in each theory paper is awarded through internal assessment in each semester.
- 5. Workload -3 periods per week per theory paper

II. Practical Paper (Annual Examination System)

- i) The practical examination will be held at the end of Even semester in one sitting of three hours.
- ii) A candidate is required to perform minimum of 7 experiments out of the list provided during course of study in odd semester & even semester of the corresponding session as the case may be and is required to perform one experiment in examination.
- iii) Distribution of Marks: As per details given in each Practical Paper separately,
- iv) Maximum 10 students in one group during course of study and also in examination.
- v) Workload 3 periods per week per group per practical paper

Sem.	Paper	Nomenclature	Internal	Max.	Total	Pass	Exam	Exam
	Code	Of Paper	Assessment	Marks	Marks	Marks	Duration	System
111	BSIT -	Circuit Analysis &	10	40	50	20	3 Hrs	
	301	Digital Electronics-II	1.0	10		• •		
	BSIT -	Transistor and Linear	10	40	50	20	3 Hrs	Sem.
	302	Integrated Circuits						
	BSIT -	Telecommunication	10	40	50	20	3 Hrs	
	303	& Networking-I						-
	BSIT -	Microprocessor	10	40	50	20	3 Hrs	
	304	Architecture and						
		Programming-I						
	BSIT -	Operating System - I	10	40	50	20	3 Hrs	
	305							
	BSIT -	Computer	10	40	50	20	3 Hrs	
	306	Programming with C						
		- I						
IV	BSIT-	Digital Electronics-III	10	40	50	20	3 Hrs	
	401							
	BSIT-	Oscillators and	10	40	50	20	3 Hrs	
	402	Multivibrators						
	BSIT-	Telecommunication	10	40	50	20	3 Hrs	
	403	& Networking-II	-	-		-		
	BSIT-	Microprocessor	10	40	50	20	3 Hrs	
	404	Architecture and						
		Programming-II						
	BSIT-	Operating System - II	10	40	50	20	3 Hrs	
	405		-	-		-		
	BSIT-	Computer	10	40	50	20	3 Hrs	
	406	Programming with C						
Commo	BSIT-	Analog Electronics	_	50	50	20	3 Hrs	
n for	407	(LT Lab-V)		00	00		0 110	
Sem III	BSIT-	Digital Electronics	_	50	50	20	3 Hrs	-
& Sem	408	(IT Lab-VI)		50	50	20	5 1115	
IV	BSIT-	Flectronics &	_	50	50	20	3 Hrs	-
1,	109	Microprocessor (IT		50	50	20	51115	Annual
		I ah_VII)						. minuui
	BSIT	Drogramming in C (IT		50	50	20	3 Hrs	-
	410	I ab-VIII)		50	50	20	51115	

B.Sc. (Hons) Information Technology-II Examination Scheme (Proposed w.e.f Session: 2019-20)

KURUKSHETRA UNIVERSITY KURUKSHETRA Semester-III Course: B.Sc. (Hons) IT Paper Code: BSIT-301 Nomenclature: -Circuit Analysis & Digital Electronics-II

Max. Marks: 40+10* Time: 3hrs.

Unit-I

<u>Network Theorems-I:</u> Kirchhofs Voltage Law, Kirchhofs Current Law, Mesh Analysis, Nodal Analysis, Source Transformation Technique, Star-Delta Transformation, Superposition Theorem, Theorem.

Unit-II

<u>Network Theorems-II</u>: Norton's Theorem, Reciprocity Theorem, Compensation Theorem, Maximum Power Transfer Theorem, Duals and Duality, Tellegen's Theorem, Millman's Theorem.

Unit-III

<u>Combinational Logic Design</u>: Combinational Circuit design procedure, Half adder, full adder, half subtractor, full subtractor, parallel binary adder, 2'S complement adder/ subtractor, multiplexer and demultiplexer, Decoder, Encoder, Code Converter.

Unit-IV

Sequential Circuits: 1 Bit memory cell, RS Flip-Flop, Clocked RS FF, JK-FF, Race around condition, MASTER SLAVE JK T-FF, D-FF, Excitation table of Flip Flop, Conversion of Flip Flops. Applications of Flip Flops (Idea Only).

Reference Books:

- 1. Modern Digital Electronics by R.P. Jain.
- 2. Circuits and Networks by A. Sudhakar, Shyammohan
- 3. Network Analysis, Publication Khanna By G.K. Mithal
- 4. Network Analysis, Publication Pearson India By M.E. Van Valkenburg

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I.A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
 - * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load -3 periods per week per theory paper

Semester-III Course: B.Sc. (Hons) IT Paper Code: BSIT-302

Nomenclature: -Transistor and Linear Integrated Circuits

Max. Marks: 40+10* Time: 3hrs.

UNIT-I

<u>**Transistor at Low Frequencies:**</u> Transistor hybrid model, h parameters, Analysis of transistor amplifier circuit using h- parameters, Emitter follower, Comparison of transistor configurations, Simplified common emitter hybrid model.

UNIT-II

<u>Integrated Circuit-I</u>: Basics of Integrated Circuit Technology, Monolithic fabrication technique, Different Fabrication Processes: Crystal growth, Epitaxial growth, Oxidation, Masking and Etching, Diffusion of Impurities, Metallization, Classification of ICs (SSI, MSI, LSI and VLSI).

UNIT-III

Integrated Circuit-II: Transistors for Monolithic Circuits (NPN & PNP), Monolithic Diodes, Integrated Resistors, Integrated Capacitors and Inductors, JFET, MOSFET fabrication (Qualitatively), Monolithic Circuit Layout.

UNIT-IV

Operational Amplifier-I: DC Coupled Amplifier, Double ended differential Amplifier, differential gain. Common-mode gain, CMRR, ideal operational amplifier, Basic Concept of Feedback in Op amp, Inverting & non-inverting configuration, Buffer, Summing and Difference amplifier.

Reference Books:

1) Electronics for Scientist & Engineers by Vishvanathan.

- 2) Op. amp. and Linear Integrated Circuit by Ramakant A. Gayakward
- 3) Integrated Electronics by Millman & Halkias
- 4) Linear Integrated Circuits by Roy Choudhury & Shail Jain

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
 * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper

Semester-III Course: B.Sc. (Hons) IT Paper Code: BSIT-303 Nomenclature: -Telecommunication & Networking-I Max. Marks: 40+10*

Time: 3hrs.

UNIT-I

Introduction to Telephone System: Data communication and its components, Topology, Transmission mode. Structure of the telephone system, local loop: Transmission Impairments Modems, Multiplexing: FDM, WDM and TDM.

UNIT-II

Switching and ISDN: Types of Switching, Circuit Switching, Space division switch, Time division switch, Crossbar switch.

Narrowband ISDN: ISDN Services, ISDN system architecture, ISDN interface. Perspective on N-ISDN.

UNIT-III

<u>Computer Networks</u>: Introduction to computer network, data transmission mode, network types, LAN topologies with its merits and demerits. Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities.

UNIT-IV

<u>Frame Relay</u>: Architecture, Layers, Congestion Control & quality of service. **<u>ATM</u>**: Design goals, Problems, Architecture, Switching, ATM layers.

Reference Books

1. Computer Networks, Prentice Hall, by Andrew S. Tanenbaum.

2. Data Communication and Networking, Tata McGraw Hill, by Behrouz A. Forouzan.

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
 * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper

Semester-III Course: B.Sc. (Hons) IT Paper Code: BSIT -304 Nomenclature: - Microprocessor Architecture and Programming-I Max. Marks: 40+10* Time: 3hrs.

UNIT-I

SAP-I & SAP-II: Simple As Possible computer (SAP-1), Architecture, Instruction Set, Programming SAP-1, Fetch Cycle, Execution Cycle, SAP-II Architecture, Memory Reference instructions, Register Instructions, Jump and Call instructions, Logic instructions.

UNIT-II

SAP-III: Programming Model, MOV & MVI, arithmetic instructions, increments, decrements and rotates, logic instructions, Arithmetic and logical immediates, jump instructions, extended register instructions, indirect instructions, stack instructions.

UNIT-III

<u>8085 Microprocessor:</u> Block diagram, Pinout diagram, Instruction set of 8085, Fetching and Executing, Instructions of 8085, Fetch execute overlap. Instruction word size, Addressing modes. **UNIT-IV**

Interrupts: The 8085 interrupt Circuit, 8085 vectored interrupts, Interrupt Instructions, Restart instructions, Concept of DMA.

Reference Books:

- 1 Digital Computer Electronics- A Malvino (2nd Edition)
- 2. Microprocessor Architecture, programming and application with the 8085 by R S Gaonkar

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
- * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper

Semester-III Course: B.Sc. (Hons) IT Paper Code: BSIT -305 Nomenclature: - Operating System - I

Max. Marks: 40+10* Time: 3hrs.

<u>Unit-I</u>

Operating System - Functions and Structure: Introduction to Operating System, Historical evolution of Operating System, Different services of Operating System, Types of Operating Systems, Operating System Architecture, Concept of System Calls, Virtual Machine and Booting.

<u>Unit-II</u>

<u>Process Management:</u> Process Concept, Process States, Process Control Block, Process Scheduling, Context Switching, Schedulers, Operation of Processes

Scheduling: Basic concepts, Scheduling criteria, Scheduling Algorithms: FCFS, SJF, Priority, RR, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling. Multiprocessor Scheduling and Real-Time Scheduling.

<u>Unit-III</u>

<u>Inter-process</u> <u>Communication and Synchronization:</u> Cooperating Processes, Inter-process Communication: Producer Consumer Problem, Process Synchronization: Critical Section, Hardware supported solutions, Software solutions.

<u>Unit-IV</u>

Deadlocks: Deadlocks, Graphical representation of a Deadlock, Deadlock Prerequisites, Methods for handling Deadlocks: Prevention, Avoidance, Detection and Recovery. **References:**

- 1. Operating System Concepts John Wiley & Sons, Inc by Peterson & Silberschetz:
- 2. Operating Systems Tata McGraw Hill by Achyut S Godbole
- 3. Operating System Mc Graw Hill by Madnick & Donomen
- 4. Operating system by A.S. Tanenbaum

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
- * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper

Semester-III Course: B.Sc. (Hons) IT Paper Code: BSIT -306 Nomenclature:- Computer Programming with C – I

Max. Marks: 40+10* Time: 3hrs.

Unit-I

Introduction: History of C, Importance of C, C Character Set, Identifiers & Keywords, data types, Qualifiers, Constants & Variables and their declarations, Symbolic Constants, Comments in C, expressions & statements, Structure of a C Program, Console I/O (printf, scanf). Escape Sequences.

<u>Unit-II</u>

Operators in C: Arithmetic, logical, relational & bitwise operators, Assignment and Conditional Operators, Increment and Decrement Operators, operator hierarchy & associativity. sizeof operator, Type conversion and cast operator, Library functions in C.

Decision Making in C: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, Programming examples using if Structure.

<u>Unit-III</u>

Decision Making in C: Switch statement, goto statement. Programming examples using switch and goto Structures.

Looping in C: While, do-while & for loops, break & continue statements, Programming examples using loop Structures.

<u>Unit-IV</u>

<u>Arrays:</u> 1-D & 2-D arrays, Creating and Processing Arrays, Applications of arrays in searching, sorting, merging & matrices. Character I/O functions: getchar(), getche(), getch(), putchar().

Reference Books:

- 1. Programming with C, Tata McGraw Hill, by Byron Gottfied.
- 2. Let Us C, BPB publications, by YashwantKanetkar.
- 3. C The Complete Reference, Tata McGraw Hill, by Herbert Schildt.
- 4. Programming in ANSI C, Tata McGraw Hill, by E. Balagurusamy.

Note:

1. Syllabus in each Theory Paper is divided in 4 units.

- I. A Student is required to attempt 5 questions in all.
- II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
- III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
- IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
 - * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper

KURUKSHETRA UNIVERSITY KURUKSHETRA

Semester-IV Course: B.Sc. (Hons) IT Paper Code: BSIT-401 Nomenclature:-Digital Electronics-III

Max. Marks: 40+10* Time: 3hrs.

UNIT -I

Sequential Circuits-II : Counters: Asynchronous Counters- Mod-N or divided by N Counter. Synchronous Counter - Modulo Counters, Decade Counter. UP-Down Counters, Basic principle of digital clock.

<u>Unit- II</u>

<u>Registers:</u> Shift Registers, Serial-in serial out (SISO), serial-in-parallel out (SIPO), parallel-in-serialout (PISO) parallel-in-parallel-out (PIPO), bi-directional shift register, Universal Shift Register Applications of shift register – Ring counter, Twisted Ring Counter, Sequence Generator.

<u>Unit -III</u>

Digital Memories : Memory System Parameters, ROM, PROM, EPROM, EEPROM, RAM (Static and dynamic), PLA's, Expanding Memory Size.

Unit -IV

<u>**D/A and A/D converters :**</u> Digital and Analog representation, D/A Converters: Weighted Resistor DAC, R-2R Ladder Type DAC, Specification of DAC. A/D converters: Single slope A/D converter, Dual slope A/D converter, Successive approximation A/D converter, Specification of ADC.

Reference Books:

- 1) Digital Electroics & Micro computers R. K. Gaur (4 th edition).
- 2) Modern Digital Electronics by R.P. Jain.

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

Semester-IV Course: B.Sc. (Hons) IT Paper Code: BSIT-402 Nomenclature: - Oscillators and Multivibrators

Max. Marks: 40+10* Time: 3hrs.

UNIT-I

Operational Amplifier-II: Offset Voltages and currents, input bias Current, input offset voltage, error introduced by offset voltage, integrating and differentiating circuit using opamp, multiplication, division, Schmitt Trigger, Active filters using opamp (Ist order)

UNIT-II

Feedback in Amplifier: Classification of Amplifiers (voltage, current, Transconductance, Transresistance amplifier), Feedback concept, calculation of transfer gain in degenerative and regenerative feedbacks, Feedback topologies, Effect of negative feedback on gain, Non-linear distortion, Frequency response, Effect of negative voltage shunt feedback on input and output resistance, Effect of negative voltage series feedback on input and output resistance, Effect of negative current shunt feedback on input and output resistance, Effect of negative current series feedback on input and output resistance.

<u>UNIT-III</u>

<u>Oscillators</u>: Principle of oscillations, condition for sustained oscillation, Principal, working and frequency calculation of RF oscillators (Hartley oscillator, Colpitts oscillator, crystal oscillator) and AF Oscillators (Wein Bridge oscillator, Phase-shift oscillator)

<u>UNIT-IV</u>

<u>Multivibrators</u>: Astable Multivibrator, Bistable Multivibrator, Monostable Multivibrator using BJT, Triangular waveform generator, The 555 Timer, Block diagram of 555 and its application as Astable & Monostable Multivibrator.

Reference Books:

- 1. Basic Electronics Solid state by B.L. Theraja.
- 2. Opamp and linear circuits by Ramakant A Gayakward.
- 3. Electronics for Scientist & Engineers by Vishvanathan & Mehta.
- 4. Integrated Electronics by Millman & Halkias

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
- IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
 - * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper

Semester-1V Course: B.Sc. (Hons) IT Paper Code: BSIT-403 Nomenclature: -Telecommunication & Networking-II

Max. Marks: 40+10* Time: 3hrs.

UNIT-I

<u>Network Devices</u>: NIC, repeaters, hub, bridge, switch, gateways, router, connectors and transceivers. Network Design Issues and Protocols, connection-oriented and connectionless services.

<u>**Transmission Media:**</u> Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite.

UNIT-II

Evolution and Challenges of Wireless Networks: Cellular Networks: Concept, Call Set up, Frequency Reuse, Channel Assignment, Handoff, Mobility Management.

GSM and IS-95 architecture, channels, and Call Establishment, Wireless Data Service, 3G and 4G Cellular Systems.

UNIT-III

<u>Fiber Optic Communication-I</u>: Light Wave Communication Systems, Fiber Optic System, Applications & Benefits of Fiber Optics, Working of Fiber Optic Cables, Construction of Fiber Optic Cables.

UNIT-IV

<u>Fiber Optic Communication-II:</u> Types of Cables: Cable Variations, Cable Attenuation, Optical Transmitter & Receivers, Fiber Optic Data Communication Systems.

Reference Books

- 1. Computer Networks, Prentice Hall, by Andrew S. Tanenbaum.
- 2. Data Communication and Networking, Tata McGraw Hill, by Behrouz A. Forouzan.
- 3. Communication Electronics, Tata McGraw Hill, by Frenzel.
- 4. Mobile Computing, Oxford Higher Education, by Raj Kamal.

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.
 - * Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.
- 5. Work load 3 periods per week per theory paper
Semester-IV Course: B.Sc. (Hons) IT Paper Code: BSIT-404 Nomenclature: -Microprocessor Architecture and Programming-II

Max. Marks: 40+10* Time: 3hrs.

UNIT-I

Interfacing Devices-I: Interfacing an 8-bit DAC with 8085, Interfacing 8-bit ADC with 8085.General purpose programmable peripheral devices: block diagram of 8255, Modes of operation of 8255-Mode0, BSR mode, Mode1, mode2.

UNIT-II

Interfacing Devices-II: 8254(8253) Programmable interval timer, block diagram of 8254, Modes of operation of 8254- Mode0 to Mode5, 8257 DMA controller.

UNIT-III

<u>Microprocessor 8086-I</u>: 8086 internal architecture, Introduction to programming the 8086, Program development steps. Addressing Modes of 8086, Instruction Set of 8086. Data Copy/Transfer Instruction (MOV, PUSH, POP, IN, OUT). Arithmetic Instructions (ADD, ADC, INC, DEC, SUB, SBB, CMP, DAA, DAS, MUL, IMUL, DIV, IDIV). Logical Instructions (AND, OR, NOT, XOR).

UNIT-IV

<u>Microprocessor 8086-II</u>: Constructing the machine codes for 8086 instructions, Simple sequence program, Jumps, flags and conditional jumps, if-then, if-then–else and multiple if-then-else program, while-do programs, Repeat –Until programs.

Reference Books:

2.

- 1. Microprocessors and Interfacing (Programming and Hardware) by Douglas V. Hall.
- 2. Microprocessor Architecture, programming and application with the 8085 by R S Gaonkar.
- 3. Advanced Microprocessors & Peripherals Architecture, Programming & Interfacing By Ray & Bhurchandani (Tata McGraw Hill)

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
 - Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

5. Work load – 3 periods per week per theory paper

Semester-IV Course: B.Sc. (Hons) IT Paper Code: BSIT -405 Nomenclature: - Operating System - II

Max. Marks: 40+10* Time: 3hrs.

<u>Unit-I</u>

<u>Memory Management:</u> Logical versus physical Address Space, Overlays, Swapping, Contiguous Memory Management: Single memory management, Fixed partition memory management, Variable Partition memory management, Non Contiguous Memory Management: Paging, H/W support for paging, protection & sharing, Segmentation, H/W support for segmentation, protection & sharing, Segmented Paging.

<u>Unit-II</u>

<u>Virtual Memory:</u> Introduction to Virtual Memory, Demand Paging, Page Replacement policies, Trashing, Cause of Thrashing.

<u>Unit-III</u>

<u>File Management:</u> File Concept, File Attributes, File Operations, File Types, Access methods, Directory Structure.

<u>File System Implementation</u>: File system structure, allocation methods, Free-space management, directory implementation, efficiency & performance, recovery, Directory systems & operations.

<u>Unit-IV</u>

Protection: Goals of Protection, Protection Mechanisms.

<u>Security:</u> The security problem, User Authentication, Program Threats, System Threads, Cryptography.

References:

- 1. Operating System Concepts John Wiley & Sons, Inc by Peterson & Silberschetz:
- 2. Operating Systems Tata McGraw Hill by Achyut S Godbole
- 3. Operating System Mc Graw Hill by Madnick & Donomen
- 4. Operating system by A.S. Tanenbaum

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I.A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

5. Work load – 3 periods per week per theory paper

Semester-IV Course: B.Sc. (Hons) IT Paper Code: BSIT -406 Nomenclature:- Computer Programming with C – II

Max. Marks: 40+10 Time: 3hrs.

<u>Unit-I</u>

<u>Preprocessor Directives:</u> The Preprocessor, File inclusion directives, Macro substitution directives, compiler control directives, other directives.

Strings: Strings and String functions. String I/O functions: gets(), puts().

<u>Unit-II</u>

Functions: Creating & Using Functions in programs, return statement, Formal & Actual Arguments, Local & Global Variables, Call by value & Call by Reference, Passing arrays to functions, Recursion, command line arguments, Programming examples using functions.

<u>Unit-III</u>

Pointer: Introduction to Pointers, Pointer Variables, Pointer Operators, Pointer Expressions, Pointers and Arrays.User Defined Data types: Structures, Array of structures, passing Structures to functions, Structure and Pointers, Unions, Enumerated data types, typedef.

<u>Unit-IV</u>

Storage Classes: auto, extern, register and static Storage classes.

<u>Files</u>: Opening and Closing a Data File, File Pointers, Creating a Data File, Processing a Data File, Reading and writing to text and binary files.

Reference Books:

- 1 Programming with C, Tata McGraw Hill, by Byron Gottfied.
- 2 Let Us C, BPB publications, by Yashwant Kanetkar.
- 3 C The Complete Reference, Tata McGraw Hill, by Herbert Schildt.
- 4 Programming in ANSI C, Tata McGraw Hill, by E. Balagurusamy.

Note:

- 1. Syllabus in each Theory Paper is divided in 4 units.
 - I. A Student is required to attempt 5 questions in all.
 - II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
 - III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
 - IV. All questions carry equal marks.
- 2. Use of simple calculator is permissible.
- 3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
- 4. Distribution of Marks: 40+10.

* Each theory question paper will be of 40 marks of 3 hours duration and 10 marks in each theory paper are to be awarded through internal assessment in each semester.

5. Work load – 3 periods per week per theory paper

Semester-IV Course: B.Sc. (Hons) IT Paper Code : BSIT-407 Nomenclature of Paper - Analog Electronics (I.T Lab-V)

Note:-

- 1. A student is required to perform a minimum of 7 experiments from the list given below during course of study(Semester III +Semester IV).
- 2. Instructions for Examiners: A candidate is required to perform one experiment.
- 3. Maximum number of students should not exceed ten in one group during course of studies as well as annual examination.

M.M: 50

EXPERIMENT (3 hrs) : 25 PRACTICAL WORK BOOK: 15 VIVA-VOCE :10

Time: 3 hrs

amplifier.

List of experiments

I.	To study op-amp as-
	(a)Unity gain buffer stage
	(b) Non-inverting amplifier
	(c) Inverting amplifier
II	To Study op-amp as-
	(a) Summing amplifier
	(b) Difference amplifier
(III)	To study the operation of integrating/differentiating circuits using op-
(IV)	Measurement of offset voltage, bias currents & CMRR of an operation
(V)	To study the operation of a monostable multivibrator circuit and meas

- s currents & CMRR of an operational amplifier. able multivibrator circuit and measure its delay
- time.
- To design astable multivibrator and measure its frequency. (VI)
- Study of UJT and its characteristics. (VII)
- (VIII) Design a sawtooth generator using UJT.
- (IX) To study & design Hartley Oscillator & measure its frequency.
- To study & design Colpitts Oscillator & measure its frequency. (X)
- (XI) To study the design of Phase Shift Oscillator & measure its frequency.
- To study the condition for sustained oscillation for Wein bridge Oscillator. (XII)
- To study the working of Schmitt trigger using operational amplifier. (XIII)

Semester-IV Course: B.Sc. (Hons) IT Paper Code : BSIT-408 Nomenclature of Paper - Digital Electronics (I.T Lab-VI)

Note:-

- 1. A student is required to perform a minimum of 7 experiments from the list given below during course of study(Semester III +Semester IV).
- 2. Instructions for Examiners: A candidate is required to perform one experiment.
- 3. Maximum number of students should not exceed ten in one group during course of studies as well as annual examination.

M.M: 50

EXPERIMENT (3 hrs)	: 25
PRACTICAL WORK BOOK	: 15
VIVA-VOCE	: 10

Time: 3 hrs

List of Experiments:-

- 1. Half adder/Full adder.
- 2. Multiplexer and Demultiplexer Circuit (4: 1)
- 3. JK, D & T Flip-Flops.
- 4. Divide by N Counter.
- 5. Shift register
- 6. DAC
- 7. Ripple' binary counter.
- 8. Synchronous binary-counter.
- 9. Up. Down counter
- 10. Code Converter.
- 11. Parity generator
- 12. C. MOS Decade Counter

Semester-IV Course: B.Sc. (Hons) IT Paper Code : BSIT-409 Nomenclature of Paper: Electronics & Microprocessor (I.T Lab-VII)

Note:-

- 1. A student is required to perform a minimum of 7 experiments from the list given below during course of study(Semester III +Semester IV).
- 2. Instructions for Examiners: A candidate is required to perform one experiment.
- 3. Maximum number of students should not exceed ten in one group during course of studies as well as annual examination.

M.M: 50

EXPERIMENT (3 hrs)	: 25
PRACTICAL WORK BOOK	: 15
VIVA-VOCE	: 10

Time: 3 hrs

List of experiments

- 1. Familiarization of microprocessor 8085 Kit and Key Command.
- 2. Addition/Subtraction of two 16 Bit numbers on Microprocessor-Kit.
- 2. Multiplication/ division of two 8 Bit numbers on Microprocessor- Kit.
- 3. Find the smallest/largest number from a given series of numbers on Microprocessor-Kit
- To sort a give series of using of unsigned numbers in ascending/Descending order on Microprocessor-Kit.
- 5. Check even parity/odd parity of binary number on Microprocessor-Kit.
- 6. Binary to gray conversion and vice-versa.
- 7. To solve the logical equation using Microprocessor-Kit.
- 8. Find the Factorial of a Number.
- 9. Generate the Fibonacci Series.
- 10. Generate a time delay through software on Microprocessor-Kit.
- 11. Program to generate Square Wave using Microprocessor-Kit.
- 12. DAC.
- 13. ADC.

Semester-IV Course: B.Sc. (Hons) IT Paper Code :BSIT-410 Nomenclature of Paper: Programming in C (I.T Lab-VIII)

Note:-

- 1. Instructions for Examiners: A candidate is required to perform one experiment.
- 2. Maximum number of students should not exceed ten in one group during course of studies as well as annual examination.

Max. Marks: 50

EXPERIMENT (3 hrs) : 25

PRACTICAL WORK BOOK : 15

VIVA-VOCE : 10

Time: 3 hrs

- 1 Program to study the behavior of data types i.e. their min & max values & their sizes.
- 2 Program to convert given distance in km to meters, feet, inches and centimeters.
- 3 Program to convert given temperature in Fahrenheit to Celsius.
- 4 Program to calculate the smallest & Largest out of given numbers using conditional operator.
- 5 Program to print roots of quadratic equation.
- 6 Program to print sum of digits of a given number.
- 7 Program to reverse the given number.
- 8 Program to check whether a given number is palindrome or not.
- 9 Program to add first seven terms of following series using for loop 1/1! + 2/2! + 3/3! + --
- 10 Program to evaluate the equation : $Y=x^n$
- 11 Program to print factorial of a number.
- 12 Program to print Fibonacci series till n given number using function.
- 13 Program to implement Calculator using functions.
- 14 Program to print binary equivalent of given decimal number.
- 15 Program to sort elements of array in ascending and descending order.
- 16 Program to search an element in 1-D arrays.
- 17 Program to implement multi-dimensional arrays-Multiplication of two matrices.
- 18 Program to check the orthogonality of a given matrix.
- 19 Program to calculate the transpose of a given matrix.
- 20 Write a function to find the largest element of an m by n matrix.
- 21 Program to calculate the substring of a given input string.
- 22 Program to remove blanks from a given string.
- 23 Program to sort given input strings.
- 24 Program to implement a function that compares the two input strings and returns 0 if equal, otherwise tells which comes first.
- 25 Program to calculate binomial coefficient ⁿC_r using function.
- 26 Program to calculate HCF of n numbers using function.
- 27 Program to implement basic pointer arithmetic.
- 28 Program using pointers to read in an array of integers and print its elements in reverse order.
- 29 Program to create a function that receives a sorted array of integers & an integer value and inserts the value in its correct place using pointers.
- 30 Use recursive function calls to evaluate $f(x)=x-x^3/3!+x^5/5!+x^7/7!$
- 31 Program to study the behavior of struct and union elements using pointers.

- 32 Program to create a binary/text files and count the numbers of characters in them.
- 33 Program to copy a file to another using command line arguments.
- 34 Program to compare the contents of two files to determine whether they are same or not.
- 35 Program to modify and delete an existing record in a file.

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

SCHEME OF EXAMINATION FOR B. PHARM. (3rd to 8th SEMESTER) COURSE UNDER CHOICE BASED CREDIT SYSTEM (CBCS)

w.e.f. the academic session 2017-18

1. These regulations shall be called as "The Revised Regulations for the B. Pharm. Degree Program (CBCS) of the Pharmacy Council of India, New Delhi". They shall come into effect from the Academic Year 2017-18. The regulations framed are subject to modifications from time to time by Pharmacy Council of India, New Delhi.

2. **Program/Course credit structure**

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

3. Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 210. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus. The lateral entry students shall get 52 credit points transferred from their D.Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

4. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – III to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – III to VIII.

Course	Name of the course	No. of	Tutorial	Credits
code		hours		
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4		2
BP306P	Physical Pharmaceutics I – Practical	4		2
BP307P	Pharmaceutical Microbiology – Practical	4		2
BP308P	Pharmaceutical Engineering –Practical	4		2
	Total	28	4	24

Table-III: Course of study for semester III

Table-IV: Course of study for semester IV

Course	Name of the course	No. of	Tutorial	Credits
code		hours		
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4		2
BP407P	Physical Pharmaceutics II – Practical	4		2
BP408P	Pharmacology I – Practical	4		2
BP409P	Pharmacognosy and Phytochemistry I – Practical	4		2
	Total	31	5	28

Table-V: Course of study for semester V

Course	Name of the course	No. of	Tutorial	Credits
code		hours		
BP501T	Medicinal Chemistry II – Theory	3	1	4
BP502T	Industrial Pharmacy I– Theory	3	1	4
BP503T	Pharmacology II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II- Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial Pharmacy I – Practical	4		2
BP507P	Pharmacology II – Practical	4		2
BP508P	Pharmacognosy and Phytochemistry II-Practical	4		2
	Total	27	5	26

Course	Name of the course	No. of	Tutorial	Credits
code		hours		
BP601T	Medicinal Chemistry III – Theory	3	1	4
BP602T	Pharmacology III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics-Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance – Theory	3	1	4
BP607P	Medicinal chemistry III – Practical	4		2
BP608P	Pharmacology III – Practical	4		2
BP609P	Herbal Drug Technology – Practical	4		2
	Total	30	6	30

Table-VI: Course of study for semester VI

Table-VII: Course of study for semester VII

Course	Name of the course	No. of	Tutorial	Credits
code		hours		
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial Pharmacy II – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705P	Instrumental Methods of Analysis – Practical	4		2
BP706PS	Practice School*	12		6
	Total	28	4	24

* Non University Examination (NUE)

Table-VIII:	Course	of studv	for	semester	VIII
	000000				

Course	Name of the course	No. of	Tutorial	Credits
code		hours		
BP801T	Biostatistics and Research Methodology	3	1	4
BP802T	Social and Preventive Pharmacy	3	1	4
BP803ET	Pharma Marketing Management			
BP804ET	Pharmaceutical Regulatory Science			
BP805ET	Pharmacovigilance			
BP806ET	Quality Control and Standardization of Herbals	3+3=6	1+1=2	4+4=8
BP807ET	Computer Aided Drug Design			
BP808ET	Cell and Molecular Biology			
BP809ET	Cosmetic Science			
BP810ET	Experimental Pharmacology			
BP811ET	Advanced Instrumentation Techniques			
BP812ET	Dietary Supplements and Nutraceuticals			
BP813PW	Project Work	12		6
	Total	24	4	22

Semester	Credit Points
I	27/29 ^{\$} /30 [#]
II	29
III	24
IV	28
V	26
VI	30
VII	24
VIII	22
Extracurricular/ Co curricular activities	01*
Total credit points for the program	211/213 ^{\$} /214 [#]

Table-IX: Semester wise credits distribution

* The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

^{\$}Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

[#]Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.

5. Examinations/Assessments

The scheme for internal assessment and end semester examinations is given below:

5.1 Internal assessment (25 Marks): Continuous mode (10 Marks) + Sessional Tests (15 Marks)

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

THEORY			
Criteria	Maximu	m Marks	
Attendance (Refer Table – XI)	4	2	
Academic activities (Average of any 3 activities e.g. quiz, assignment,	3	1.5	
open book test, field work, group discussion and seminar)			

Table-X: Scheme for awarding internal assessment: Continuous mode

Student – Teacher interaction	3	1.5		
Total	10	05		
PRACTICALS				
Attendance (Refer Table – XI) 2		2		
Based on Practical Records, Regular viva voce, etc. 3		5		
Total	5	5		

Table- XI: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 - 100	4	2
90 - 94	3	1.5
85 - 89	2	1
80 - 84	1	0.5
Less than 80	0	0

5.2 Sessional Exams

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical Sessional examinations is given in table – X. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in table – XII. Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

5.3 Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of that end semester theory examinations.

5.4 Evaluation of Project work (8th Semester)

Evaluation of Dissertation Book	Evaluation of Presentation:			
Objective(s) of the work done: 15 Marks	Presentation of work : 25 Marks			
Methodology adopted : 20 Marks	Communication skills : 20 Marks			
Results and Discussions : 20 Marks	Question and answer skills : 30 Marks			
Conclusions and Outcomes : 20 Marks	Total : 75 Marks			
Total : 75 Marks				

Explanation: The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.

6. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course including internal assessment as specified above, then he/she shall reappear for the end semester examination of that course only. However his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

SEMESTER III

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous	Session	al Marks	Total	Marks	Duration	
		Mode	Exams	Duration				
BP301T	Pharmaceutical Organic Chemistry II – Theory	10	15	1 Hr	25	75	3 Hr	100
BP302T	Physical Pharmaceutics I – Theory	10	15	1 Hr	25	75	3 Hr	100
BP303T	Pharmaceutical Microbiology – Theory	10	15	1 Hr	25	75	3 Hr	100
BP304T	Pharmaceutical Engineering – Theory	10	15	1 Hr	25	75	3 Hr	100
BP305P	Pharmaceutical Organic Chemistry II – Practical	5	10	4 Hr	15	35	4 Hr	50
BP306P	Physical Pharmaceutics I – Practical	5	10	4 Hr	15	35	4 Hr	50
BP307P	Pharmaceutical Microbiology – Practical	5	10	4 Hr	15	35	4 Hr	50
BP308P	Pharmaceutical Engineering –Practical	5	10	4 Hr	15	35	4 Hr	50
	Total	60	100	20 Hrs	160	440	28 Hrs	600

SEMESTER IV

Course code	Name of the course	Internal Assessment				Internal Assessment End Semester Exams		
		Continuous	Session	al Marks	Total	Marks	Duration	
		Mode	Exams	Duration				
BP401T	Pharmaceutical Organic Chemistry III– Theory	10	15	1 Hr	25	75	3 Hr	100
BP402T	Medicinal Chemistry I – Theory	10	15	1 Hr	25	75	3 Hr	100
BP403T	Physical Pharmaceutics II – Theory	10	15	1 Hr	25	75	3 Hr	100
BP404T	Pharmacology I – Theory	10	15	1 Hr	25	75	3 Hr	100
BP405T	Pharmacognosy and Phytochemistry I– Theory	10	15	1 Hr	25	75	3 Hr	100
BP406P	Medicinal Chemistry I – Practical	5	10	4 Hr	15	35	4 Hr	50
BP407P	Physical Pharmaceutics II – Practical	5	10	4 Hr	15	35	4 Hr	50
BP408P	Pharmacology I – Practical	5	10	4 Hr	15	35	4 Hr	50
BP409P	Pharmacognosy and Phytochemistry I – Practical	5	10	4 Hr	15	35	4 Hr	50
	Total	70	115	21 Hrs	185	515	31 Hrs	700

SEMESTER V

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous	Session	al Marks	Total	Marks	Duration	
		Mode	Exams	Duration				
BP501T	Medicinal Chemistry II – Theory	10	15	1 Hr	25	75	3 Hr	100
BP502T	Industrial Pharmacy I– Theory	10	15	1 Hr	25	75	3 Hr	100
BP503T	Pharmacology II – Theory	10	15	1 Hr	25	75	3 Hr	100
BP504T	Pharmacognosy and Phytochemistry II– Theory	10	15	1 Hr	25	75	3 Hr	100
BP505T	Pharmaceutical Jurisprudence – Theory	10	15	1 Hr	25	75	3 Hr	100
BP506P	Industrial Pharmacy I – Practical	5	10	4 Hr	15	35	4 Hr	50
BP507P	Pharmacology II – Practical	5	10	4 Hr	15	35	4 Hr	50
BP508P	Pharmacognosy and Phytochemistry II- Practical	5	10	4 Hr	15	35	4 Hr	50
	Total	65	105	17 Hrs	170	480	27 Hrs	650

SEMESTER VI

Course code	Name of the course	Internal Assessment				Internal Assessment End Semester Exams		emester ams	Total Marks
		Continuous	Session	al Marks	Total	Marks	Duration		
		Mode	Exams	Duration					
BP601T	Medicinal Chemistry III – Theory	10	15	1 Hr	25	75	3 Hr	100	
BP602T	Pharmacology III – Theory	10	15	1 Hr	25	75	3 Hr	100	
BP603T	Herbal Drug Technology – Theory	10	15	1 Hr	25	75	3 Hr	100	
BP604T	Biopharmaceutics and Pharmacokinetics- Theory	10	15	1 Hr	25	75	3 Hr	100	
BP605T	Pharmaceutical Biotechnology – Theory	10	15	1 Hr	25	75	3 Hr	100	
BP606T	Quality Assurance – Theory	10	15	1 Hr	25	75	3 Hr	100	
BP607P	Medicinal chemistry III – Practical	5	10	4 Hr	15	35	4 Hr	50	
BP608P	Pharmacology III – Practical	5	10	4 Hr	15	35	4 Hr	50	
BP609P	Herbal Drug Technology – Practical	5	10	4 Hr	15	35	4 Hr	50	
	Total	75	120	18 Hrs	195	555	30 Hrs	750	

SEMESTER VII

Course code	Name of the course	Internal Assessment				End Se Exa	Total Marks	
		Continuous	Session	al Marks	Total	Marks	Duration	
		Mode	Exams	Duration				
BP701T	Instrumental Methods of Analysis – Theory	10	15	1 Hr	25	75	3 Hr	100
BP702T	Industrial Pharmacy II – Theory	10	15	1 Hr	25	75	3 Hr	100
BP703T	Pharmacy Practice – Theory	10	15	1 Hr	25	75	3 Hr	100
BP704T	Novel Drug Delivery System – Theory	10	15	1 Hr	25	75	3 Hr	100
BP705P	Instrumental Methods of Analysis – Practical	5	10	4 Hr	15	35	4 Hr	50
BP706PS	Practice School*	25			25	125	5 Hr	150
	Total	70	70	8 Hrs	140	460	21 Hrs	600

* Non University Examination (NUE)

SEMESTER VIII

Course code	Name of the courseInternal AssessmentEnd		Internal Assessment					Total Marks
		Continuous	Session	al Marks	Total	Marks	Duration	
		Mode	Exams	Duration				
BP801T	Biostatistics and Research Methodology	10	15	1 Hr	25	75	3 Hr	100
BP802T	Social and Preventive Pharmacy	10	15	1 Hr	25	75	3 Hr	100
BP803ET	Pharma Marketing Management							
BP804ET	Pharmaceutical Regulatory Science							
BP805ET	Pharmacovigilance							
BP806ET	Quality Control and Standardization of							
	Herbals	10+10 = 20	15 + 15 =	1 Hr + 1 Hr	25 + 25 =	75 + 75 =	3Hr+3Hr	100+100
BP807ET	Computer Aided Drug Design		30	= 2 Hr	50	150	= 6 Hr	= 200
BP808ET	Cell and Molecular Biology							
BP809ET	Cosmetic Science							
BP810ET	Experimental Pharmacology							
BP811ET	Advanced Instrumentation Techniques							
BP812ET	Dietary Supplements and Nutraceuticals							
BP813PW	Project Work					150	4 Hrs	150
	Total	40	60	4 Hrs	100	450	16 Hrs	550

7. End Semester Examinations

The End Semester Examinations for each theory and practical course through semesters III to VIII shall be conducted by the university as shown in Table XIII. For the subjects with asterix symbol (*) in table VII for which examinations shall be conducted by the subject experts at Institute level and the marks/grades shall be submitted to the university as given in table–XIV.

8. Question paper pattern for end semester theory examinations For 75 marks paper

I. Multiple Choice Questions (MCQs) = 20 x 1 = 20 OR OR Objective Type Questions (10 x 2) = 10 x 2 = 20 (Answer all the questions) II. Long Answers (Answer 2 out of 3) = 2 x 10 = 20 III. Short Answers (Answer 7 out of 9) = 7 x 5 = 35

Total = 75 marks

For 50 marks paper

I. Long Answers (Answer 2 out of 3) = $2 \times 10 = 20$ II. Short Answers (Answer 6 out of 8) = $6 \times 5 = 30$

Total = 50 marks

For 35 marks paper

I. Long Answers (Answer 1 out of 2) = $1 \times 10 = 10$ II. Short Answers (Answer 5 out of 7) = $5 \times 5 = 25$

Total = 35 marks

Question paper pattern for end semester practical examinations

I. Synopsis	= 5
II. Experiments	= 25
III. Viva voce	= 5
	Total = 35 marks

9. End semester and Reappear examinations

End semester examination shall be conducted as per the schedule given in table XIII. The exact dates of examinations shall be notified by the University.

Table-2011. Tentative senerate of the senester examinations								
Semester	For Regular Candidates	For Failed Candidates						
III, V and VII	November / December	May / June						
IV, VI and VIII	May / June	November / December						

Table-XIII: Tentative schedule of end semester examinations

10. Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of B.Pharm. program if he/she secures at least 50% marks in that particular course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal assessment and end semester practical examination.

11. Grading of performances (Letter grades and grade points allocations)

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XIV.

Percentage of Marks Obtained	Letter grade	Grade Point	Marks
90.00-100	0	10	Outstanding
80.00-89.99	A	9	Excellent
70.00-79.99	В	8	Good
60.00-69.99	С	7	Fair
50.00-59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

Table-XIV

A student who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

12. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points Obtained in all the courses by the student during the semester. For example, if a student takes five courses(Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student's grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students' SGPA is equal to:

C1G1 + C2G2 + C3G3 + C4G4 + C5G5

SGPA

C1 + C2 + C3 + C4 + C5

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:

		C1G1 + C2G2 + C3G3 + C4* ZERO + C5G5
SGPA	=	
		C1 + C2 + C3 + C4 + C5

13. Cumulative Grade Point Average (CGPA)

=

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

 $CGPA = \frac{C1S1 + C2S2 + C3S3 + C4S4 + C5S5 + C6S6 + C7S7 + C8S8}{C1 + C2 + C3 + C4 + C5 + C6 + C7 + C8}$

where C1, C2, C3,.... is the total number of credits for semester I,II,III,.... and S1,S2, S3,....is the SGPA of semester I,II,III,.....

14. Declaration of class

The class shall be awarded on the basis of CGPA as follows: First Class with Distinction = CGPA of. 7.50 and above First Class = CGPA of 6.00 to 7.49 Second Class = CGPA of 5.00 to 5.99

15. Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

16. Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

B.PHARMACY-III SEMESTER (2017-2018)

BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY-II

Scope :	This subject deals we organic compounds. syllabus emphasizes of and ails are also include	with general methods of prepara Reactivity of organic compound on mechanisms and orientation of used in the avalabus	tion and reactions of some s are also studied here. The f reactions. Chemistry of fats		
Objectives:	and oils are also included in the syllabus. Upon completion of the course the student shall be able to				
	of the organic compound of reactions				
	 3. account for reactivity/stability of compounds, 4. prepare organic compounds Mars Markey 75 2. Harma/market 				
THEODY					
THEORY	Max. Marks: 75	1 otai nours: 45	5 Hours/week Exam. hours: 03		
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.				
Instructions to Candidates	Section A is comput Question carry 10 M Question carry 5 Mar	lsory. Attempt any TWO quest arks. Attempt any SEVEN quest ks.	tions from Section B. Each stions from Section C. Each		

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained. To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

- 1. Benzene and its derivatives: Analytical, synthetic and other 10 hours evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedel crafts alkylation- reactivity, limitations, Friedel crafts acylation. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction, Structure and uses of DDT, Saccharin, BHC and Chloramine
- 2. **Phenols*** Acidity of phenols, effect of substituents on acidity, 10 hours qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols.

Aromatic Amines* - Basicity of amines, effect of substituents on

basicity, and synthetic uses of aryl diazonium salts. **Aromatic Acids*** –Acidity, effect of substituents on acidity and important reactions of benzoic acid.

- 3. Fats and Oils:a) Fatty acids reactions, b) Hydrolysis, 10 hours Hydrogenation, Saponification and Rancidity of oils, Drying oils, c) Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination.
- **4. Polynuclear hydrocarbons:** a) Synthesis, reactions b) Structure and 08 hours medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives.
- 5. Cyclo alkanes*: Stabilities Baeyer's strain theory, limitation of 07 hours Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only.

BP305P. PHARMACEUTICAL ORGANIC CHEMISTRY -II PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

I Experiments involving laboratory techniques

i) Recrystallization ii) Steam distillation

II Determination of following oil values (including standardization of reagents)

i) Acid value ii) Saponification value iii) Iodine value

III Preparation of compounds

- 1. Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2. 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination) reaction.
- 3. 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- 4. Benzoic acid from Benzyl chloride by oxidation reaction.
- 5. Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 6. 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.
- 7. Benzil from Benzoin by oxidation reaction.
- 8. Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction
- 9. Cinnammic acid from Benzaldehyde by Perkin reaction
- 10. *P*-Iodo benzoic acid from *P*-amino benzoic acid

Recommended Books (Latest Editions)

- 1. Organic Chemistry by Morrison and Boyd
- 2. Organic Chemistry by I.L. Finar, Volume-I
- 3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
- 4. Organic Chemistry by P.L.Soni
- 5. Practical Organic Chemistry by Mann and Saunders.
- 6. Vogel's text book of Practical Organic Chemistry
- 7. Advanced Practical organic chemistry by N.K.Vishnoi.
- 8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

BP302T. PHYSICAL PHARMACEUTICS-I

Scope : The course deals with the various physica and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon the completion of the course student shall be able to

- 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms.
- 2. Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations
- 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

THEORYMax. Marks: 75Total hours: 453 Hours/weekExam. hours: 03

- InstructionsThe question paper contains 3 Sections. Section A (compulsory) have 10 questionsto the
paper-setter(2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks
each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each)
carrying 35 marks.
- InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.
 - 1. Solubility of drugs: Solubility expressions, mechanisms of solute 10 hours solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications.

- States of Matter and properties of matter: State of matter, changes 10 hours in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism.
 Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications
- **3. Surface and interfacial phenomenon:** Liquid interface, surface & 10 hours interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.
- **4. Complexation and protein binding:** Introduction, Classification of 08 hours Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.
- **5. pH, buffers and Isotonic solutions:** Sorensen's pH scale, pH 07 hours determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

BP306P. PHYSICAL PHARMACEUTICS-I PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Determination the solubility of drug at room temperature
- 2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
- 3. Determination of Partition co- efficient of benzoic acid in benzene and water
- 4. Determination of Partition co- efficient of Iodine in CCl4 and water
- 5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
- 6. Determination of surface tension of given liquids by drop count and drop weight method
- 7. Determination of HLB number of a surfactant by saponification method
- 8. Determination of Freundlich and Langmuir constants using activated char coal
- 9. Determination of critical micellar concentration of surfactants
- 10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
- 11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

Recommended Books (Latest Editions)

- 1. Physical Pharmacy by Alfred Martin
- 2. Experimental Pharmaceutics by Eugene, Parott.
- 3. Tutorial Pharmacy by Cooper and Gunn.
- 4. Stocklosam J. Pharmaceutical Calculations, Lea & Febiger, Philadelphia.
- 5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
- Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
- 7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
- 8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
- 9. Physical Pharmaceutics by C.V.S. Subramanyam
- 10. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar

BP 303 T. PHARMACEUTICAL MICROBIOLOGY

- Scope Study of all categories of microorganisims especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc. **Objectives:** Upon completion of the subject student shall be able to; 1. Understand methods of identification, cultivation and preservation of various microorganisms 2. To understand the importance and implementation of sterlization in pharmaceutical processing and industry 3. Learn sterility testing of pharmaceutical products. 4. Carried out microbiological standardization of Pharmaceuticals. 5. Understand the cell culture technology and its applications in pharmaceutical industries. THEORY Max. Marks: 75 Total hours: 45 **3 Hours/week** Exam. hours: 03 Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions
- to the paper-setter (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

1. Introduction, history of microbiology, its branches, scope and its 10 hours importance. Introduction to Prokaryotes and Eukaryotes, Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and

preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). Study of different types of phase constrast microscopy, dark field microscopy and electron microscopy.

- 2. Identification of bacteria using staining techniques (simple, Gram's 10 hours &Acid fast staining) and biochemical tests (IMViC). Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization. Evaluation of the efficiency of sterilization methods. Equipments employed in large scale sterilization. Sterility indicators.
- **3.** Study of morphology, classification, reproduction/replication and 10 hours cultivation of Fungi and Viruses.Classification and mode of action of disinfectants, Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions Evaluation of bactericidal & Bacteriostatic. Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.
- 4. Designing of aseptic area, laminar flow equipments; study of 08 hours different sources of contamination in an aseptic area and methods of prevention, clean area classification. Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.
- 5. Types of spoilage, factors affecting the microbial spoilage of 07 hours pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research.

BP 307P.PHARMACEUTICAL MICROBIOLOGY PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
- 2. Sterilization of glassware, preparation and sterilization of media.
- 3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
- 4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
- 5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other

techniques.

- 6. Microbiological assay of antibiotics by cup plate method and other methods
- 7. Motility determination by Hanging drop method.
- 8. Sterility testing of pharmaceuticals.
- 9. Bacteriological analysis of water
- 10. Biochemical test.

Recommended Books (Latest Editions)

- 1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
- 2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
- 3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
- 4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
- 5. Rose: Industrial Microbiology.
- 6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
- 7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
- 8. Peppler: Microbial Technology.
- 9. I.P., B.P., U.S.P.- latest editions.
- 10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
- 11. Edward: Fundamentals of Microbiology.
- 12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
- 13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

BP 304 T. PHARMACEUTICAL ENGINEERING

Objectives: U	Upon completion of the cou				
1 2 3 4 5 1	 Upon completion of the course student shall be able: 1. To know various unit operations used in Pharmaceutical industries. 2. To understand the material handling techniques. 3. To perform various processes involved in pharmaceutical manufacturing process. 4. To carry out various test to prevent environmental pollution. 5. To appreciate and comprehend significance of plant lay out design for optimum use of resources 				
e F	6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.				
THEORY N	Max. Marks: 75	Total hours: 45	3 Hours/week Exam. hours: 03		

InstructionsThe question paper contains 3 Sections. Section A (compulsory) have 10 questionsto the(2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks)

each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) paper-setter carrying 35 marks.

Instructions Section A is compulsory. Attempt any **TWO** questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each to Candidates Question carry 5 Marks.

1. Flow of fluids: Types of manometers, Reynolds number and its 10 hours significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank. 2. Heat Transfer: Objectives, applications & Heat transfer 10 hours mechanisms. Fourier's law, Heat transfer by conduction, convection

Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator.

& radiation. Heat interchangers & heat exchangers.

Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

3. **Drving:** Objectives, applications & mechanism of drving process, 10 hours measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

> Mixing: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier.

Filtration: Objectives, applications, Theories & Factors influencing 08 hours 4. filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and

Seidtz filter.

Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

5. Materials of pharmaceutical plant construction, Corrosion and 07 hours its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

Recommended Books (Latest Editions)

- 1. Introduction to chemical engineering Walter L Badger & Julius Banchero, Latest edition.
- 2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson-Latest edition.
- 3. Unit operation of chemical engineering Mcabe Smith, Latest edition.
- 4. Pharmaceutical engineering principles and practices C.V.S Subrahmanyam et al., Latest edition.
- 5. Remington practice of pharmacy- Martin, Latest edition.
- 6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
- 7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.
- 8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

BP308P - PHARMACEUTICAL ENGINEERING PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Determination of radiation constant of brass, iron, unpainted and painted glass.
- 2. Steam distillation To calculate the efficiency of steam distillation.
- 3. To determine the overall heat transfer coefficient by heat exchanger.
- 4. Construction of drying curves (for calcium carbonate and starch).
- 5. Determination of moisture content and loss on drying.
- 6. Determination of humidity of air i) From wet and dry bulb temperatures –use of Dew point method.
- 7. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
- 8. Size analysis by sieving To evaluate size distribution of tablet granulations Construction of various size frequency curves including arithmetic and logarithmic probability plots.
- 9. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
- 10. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.

- 11. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
- 12. To study the effect of time on the Rate of Crystallization.
- 13. To calculate the uniformity Index for given sample by using Double Cone Blender.

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

B.PHARMACY-IV SEMESTER (2017-2018)

BP401T. PHARMACEUTICAL ORGANIC CHEMISTRY-III

Scope :	This subject imparts ke and organic reactions, cyclic compounds. It compounds.	nowledge on stereo-chemical as important named reactions, ch also emphasizes on medicinal	spects of organic compounds nemistry of important hetero l and other uses of organic		
Objectives:	At the end of the cours	e, the student shall be able to			
Ū	 understand the methods of preparation and properties of organic compounds explain the stereo chemical aspects of organic compounds and stereo chemical reactions 				
	3. know the medicinal uses and other applications of organic compounds				
THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week		
			Exam. hours: 03		
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.				
Instructions to	Section A is compuls Ouestion carry 10 Ma	ory. Attempt any TWO ques rks. Attempt any SEVEN que	tions from Section B. Each stions from Section C. Each		

Candidates Question carry 5 Marks.

Note: To emphasize on definition, types, mechanisms, examples, uses/applications

- 1. Stereo isomerism:Optical isomerism Optical activity, 10 hours enantiomerism, diastereoisomerism, meso compounds, Elements of symmetry, chiral and achiral molecules, DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers, Reactions of chiral molecules, Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute
- 2. Geometrical isomerism, Nomenclature of geometrical isomers (Cis 10 hours Trans, EZ, Syn Anti systems), Methods of determination of configuration of geometrical isomers. Conformational isomerism in Ethane, n-Butane and Cyclohexane. Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity. Stereospecific and stereoselective reactions

- 3. Heterocyclic compounds: Nomenclature and classification. 10 hours Synthesis, reactions and medicinal uses of following compounds/derivatives, Pyrrole, Furan, and Thiophene, Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene.
- **4.** Synthesis, reactions and medicinal uses of following 08 hours compounds/derivatives, Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine, Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives
- Reactions of synthetic importance: Metal hydride reduction 07 hours (NaBH₄ and LiAlH₄), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation

Recommended Books (Latest Editions)

- 1. Organic chemistry by I.L. Finar, Volume-I & II.
- 2. A text book of organic chemistry Arun Bahl, B.S. Bahl.
- 3. Heterocyclic Chemistry by Raj K. Bansal
- 4. Organic Chemistry by Morrison and Boyd
- 5. Heterocyclic Chemistry by T.L. Gilchrist

BP402T. MEDICINAL CHEMISTRY-I

Scope : Objectives:	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class. Upon completion of the course the student shall be able to 1. understand the chemistry of drugs with respect to their pharmacological activity 2 understand the drug metabolia pathways, adverse affect and therapeutic using of			
	 2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. know the Structural Activity Relationship (SAR) of different class of drugs 4. write the chemical synthesis of some drugs 			
THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week	
			Exam. hours: 03	
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.			
Instructions	Section A is compuls	sory. Attempt any TWO question	ons from Section B. Each	

Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each to Candidates Question carry 5 Marks.

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

1. **Introduction to Medicinal Chemistry** 10 hours History and development of medicinal chemistry Physicochemical properties in relation to biological action: Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism: Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects. 2. **Drugs acting on Autonomic Nervous System** 10 hours Adrenergic Neurotransmitters: Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. Sympathomimetic agents: SAR of Sympathomimetic agents: Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Agents with mixed mechanism: Ephedrine, Metaraminol. **Adrenergic Antagonists:** Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol. 3. **Cholinergic neurotransmitters:** Biosynthesis and catabolism of 10 hours acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (**Reversible** & Physostigmine, **Irreversible**): Neostigmine*. Pyridostigmine, hydrochloride, Ambenonium Edrophonium chloride, Tacrine chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion.

Cholinesterase reactivator: Pralidoxime chloride.

Cholinergic Blocking agents: SAR of cholinolytic agents

10(107)

Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.

Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

4.

5.

Drugs acting on Central Nervous System A. Sedatives and Hypnotics:

08 hours

Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem

Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital

Miscelleneous:

Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.

B. Antipsychotics

Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

Ring Analogues of Phenothiazeines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.

Fluro buterophenones: Haloperidol, Droperidol, Risperidone.

Beta amino ketones: Molindone hydrochloride.

Benzamides: Sulpieride.

C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action

Hvdantoins: Barbiturates: Phenobarbitone, Methabarbital. Phenytoin*, Ethotoin Oxazolidine diones: Mephenytoin, Trimethadione, Paramethadione Succinimides: Phensuximide, Ethosuximide* Methsuximide. Urea and monoacvlureas: Phenacemide, Carbamazepine* Benzodiazepines: Clonazepam

Miscellaneous: Primidone, Valproic acid , Gabapentin, Felbamate **Drugs acting on Central Nervous System**

07 hours

General anesthetics: Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.

Ultra short acting barbitutrates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium.

Dissociative anesthetics: Ketamine hydrochloride.*
Narcotic and non-narcotic analgesics

Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide citrate*, hvdrochloride*. hydrochloride, Fentanyl Methadone Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate. Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride. Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate. Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac. Ketorolac. Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

BP406P. MEDICINAL CHEMISTRY-I PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

I Preparation of drugs/ intermediates

i) 1,3-pyrazole	ii) 1,3-oxazole	iii) Benzimidazole
iv) Benztriazole	v) 2,3- diphenyl quinoxaline	vi) Benzocaine
vii) Phenytoin	viii) Phenothiazine	ix) Barbiturate
II Assay of drugs i) Chlorpromazine	ii) Phenobarbitone	iii) Atropine
iv) Ibuprofen	v) Aspirin	vi) Furosemide

III Determination of Partition coefficient for any two drugs

Recommended Books (Latest Editions)

- 1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
- 2. Foye's Principles of Medicinal Chemistry.
- 3. Burger's Medicinal Chemistry, Vol I to IV.
- 4. Introduction to principles of drug design- Smith and Williams.
- 5. Remington's Pharmaceutical Sciences.
- 6. Martindale's extra pharmacopoeia.
- 7. Organic Chemistry by I.L. Finar, Vol. II.
- 8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
- 9. Indian Pharmacopoeia.
- 10. Text book of practical organic chemistry- A.I.Vogel.

BP 403 T. PHYSICAL PHARMACEUTICS-II

Scope : The course deals with the various physica and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon the completion of the course student shall be able to

- 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
- 2. Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations
- 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

THEORYMax. Marks: 75Total hours: 453 Hours/weekExam. hours: 03

Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

- 1. Colloidal dispersions: Classification of dispersed systems & their 07 hours general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization& protective action.
- 2. Rheology: Newtonian systems, law of flow, kinematic viscosity, 08 hours effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers.
 Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus.
- **3. Coarse dispersion:** Suspension, interfacial properties of suspended 10 hours particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, micro emulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.

- 4. Micromeretics: Particle size and distribution, mean particle size, 10 hours number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.
- 5. Drug stability: Reaction kinetics: zero, pseudo-zero, first & second 10 hours order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention.

BP 407P. PHYSICAL PHARMACEUTICS-II PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Determination of particle size, particle size distribution using sieving method
- 2. Determination of particle size, particle size distribution using Microscopic method
- 3. Determination of bulk density, true density and porosity
- 4. Determine the angle of repose and influence of lubricant on angle of repose
- 5. Determination of viscosity of liquid using Ostwald's viscometer
- 6. Determination sedimentation volume with effect of different suspending agent
- 7. Determination sedimentation volume with effect of different concentration of single suspending agent
- 8. Determination of viscosity of semisolid by using Brookfield viscometer
- 9. Determination of reaction rate constant first order.
- 10. Determination of reaction rate constant second order
- 11. Accelerated stability studies

Recommended Books (Latest Editions)

- 1. Physical Pharmacy by Alfred Martin, Sixth edition
- 2. Experimental pharmaceutics by Eugene, Parott.
- 3. Tutorial pharmacy by Cooper and Gunn.
- 4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia.
- 5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.

6. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.

7. Physical Pharmaceutics by Ramasamy C, and Manavalan R.

BP 404 T. PHARMACOLOGY-I

Scope : The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

Objectives: Upon completion of this course the student should be able to

1. Understand the pharmacological actions of different categories of drugs

2. Explain the mechanism of drug action at organ system/sub cellular/macromolecular levels.

3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

4. Observe the effect of drugs on animals by simulated experiments

- 5. Appreciate correlation of pharmacology with other bio medical sciences
- THEORYMax. Marks: 75Total hours: 453 Hours/weekExam. hours: 03

Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

- 1. 1. General Pharmacology: a. Introduction to Pharmacology-08 hours Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists (competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs. Enzyme induction, enzyme inhibition, kinetics of elimination
- 2. General Pharmacology: a. Pharmacodynamics- Principles and 12 hours mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription

factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

- 3. 2. Pharmacology of drugs acting on peripheral nervous system: a. 10 hours Organization and function of ANS. b.Neurohumoral transmission, coclassification of neurotransmitters. transmission and c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma
- 4. 3. Pharmacology of drugs acting on central nervous system:a. 08 hours Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and preanesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram
- **3. Pharmacology of drugs acting on central nervous system** a. 07 hours Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.

BP 408 P.PHARMACOLOGY-I PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Introduction to experimental pharmacology.
- 2. Commonly used instruments in experimental pharmacology.
- 3. Study of common laboratory animals.
- 4. Maintenance of laboratory animals as per CPCSEA guidelines.
- 5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
- 6. Study of different routes of drugs administration in mice/rats.
- 7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
- 8. Effect of drugs on ciliary motility of frog oesophagus
- 9. Effect of drugs on rabbit eye.
- 10. Effects of skeletal muscle relaxants using rota-rod apparatus.
- 11. Effect of drugs on locomotor activity using actophotometer.
- 12. Anticonvulsant effect of drugs by MES and PTZ method.

- 13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
- 14. Study of anxiolytic activity of drugs using rats/mice.
- 15. Study of local anesthetics by different methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

- 1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
- 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
- 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
- 4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
- 5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
- 6. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
- 7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
- 8. Modern Pharmacology with clinical Applications, by Charles R. Craig & Robert,
- 9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
- 10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

BP 405 T.PHARMACOGNOSY AND PHYTOCHEMISTRY-I

Scope : Objectives:	The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties. Upon completion of the course, the student shall be able 1, to know the techniques in the cultivation and production of crude drugs			
	 to know the technic to know the crude of know the evaluation to carry out the mic 	 to know the techniques in the cultivation and production of crude drugs to know the crude drugs, their uses and chemical nature know the evaluation techniques for the herbal drugs to carry out the microscopic and morphological evaluation of crude drugs 		
THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week Exam_bours: 03	
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.			
Instructions to Candidates	Section A is compu Question carry 10 M Question carry 5 Mar	lsory. Attempt any TWO quest farks. Attempt any SEVEN quest ks.	tions from Section B. Each stions from Section C. Each	

1. Introduction to Pharmacognosy: (a) Definition, history, scope and 10 hours development of Pharmacognosy (b) Sources of Drugs – Plants, Animals, Marine & Tissue culture (c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).

Classification of drugs: Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs

Quality control of Drugs of Natural Origin: Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties. Quantitative microscopy of crude drugs including lycopodium spore method, leafconstants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

2. Cultivation, Collection, Processing and storage of drugs of 10 hours natural origin: Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants

- **3. Plant tissue culture:** Historical development of plant tissue culture, 07 hours types of cultures, Nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy. Edible vaccines.
- **4. Pharmacognosy in various systems of medicine:** Role of 10 hours Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites: Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

5. Study of biological source, chemical nature and uses of drugs of 08 hours natural origin containing following drugs

Plant Products: Fibers - Cotton, Jute, Hemp, Hallucinogens, Teratogens, Natural allergens

Primary metabolites: General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes: Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs: Novel medicinal agents from marine sources

BP409 P. PHARMACOGNOSY AND PHYTOCHEMISTRY-I PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Analysis of crude drugs by chemical tests: (i)Tragaccanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
- 2. Determination of stomatal number and index
- 3. Determination of vein islet number, vein islet termination and paliside ratio.
- 4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
- 5. Determination of Fiber length and width
- 6. Determination of number of starch grains by Lycopodium spore method
- 7. Determination of Ash value
- 8. Determination of Extractive values of crude drugs
- 9. Determination of moisture content of crude drugs
- 10. Determination of swelling index and foaming

Recommended Books (Latest Editions)

- 1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
- 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
- 3. Text Book of Pharmacognosy by T.E. Wallis
- 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
- 6. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
- 8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
- 9. Anatomy of Crude Drugs by M.A. Iyengar

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

B.PHARMACY-V SEMESTER (2017-2018)

BP501T. MEDICINAL CHEMISTRY-II

Scope :	This subject is designed to chemistry and therapeutic va activity relationships of drug metabolism of drugs. The s important drugs under each cla	impart fundamental kn lue of drugs. The subje gs, importance of phys yllabus also emphasizes ass.	nowledge on the structure, ect emphasizes on structure icochemical properties and s on chemical synthesis of
Objectives:	Upon completion of the course 1. Understand the chemistry o 2. Understand the drug metabo of drugs	e the student shall be able f drugs with respect to the olic pathways, adverse ef	e to eir pharmacological activity fect and therapeutic value
	3. Know the Structural Activit 4. Study the chemical synthesi	y Relationship of differe s of selected drugs	nt class of drugs
THEORY	Max. Marks: 75 T	otal hours: 45	3 Hours/week Exam. hours: 03
Instructions to the paper-setter	The question paper contains 3 (2 marks each) carrying 20 marks. Sec carrying 35 marks.	Sections. Section A (contarks. Section B have 3 q tion C have 9 questions	mpulsory) have 10 questions uestions (any two, 10 marks s (any seven, 5 marks each)

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

1. Antihistaminic agents: Histamine, receptors and their distribution in 10 hours the humanbody H1–antagonists: Diphenhydramine hydrochloride*. Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate. Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

H2-antagonists: Cimetidine*, Famotidine, Ranitidin.

Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole

Anti-neoplastic agents:

Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepa

Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine.

Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate Miscellaneous: Cisplatin, Mitotane.

2. Anti-anginal:

10 hours

Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole.

Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide. Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol

Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.

3. Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide 10 hours hydrochloride, Disopyramide phosphate*,Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol.

Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol

Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel

Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

Drugs acting on Endocrine system: Nomenclature, Stereochemistry 08 hours and metabolism of steroids
 Sex hormones: Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.
 Drugs for erectile dysfunction: Sildenafil, Tadalafil.
 Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol
 Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone

Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

5. Antidiabetic agents: Insulin and its preparations. Sulfonyl ureas: 07 hours Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Thiazolidinediones: Metformin. Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acrabose, Voglibose. Local Anesthetics: SAR of Local anesthetics Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. Miscellaneous: Phenacaine, Diperodon, Dibucaine.*

Recommended Books (Latest Editions)

- 1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
- 2. Foye's Principles of Medicinal Chemistry.
- 3. Burger's Medicinal Chemistry, Vol I to IV.
- 4. Introduction to principles of drug design- Smith and Williams.
- 5. Remington's Pharmaceutical Sciences.
- 6. Martindale's extra pharmacopoeia.
- 7. Organic Chemistry by I.L. Finar, Vol. II.
- 8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
- 9. Indian Pharmacopoeia.
- 10. Text book of practical organic chemistry- A.I.Vogel.

BP 502 T. Industrial Pharmacy-I

Scope	:	Course enables the student to understand and appreciate the influence of				
		pharmaceutical additives and various pharmaceutical dosage forms on the				
		performance of the drug product.				
Objective	es:	Upon completion of the course the student shall be able to				
-		1. Know the various pharmaceutical dosage forms and their manufacturing				
		techniques.				
		2. Know various considerations in development of pharmaceutical dosage forms				
		3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their				
		quality				

THEORYMax. Marks: 75Total hours: 453 Hours/week

Instructions to the paper-setter The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

1. **Preformulation Studies:** Introduction to preformulation, goals and 07 hours objectives, study of physicochemical characteristics of drug substances.

a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism

b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization BCS classification of drugs & its significant, Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

2. **Tablets:** a. Introduction, ideal characteristics of tablets, classification 10 hours of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.

b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.

c. Quality control tests: In process and finished product tests **Liquid orals:** Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia.

3. Capsules: a. *Hard gelatin capsules:* Introduction, Production of hard 08 hours gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.
b. *Soft gelatin capsules:* Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets

4. **Parenteral Products:** a. Definition, types, advantages and 10 hours limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity b. Production procedure, production facilities and controls, aseptic processing c.

Formulation of injections, sterile powders, large volume parenterals and lyophilized products. d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.

Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations

5. Cosmetics: Formulation and preparation of the following cosmetic 10 hours preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.

Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies. **Packaging Materials Science:** Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.

BP 506 P. Industrial Pharmacy-I PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Preformulation studies on paracetamol/asparin/or any other drug
- 2. Preparation and evaluation of Paracetamol tablets
- 3. Preparation and evaluation of Aspirin tablets
- 4. Coating of tablets- film coating of tables/granules
- 5. Preparation and evaluation of Tetracycline capsules
- 6. Preparation of Calcium Gluconate injection
- 7. Preparation of Ascorbic Acid injection
- 8. Qulaity control test of (as per IP) marketed tablets and capsules
- 9. Preparation of Eye drops/ and Eye ointments
- 10. Preparation of Creams (cold / vanishing cream)
- 11. Evaluation of Glass containers (as per IP)

Recommended Books (Latest Editions)

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman & J.B. Schwartz

- 2. Pharmaceutical dosage form Parenteral medication vol- 1&2 by Liberman & Lachman
- 3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
- 4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
- 5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)

6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman

7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition

8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea & Febiger, Philadelphia, 5^{th} edition, 2005

9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

BP503.T. PHARMACOLOGY-II

Scope :	This subject is intended to impart the fundamental knowledge on various aspect (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.
Objectives:	Upon completion of this course the student should be able to 1. Understand the mechanism of drug action and its relevance in the treatment of different diseases 2. Demonstrate isolation of different organs/tissues from the laboratory animals by
THEODY	 simulated experiments Demonstrate the various receptor actions using isolated tissue preparation Appreciate correlation of pharmacology with related medical sciences Max Marka 75
INFORT	Max. Marks: 75Total hours: 455 Hours/weekExam. hours: 03
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 question. (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each carrying 35 marks.
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Eacl Question carry 10 Marks. Attempt any SEVEN questions from Section C. Eacl Question carry 5 Marks.
1.	1. Pharmacology of drugs acting on cardio vascular system: a. 10 hours Introduction to hemodynamic and electrophysiology of heart. b. Drugs used in congestive heart failure c. Anti-hypertensive drugs. d. Anti-anginal drugs. e. Anti-arrhythmic drugs. f. Anti-hyperlipidemic drugs
2.	1. Pharmacology of drugs acting on cardio vascular system: a. 10 hours Drug used in the therapy of shock. b. Hematinics, coagulants and anticoagulants. c. Fibrinolytics and anti-platelet drugs d. Plasma volume expanders
	2. Pharmacology of drugs acting on urinary system: a. Diuretics b. Anti-diuretics.

- **3. 3. Autocoids and related drugs:**a. Introduction to autacoids and 10 hours classification b. Histamine, 5-HT and their antagonists. c. Prostaglandins, Thromboxanes and Leukotrienes. d. Angiotensin, Bradykinin and Substance P. e. Non-steroidal anti-inflammatory agents f. Anti-gout drugs g. Antirheumatic drugs
- 4. 5. Pharmacology of drugs acting on endocrine system: a. Basic 08 hours concepts in endocrine pharmacology. b. Anterior Pituitary hormonesanalogues and their inhibitors. c. Thyroid hormones- analogues and their inhibitors. d. Hormones regulating plasma calcium level-Parathormone, Calcitonin and Vitamin-D. d. Insulin, Oral Hypoglycemic agents and glucagon. e. ACTH and corticosteroids.
- 5. 5. Pharmacology of drugs acting on endocrine system: a. 07 hours Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus.
 6. Bioassay a. Principles and applications of bioassay. b. Types of

bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH, dtubocurarine, digitalis, histamine and 5-HT

BP 507 P. PHARMACOLOGY-II PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
- 2. Effect of drugs on isolated frog heart.
- 3. Effect of drugs on blood pressure and heart rate of dog.
- 4. Study of diuretic activity of drugs using rats/mice.
- 5. DRC of acetylcholine using frog rectus abdominis muscle.
- 6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
- 7. Bioassay of histamine using guinea pig ileum by matching method.
- 8. Bioassay of oxytocin using rat uterine horn by interpolation method.
- 9. Bioassay of serotonin using rat fundus strip by three point bioassay.
- 10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
- 11. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method).
- 12. Determination of PD2 value using guinea pig ileum.
- 13. Effect of spasmogens and spasmolytics using rabbit jejunum.
- 14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
- 15. Analgesic activity of drug using central and peripheral methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

- 1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
- 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
- 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
- 4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
- 5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
- 6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
- 7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
- 8. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert.
- 9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
- 10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY-II

Scope :	The main purpose of subject secondary metabolites are pri- and produce them industrial the plants and phytochemicate basic principles of traditional	t is to impart the oduced in the cru lly. Also this sub als through plant l system of medic	e students the knowledge of how ide drugs, how to isolate and iden ject involves the study of produc tissue culture, drug interactions ine	the tify cing and
Objectives:	Upon completion of the cour 1. to know the mo- identification of the h	rse, the student sh dern extraction perbal drugs and r	all be able techniques, characterization hytoconstituents	and
	 to understand the pre to understand the her to carryout isolation 	paration and deve bal drug interaction and identification	Plopment of herbal formulation. ons of phytoconstituents	
THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week	
THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week Exam. hours:	03
THEORY Instructions to the paper-setter	Max. Marks: 75 The question paper contains (2 marks each) carrying 20 marks. So carrying 35 marks.	Total hours: 45 3 Sections. Section narks. Section B ection C have 9	3 Hours/week Exam. hours: on A (compulsory) have 10 quest have 3 questions (any two, 10 ma questions (any seven, 5 marks ea	03 ions arks ach)

1. **Metabolic pathways in higher plants and their determination:** a) 07 hours Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways-Shikimic acid pathway, Acetate pathways and Amino acid pathway. b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies. 2. General introduction, composition, chemistry & chemical classes, 14 hours biosources, therapeutic uses and commercial applications of following secondary metabolites: Alkaloids: Vinca, Rauwolfia, Belladonna, Opium, Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander, Tannins: Catechu, Pterocarpus **Resins:** Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony Glycosides: Senna, Aloes, Bitter Almond Iridoids, Other terpenoids & Naphthaquinones: Gentian,

Artemisia, taxus, carotenoids

- **3.** Isolation, Identification and Analysis of Phytoconstituents: a) 06 hours Terpenoids: Menthol, Citral, Artemisin b) Glycosides: Glycyrhetinic acid & Rutin c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine d) Resins: Podophyllotoxin, Curcumin
- **4.** Industrial production, estimation and utilization of the following 10 hours phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine
- 5. **Basics of Phytochemistry:** Modern methods of extraction, 08 hours application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

BP 508 P. PHARMACOGNOSY AND PHYTOCHEMISTRY-II PRACTICAL

Max. Marks: 35

4 Hours/week

Exam. hours: 04

- 1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
- 2. Exercise involving isolation & detection of active principles a. Caffeine from tea dust. b. Diosgenin from Dioscorea c. Atropine from Belladonna d. Sennosides from Senna
- 3. Separation of sugars by Paper chromatography
- 4. TLC of herbal extract
- 5. Distillation of volatile oils and detection of phytoconstitutents by TLC
- 6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

Recommended Books (Latest Editions)

- 1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
- 2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
- 4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
- 6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
- 7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
- 8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
- 9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
- 10. The formulation and preparation of cosmetic, fragrances and flavours.
- 11. Remington's Pharmaceutical sciences.
- 12. Text Book of Biotechnology by Vyas and Dixit.
- 13. Text Book of Biotechnology by R.C. Dubey.

BP 505 T. PHARMACEUTICAL JURISPRUDENCE

Scope :	This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.		
Objectives:	 Upon completion of the course, the student shall be able to understand: 1. The Pharmaceutical legislations and their implications in the development marketing of pharmaceuticals. 2. Various Indian pharmaceutical Acts and Laws 3. The regulatory authorities and agencies governing the manufacture and sale pharmaceuticals 		
	4. The code of ethics during the pharmaceutical practice		
THEORY	Max. Marks: 75Total hours: 453 Hours/weekExam. hours: 03		
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.		
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each Question carry 5 Marks.		

- Drugs and Cosmetics Act, 1940 and its rules 1945: Objectives, 10 hours Definitions, Legal definitions of schedules to the Act and Rules. Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.
- 2. Drugs and Cosmetics Act, 1940 and its rules 1945: Detailed study 10 hours of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties. Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors
- **3. Pharmacy Act –1948**: Objectives, Definitions, Pharmacy Council of 10 hours India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties.

Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.

Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

4. Study of Salient Features of Drugs and Magic Remedies Act and 08 hours its rules: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties

> **Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties

> **National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk

drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

5. Pharmaceutical Legislations – A brief review, Introduction, Study 07 hours of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
 Code of Pharmaceutical ethics D efinition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's

oath

Medical Termination of Pregnancy Act Right to Information Act Introduction to Intellectual Property Rights (IPR)

Recommended Books (Latest Editions)

- 1. Forensic Pharmacy by B. Suresh
- 2. Text book of Forensic Pharmacy by B.M. Mithal
- 3. Hand book of drug law-by M.L. Mehra
- 4. A text book of Forensic Pharmacy by N.K. Jain
- 5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
- 6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
- 7. Narcotic drugs and psychotropic substances act by Govt. of India publications
- 8. Drugs and Magic Remedies act by Govt. of India publication
- 9. Bare Acts of the said laws published by Government. Reference books (Theory)

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

B.PHARMACY-VI SEMESTER (2017-2018)

BP601T. MEDICINAL CHEMISTR-III

Scope :	This subject is desig chemistry and therap techniques of rational (QSAR), Prodrug con design (CADD). The action, metabolism, therapeutic uses and sy	gned to impart fundamental beutic value of drugs. The drug design like quantitativ ncept, combinatorial chemis subject also emphasizes or adverse effects, Structure withesis of important drugs.	knowledge on the structure, subject emphasis on modern e structure activity relationship stry and Computer aided drug a the chemistry, mechanism of Activity Relationships (SAR),
Objectives:	Upon completion of th	ne course student shall be able	e to
9	1. Understand the im design.	portance of drug design an	d different techniques of drug
	2. Understand the cher	mistry of drugs with respect t	o their biological activity.
	3. Know the metabolis	sm, adverse effects and therap	peutic value of drugs.
	4. Know the important	ce of SAR of drugs.	
THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week
			Exam. hours: 03
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.		
Instructions	Section A is compuls	sory. Attempt any TWO qu	lestions from Section B. Each
to	Question carry 10 Ma	arks. Attempt any SEVEN c	uestions from Section C. Each
Candidates	Question carry 5 Mark	ζς.	

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted by (*)

 Antibiotics: Historical background, Nomenclature, Stereochemistry, 10 hours Structure activity relationship, Chemical degradation classification and important products of the following classes.
 β-Lactam antibiotics: Penicillin, Cepholosporins, β- Lactamase inhibitors, Monobactams Aminoglycosides: Streptomycin, Neomycin, Kanamycin Tetracyclines: Tetracycline, Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline 2. Antibiotics: Historical background, Nomenclature, Stereochemistry, 10 hours Structure activity relationship, Chemical degradation classification and important products of the following classes. Macrolide: Erythromycin Clarithromycin, Azithromycin. Miscellaneous: Chloramphenicol*, Clindamycin. **Prodrugs:** Basic concepts and application of prodrugs design. Antimalarials: Etiology of malaria. Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaguine phosphate, Pamaguine*, Quinacrine hydrochloride, Mefloquine. Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil. Miscellaneous: Pyrimethamine, Artesunete, Artemether, Atovoquone. 3. 10 hours **Anti-tubercular Agents** Synthetic anti tubercular agents: Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.* Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycine, Capreomycin sulphate. Urinary tract anti-infective agents Quinolones: SAR of quinolones, Nalidixic Acid, Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine. **Antiviral agents:** Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine. Lamivudine. Loviride. Delavirding. Ribavirin. Saquinavir, Indinavir, Ritonavir.

4. Antifungal agents:

Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin.

Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole. Oxiconazole Tioconozole. Miconazole*. Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*.

Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.

Anthelmintics: Diethylcarbamazine citrate*. Thiabendazole, Albendazole. Mebendazole*. Niclosamide. Oxamniquine. Praziquantal, Ivermectin.

Sulphonamides and Sulfones: Historical development, chemistry, Sulfonamides: Sulphamethizole, classification and SAR of Sulfisoxazole, Sulphamethizine, Sulfacetamide*, Sulphapyridine, Sulfamethoxaole*, Sulphadiazine, Mefenide acetate, Sulfasalazine. Folate reductase inhibitors: Trimethoprim*, Cotrimoxazole.

08 hours

Sulfones: Dapsone*.

5. Introduction to Drug Design: Various approaches used in drug 07 hours design. Physicochemical parameters used in quantitative structure activityrelationship (QSAR) such as partition coefficient, Hammet's electronic parameter, Tafts steric parameter and Hansch analysis. Pharmacophore modeling and docking techniques.
 Combinatorial Chemistry: Concept and applications of combinatorial chemistry: solid phase and solution phase synthesis.

BP607P. MEDICINAL CHEMISTR-III PRACTICAL

Max. Marks: 35	4 Hours/week
	Exam, hours: 04

I Preparation of drugs and intermediates

i) Sulphanilamide	ii) 7-Hydroxy, 4-methyl coumarin	iii) Chlorobutanol
iv) Triphenyl imidazole	v) Tolbutamide	vi) Hexamine
II Assay of drugs		
i) Isonicotinic acid hydrazide	ii) Chloroquine	iii) Metronidazole
iv) Dapsone	v) Chlorpheniramine maleate	vi) Benzyl penicillin

III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique

IV Drawing structures and reactions using chem draw®

V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

Recommended Books (Latest Editions)

- 1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
- 2. Foye's Principles of Medicinal Chemistry.
- 3. Burger's Medicinal Chemistry, Vol I to IV.
- 4. Introduction to principles of drug design- Smith and Williams.
- 5. Remington's Pharmaceutical Sciences.
- 6. Martindale's extra pharmacopoeia.
- 7. Organic Chemistry by I.L. Finar, Vol. II.
- 8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
- 9. Indian Pharmacopoeia.
- 10. Text book of practical organic chemistry- A.I.Vogel.

BP602 T. PHARMACOLOGY-III

Scope : This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology. **Objectives:** Upon completion of this course the student should be able to: 1. understand the mechanism of drug action and its relevance in the treatment of different infectious diseases 2. comprehend the principles of toxicology and treatment of various poisonings and 3. appreciate correlation of pharmacology with related medical sciences. Max. Marks: 75 **Total hours: 45** 3 Hours/week THEORY Exam. hours: 03 The question paper contains 3 Sections. Section A (compulsory) have 10 questions Instructions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks to the paper-setter each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks. Instructions Section A is compulsory. Attempt any **TWO** questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each to Candidates Question carry 5 Marks. 1. **1. Pharmacology of drugs acting on Respiratory system:** a. Anti - 10 hours asthmatic drugs b. Drugs used in the management of COPD c. Expectorants and antitussives d. Nasal decongestants e. Respiratory stimulants 2. Pharmacology of drugs acting on the Gastrointestinal Tract:a. Antiulcer agents. b. Drugs for constipation and diarrhoea. c. Appetite stimulants and suppressants. d. Digestants and carminatives. e. Emetics and anti-emetics. 2. **3.** Chemotherapy: a. General principles of chemotherapy. b. 10 hours Sulfonamides and cotrimoxazole. c. Antibiotics- Penicillins, chloramphenicol, macrolides, cephalosporins, quinolones and fluoroquinolins, tetracycline and aminoglycosides 3. **3.** Chemotherapy: a. Antitubercular agents b. Antileprotic agents c. 10 hours Antifungal agents d. Antiviral drugs e. Anthelmintics f. Antimalarial drugs g. Antiamoebic agents 3. Chemotherapy: 1. Urinary tract infections and sexually 08 hours 4. transmitted diseases. m. Chemotherapy of malignancy. 4. Immunopharmacology: Immunostimulants a. b. Immunosuppressant. Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

5. 5. Principles of toxicology: a. Definition and basic knowledge of 07 hours acute, subacute and chronic toxicity. b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity c. General principles of treatment of poisoning d. Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.

6. Chronopharmacology a. Definition of rhythm and cycles. b. Biological clock and their significance leading to chronotherapy.

BP 608 P. PHARMACOLOGY-III PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Dose calculation in pharmacological experiments
- 2. Antiallergic activity by mast cell stabilization assay
- 3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
- 4. Study of effect of drugs on gastrointestinal motility
- 5. Effect of agonist and antagonists on guinea pig ileum
- 6. Estimation of serum biochemical parameters by using semi- autoanalyser
- 7. Effect of saline purgative on frog intestine
- 8. Insulin hypoglycemic effect in rabbit
- 9. Test for pyrogens (rabbit method)
- 10. Determination of acute oral toxicity (LD50) of a drug from a given data
- 11. Determination of acute skin irritation / corrosion of a test substance
- 12. Determination of acute eye irritation / corrosion of a test substance
- 13. Calculation of pharmacokinetic parameters from a given data
- 14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA)
- 15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)

*Experiments are demonstrated by simulated experiments/videos

Recommended Books (Latest Editions)

- 1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
- 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
- 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
- 4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
- 5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology

- 6. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
- 7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher Modern Pharmacology with clinical Applications, by Charles R. Craig & Robert,
- 8. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
- 9. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan,
- 10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.

BP 603 T. HERBAL DRUG TECHNOLOGY

Scope : Objectives:	This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs Upon completion of this course the student should be able to: 1. understand raw material as source of herbal drugs from cultivation to herbal drug product		
	2. know the WHO and ICH guidelines for evaluation of herbal drugs		
	3. know the herbal cosmetics, natural sweeteners, nutraceuticals 4. appreciate patenting of herbal drugs GMP		
THEORY	Max. Marks: 75Total hours: 453 Hours/weekExam. hours: 03		
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.		
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each Question carry 5 Marks.		
1.	 Herbs as raw materials: Definition of herb, herbal medicine, herbal 11 hours medicinal product, herbal drug preparation Source of Herbs Selection, identification and authentication of herbal materials, Processing of herbal raw material Biodynamic Agriculture: Good agricultural practices in cultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides. Indian Systems of Medicine: a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma. 		

- Nutraceuticals: General aspects, Market, growth, scope and types of 07 hours products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases. Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.
- **3. Herbal Cosmetics:** Sources and description of raw materials of 10 hours herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

Herbal excipients: Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes. **Herbal formulations :** Conventional herbal formulations like syrups,

mixtures and tablets and Novel dosage forms like phytosomes

- Evaluation of Drugs WHO & ICH guidelines for the assessment of 10 hours herbal drugs, Stability testing of herbal drugs.
 Patenting and Regulatory requirements of natural products: a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.
 Regulatory Issues Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs Schedule Z of Drugs & Cosmetics Act for ASU drugs.
- 5. General Introduction to Herbal Industry: Herbal drugs industry: 07 hours Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.

Schedule T – Good Manufacturing Practice of Indian systems of medicine: Components of GMP (Schedule – T) and its objectives Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.

BP 609 P. HERBAL DRUG TECHNOLOGY PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. To perform preliminary phytochemical screening of crude drugs.
- 2. Determination of the alcohol content of Asava and Arista

- 3. Evaluation of excipients of natural origin
- 4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
- 5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
- 6. Monograph analysis of herbal drugs from recent Pharmacopoeias
- 7. Determination of Aldehyde content
- 8. Determination of Phenol content
- 9. Determination of total alkaloids

Recommended Books (Latest Editions)

- 1. Textbook of Pharmacognosy by Trease & Evans.
- 2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
- 3. Pharmacognosy by Kokate, Purohit and Gokhale
- 4. Essential of Pharmacognosy by Dr.S.H. Ansari
- 5. Pharmacognosy & Phytochemistry by V.D. Rangari
- 6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
- 7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS

- **Scope** : This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arised therein.
- **Objectives:** Upon completion of the course student shall be able to:
 - 1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
 - 2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
 - 3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
 - 4. Understand various pharmacokinetic parameters, their significance & applications.

THEORYMax. Marks: 75Total hours: 453 Hours/weekExam. hours: 03

Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

Instructions Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each to Question carry 5 Marks. Candidates

- **Introduction to Biopharmaceutics** Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Non per oral extra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting proteindrug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs
- 2. Elimination: Drug metabolism and basic understanding metabolic 10 hours pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, in-vitro drug dissolution models, in-vitro-in-vivo correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.
- 3. Pharmacokinetics: Definition and introduction to Pharmacokinetics. 10 hours Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - KE, t1/2, Vd, AUC, Ka, Clt and CLR- definitions methods of eliminations, understanding of their significance and application.
- Multicompartment models: Two compartment open model. IV bolus, 08 hours 4. Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settins.
- 5. Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing 07 hours Michaelis-menton method of estimating Non-linearity. c. parameters, Explanation with example of drugs.

Recommended Books (Latest Editions)

1.

- 1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
- 2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
- 3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition, Prentice-Hall Inernational edition.USA
- 4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B.Jaiswal, Vallabh Prakashan Pitampura, Delhi
- 5. Pharmacokinetics: By Milo Glbaldi Donald, R. Mercel Dekker Inc.
- 6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.

10 hours

- 7. Biopharmaceutics; By Swarbrick
- 8. Clinical Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and
- 9. Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
- 10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company, Pennsylvania 1989.
- 11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Rebort F Notari Marcel Dekker Inn, New York and Basel, 1987.
- 12. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvnia

BP 605 T. PHARMACEUTICAL BIOTECHNOLOGY

Scope : Biotechnology has a long promise to revolutionize the biological sciences and technology. Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting. Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. Biotechnology has already produced transgenic crops and animals and the future promises lot more. It is basically a research-based subject.

Objectives: Upon completion of the subject student shall be able to;

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

2. Genetic engineering applications in relation to production of pharmaceuticals

- 3. Importance of Monoclonal antibodies in Industries
- 4. Appreciate the use of microorganisms in fermentation technology

THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week
			Exam. hours: 03

Instructions to the paper-setter The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

 a) Brief introduction to Biotechnology with reference to 10 hours Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.

- 2. a) Study of cloning vectors, restriction endonucleases and DNA 10 hours ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccineshepatitis- B iii) Hormones-Insulin. d) Brief introduction to PCR.
- **3.** Types of immunity- humoral immunity, cellular immunity, a) 10 hours Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substituties.
- a) Immuno blotting techniques- ELISA, Western blotting, Southern 08 hours blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants.
- a) Fermentation methods and general requirements, study of media, 07 hours equipments, sterilization methods, aeration process, stirring.
 b) Large scale production fermenter design and its various controls.
 c) Study of the production of penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin, d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties.

Recommended Books (Latest Editions)

- 1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
- 2. RA Goldshy et. al., : Kuby Immunology.
- 3. J.W. Goding: Monoclonal Antibodies.
- 4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal Society of Chemistry.
- 5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
- 6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
- 7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi.

BP606T: QUALITY ASSURANCE

Scope :	This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, OC tests, documentation, quality certifications and regulatory affairs.		
Objectives:	 Upon completion of the course student shall be able to: 1. understand the cGMP aspects in a pharmaceutical industry 2. appreciate the importance of documentation 3. understand the scope of quality certifications applicable to pharmaceutical industries 4. understand the responsibilities of QA & QC departments 		
THEORY	Max. Marks: 75Total hours: 453 Hours/weekExam. hours: 03		
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.		
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each Question carry 5 Marks.		
1.	 Quality Assurance and Quality Management concepts: Definition 10 hours and concept of Quality control, Quality assurance and GMP Total Quality Management (TQM): Definition, elements, philosophies ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines Quality by design (QbD): Definition, overview, elements of QbD program, tools ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration NABL accreditation: Principles and procedures 		
2.	Organization and personnel: Personnel responsibilities, training, 10 hours hygiene and personal records. Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination. Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.		
3.	 Quality Control: Quality control test for containers, rubber closures 10 hours and secondary packing materials. Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test 		

and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

- Complaints: Complaints and evaluation of complaints, Handling of 08 hours return good, recalling and waste disposal.
 Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.
- 5. Calibration and Validation: Introduction, definition and general 07 hours principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

Recommended Books (Latest Editions)

- 1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
- 2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
- 3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
- 4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
- 5. How to Practice GMP's P P Sharma.
- 6. ISO 9000 and Total Quality Management Sadhank G Ghosh
- 7. The International Pharmacopoeia Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
- 8. Good laboratory Practices Marcel Deckker Series
- 9. ICH guidelines, ISO 9000 and 14000 guidelines.

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

B.PHARMACY-VII SEMESTER (2017-2018)

BP701T. INSTRUMENTAL METHODS OF ANALYSIS

Scope : Objectives:	This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing. Upon completion of the course the student shall be able to			
	 Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis Understand the chromatographic separation and analysis of drugs. Perform quantitative & qualitative analysis of drugs using various analytical instruments. 			
THEORY	Max. Marks: 75	Total hours	: 45	3 Hours/week Exam. hours: 03
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each)			

Instructions Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each to Candidates Question carry 5 Marks.

carrying 35 marks.

1. **UV Visible spectroscopy:** Electronic transitions, chromophores, 10 hours auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law. Derivation and deviations. Instrumentation -Sources of radiation, wavelength selectors, sample cells, detectors-Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications - Spectrophotometric titrations, Single component and multi component analysis Fluorimetry: Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications **IR spectroscopy:** Introduction, fundamental modes of vibrations in 10 hours 2. poly atomic molecules, sample handling, factors affecting vibrations. Instrumentation - Sources of radiation, wavelength selectors,

Flame Photometry-Principle, interferences, instrumentation and applications.

Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications.

Nepheloturbidometry- Principle, instrumentation and applications.

3. Introduction to chromatography. Adsorption and partition 10 hours column chromatography-Methodology, advantages, disadvantages and applications.

Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications

Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

4. Gas chromatography - Introduction, theory, instrumentation, 08 hours derivatization, temperature programming, advantages, disadvantages and applications

High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.

5. Ion exchange chromatography- Introduction, classification, ion 07 hours exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology & applications Gel chromatography- Introduction, theory, instrumentation and applications.

Affinity chromatography- Introduction, theory, instrumentation and applications.

BP705P. INSTRUMENTAL METHODS OF ANALYSIS PRACTICAL

Max. Marks: 35

4 Hours/week Exam. hours: 04

- 1. Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
- 2. Estimation of dextrose by colorimetry
- 3. Estimation of sulfanilamide by colorimetry
- 4. Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
- 5. Assay of paracetamol by UV- Spectrophotometry
- 6. Estimation of quinine sulfate by fluorimetry
- 7. Study of quenching of fluorescence
- 8. Determination of sodium by flame photometry
- 9. Determination of potassium by flame photometry

- 10. Determination of chlorides and sulphates by nephelo turbidometry
- 11. Separation of amino acids by paper chromatography
- 12. Separation of sugars by thin layer chromatography
- 13. Separation of plant pigments by column chromatography
- 14. Demonstration experiment on HPLC
- 15. Demonstration experiment on Gas Chromatography

Recommended Books (Latest Editions)

- 1. Instrumental Methods of Chemical Analysis by B.K Sharma
- 2. Organic spectroscopy by Y.R Sharma
- 3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
- 4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
- 5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
- 6. Organic Chemistry by I. L. Finar
- 7. Organic spectroscopy by William Kemp
- 8. Quantitative Analysis of Drugs by D. C. Garrett
- 9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
- 10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 702 T. INDUSTRIAL PHARMACY-II

Scope :	This course is designed to impart fundamental knowledge on pharmaceutical				
	product development and translation from laboratory to market.				
Objectives:	Upon completion of the course, the student shall be able to:				
	1. Know the process of pilot plant and scale up of pharmaceutical dosage forms				
	2. Understand the process of technology transfer from lab scale to commercial batch3. Know different Laws and Acts that regulate pharmaceutical industry				
	4 Understand the approval process and regulatory requirements for drug products				
THEORY	Max. Marks: 75 Total hours: 45 3 Hours/week				
	Exam. hours: 03				
Instructions	The question paper contains 3 Sections, Section A (compulsory) have 10 questions				
to the	(2 marks each) carrying 20 marks Section B have 3 questions (any two 10 marks				
naner-setter	each) carrying 20 marks Section C have 9 questions (any seven 5 marks each)				
paper-setter	carrying 35 marks.				
Instructions	Section A is compulsory. Attempt any TWO questions from Section B. Each				
to	Question carry 10 Marks Attempt any SEVEN questions from Section C. Each				
Candidates	Question carry 5 Marks.				
1.	Pilot plant scale up techniques: General considerations - including 10 hours				
	significance of personnel requirements, space requirements, raw				

materials, Pilot plant scale up considerations for solids, liquid orals,
semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology

- 2. Technology development and transfer: WHO guidelines for 10 hours Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation confidentiality agreement, licensing, MoUs, legal issues
- 3. **Regulatory affairs:** Introduction, Historical overview of Regulatory 10 hours Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / Clinical Research Protocols, Biostatistics BE studies. in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.
- 4. Quality management systems: Quality management & 08 hours Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP
- 5. Indian Regulatory Requirements: Central Drug Standard Control 07 hours Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.

Recommended Books (Latest Editions)

- 1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http,//en.wikipedia.org/wiki/Regulatory_ Affairs.
- 2. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php
- 3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
- 4. Regulatory Affairs brought by learning plus, inc. available at http://www.cgmp.com/ra.htm.

BP 703T. PHARMACY PRACTICE

Scope :	In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.		
Objectives:	 Incation, patient counselling for improved patient care in the community set up. on completion of the course, the student shall be able to know various drug distribution methods in a hospital appreciate the pharmacy stores management and inventory control monitor drug therapy of patient through medication chart review and clinical review obtain medication history interview and counsel the patients identify drug related problems detect and assess adverse drug reactions interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states know pharmaceutical care services do patient counseling in community pharmacy; 		
THEORY	Max. Marks: 75Total hours: 453 Hours/weekExam. hours: 03		
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.		
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each Question carry 5 Marks.		
1.	 a) Hospital and it's organization: Definition, Classification of 10 hours hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions. b) Hospital pharmacy and its organization: Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists. c) Adverse drug reaction: Classifications - Excessive pharmacological effects, secondary pharmacological effects, 		

idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interactionbeneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.

d) **Community Pharmacy:** Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

a) **Drug distribution system in a hospital:** Dispensing of drugs to 10 hours inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

b) Hospital formulary: Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

c) Therapeutic drug monitoring: Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

d) **Medication adherence:** Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

e) Patient medication history interview: Need for the patient medication history interview, medication interview forms.

f) Community pharmacy management: Financial, materials, staff, and infrastructure requirements.

3. a) Pharmacy and therapeutic committee: Organization, functions, 10 hours Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

b) Drug information services: Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.

c) Patient counseling: Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist

d) Education and training program in the hospital: Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

e) **Prescribed medication order and communication skills:** Prescribed medication order- interpretation and legal requirements,

2.

and Communication skills- communication with prescribers and patients.

4. a) Budget preparation and implementation: Budget preparation 08 hours and implementation

b) Clinical Pharmacy: Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care. Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

c) Over the counter (OTC) sales: Introduction and sale of over the counter, and Rational use of common over the counter medications.

5. a) Drug store management and inventory control: Organisation of 07 hours drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure

b) Investigational use of drugs: Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

c) Interpretation of Clinical Laboratory Tests: Blood chemistry, hematology, and urinalysis

Recommended Books (Latest Editions)

- 1. Merchant S.H. and Dr. J.S.Quadry. *A textbook of hospital pharmacy*, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
- 2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. A textbook of Clinical Pharmacy Practice- essential concepts and skills, 1st ed. Chennai: Orient Longman Private Limited; 2004.
- 3. William E. Hassan. Hospital pharmacy, 5th ed. Philadelphia: Lea & Febiger; 1986.
- 4. Tipnis Bajaj. *Hospital Pharmacy*, 1st ed. Maharashtra: Career Publications; 2008.
- 5. Scott LT. *Basic skills in interpreting laboratory data*, 4thed. American Society of Health System Pharmacists Inc; 2009.
- 6. Parmar N.S. *Health Education and Community Pharmacy*, 18th ed. India: CBS Publishers & Distributers; 2008.

Journals:

- 1. Therapeutic drug monitoring. ISSN: 0163-4356
- 2. Journal of pharmacy practice. ISSN: 0974-8326
- 3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
- 4. Pharmacy times (Monthly magazine)

BP 704T: NOVEL DRUG DELIVERY SYSTEMS

- Scope : This subject is designed to impart basic knowledge on the area of novel drug delivery systems.
 Objectives: Upon completion of the course student shall be able

 To understand various approaches for development of novel drug delivery systems.
 To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

 THEORY Max. Marks: 75 Total hours: 45 3 Hours/week Exam. hours: 03
- InstructionsThe question paper contains 3 Sections. Section A (compulsory) have 10 questionsto the
paper-setter(2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks
each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each)
carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

1. Controlled drug delivery systems: Introduction, 10 hours terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

2. Microencapsulation: Definition, advantages and disadvantages, 10 hours microspheres/microcapsules, microparticles, methods of microencapsulation, applications

Mucosal Drug Delivery system: Introduction, Principles of bioadhesion/mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implantsand osmotic pump

3. Transdermal Drug Delivery Systems: Introduction, Permeation 10 hours through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches
 Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications. Nasopulmonary drug delivery system: Introduction to Nasal and

Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

- **4. Targeted drug Delivery:** Concepts and approaches advantages and 08 hours disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications.
- 5. Ocular Drug Delivery Systems: Introduction, intra ocular barriers 07 hours and methods to overcome –Preliminary study, ocular formulations and ocuserts.
 Intrauterine Drug Delivery Systems: Introduction, advantages

and disadvantages, development of intra uterine devices (IUDs) and applications

Recommended Books (Latest Editions)

- 1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
- Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
- 3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
- 4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
- 5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Journals

- 1. Indian Journal of Pharmaceutical Sciences (IPA)
- 2. Indian Drugs (IDMA)
- 3. Journal of Controlled Release (Elsevier Sciences)
- 4. Drug Development and Industrial Pharmacy (Marcel & Decker)
- 5. International Journal of Pharmaceutics (Elsevier Sciences).

*BP 706 PS: Practice School

Max. Marks: 125

Total hours: 150

12 Hours/week Exam. hours: 05

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time. At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college leveland grade point shall be awarded.

INSTITUTE OF PHARMACEUTICAL SCIENCES, KURUKSHETRA UNIVERSITY KURUKSHETRA

B.PHARMACY-VIII SEMESTER (2017-2018)

BP801T. BIOSTATISITCS AND RESEARCH METHODOLOGY

Scope : Objectives:	To understand the applications of Biostatics in Pharmacy. This subject descriptive statistics, Graphics, Correlation, Regression, logistic Probability theory, Sampling technique, Parametric tests, Non Param ANOVA, Introduction to Design of Experiments, Phases of Clinical Observational and Experimental studies, SPSS, R and MINITAB software's, analyzing the statistical data using Excel. Upon completion of the course the student shall be able to • Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (De Experiment) • Know the various statistical techniques to solve statistical problems • Appreciate statistical techniques in solving the problems.	deals with regression etric tests, trials and statistical esign of
THEORY	Max. Marks: 75 Total hours: 45 3 Hours	s/week
	Exam. I	hours: 03
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 (2 marks each) carrying 20 marks. Section B have 3 questions (any two each) carrying 20 marks. Section C have 9 questions (any seven, 5 m carrying 35 marks.) questions , 10 marks barks each)
to Candidates	Question carry 10 Marks. Attempt any SEVEN questions from Section Question carry 5 Marks.	n C. Each
1.	Introduction: Statistics, Biostatistics, Frequency distribution Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation- Pharmaceuticals examples	10 hours
2.	Regression: Curve fitting by the method of least squares, fitting the lines $y=a + bx$ and $x = a + by$, Multiple regression, standard error of regression– Pharmaceutical Examples Probability: Definition of	10 hours

probability, Binomial distribution, Normal distribution, Poisson's distribution, properties – problems. Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples

	Parametric test : t-test (Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference	
3.	Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test.	10 hours
	Introduction to Research: Need for research, Need for design of	
	Experiments, Experiential Design Technique, plagiarism.	
	Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot,	
	Counter Plot graph.	
	Designing the methodology: Sample size determination and Power	
	of a study, Report writing and presentation of data, Protocol, Cohorts	
	studies, Observational studies, Experimental studies, Designing	
	clinical trial, various phases.	
4.	Blocking and confounding system for Two-level factorials	08 hours
	Regression modeling: Hypothesis testing in Simple and Multiple	
	regressionmodels Introduction to Practical components of	
	Industrial and Clinical Trials Problems: Statistical Analysis Using	
	Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R -	
	Online Statistical Software's to Industrial and Clinical trial approach	
5.	Design and Analysis of experiments:	07 hours
	Factorial Design: Definition, 22, 23 design. Advantage of factorial	
	design	
	Response Surface methodology: Central composite design,	
	Historical design, Optimization Techniques	

Recommended Books (Latest Editions)

- 1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. New York.
- 2. Fundamental of Statistics Himalaya Publishing House- S.C. Guptha
- 3. Design and Analysis of Experiments -PHI Learning Private Limited, R. Pannerselvam
- 4. Design and Analysis of Experiments Wiley Students Edition, Douglas and C. Montgomery.

BP 802T SOCIAL AND PREVENTIVE PHARMACY

- **Scope** : The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.
- **Objectives:** After the successful completion of this course, the student shall be able to:
 - 1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
 - 2. Have a critical way of thinking based on current healthcare development.
 - 3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues

THEORYMax. Marks: 75Total hours: 45	
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3 Hours/week Exam. hours: 03

Instructions to the paper-setter The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

Concept of health and disease: Definition, concepts and evaluation 10 hours of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.
 Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

Hygiene and health: personal hygiene and health care; avoidable habits.

- 2. **Preventive medicine:** General principles of prevention and control 10 hours of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse
- 3. National health programs, its objectives, functioning and 10 hours outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.
- 4. National health intervention programme for mother and child, 08 hours National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program
- **5.** Community services in rural, urban and school health: Functions of 07 hours PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

Recommended Books (Latest Editions)

- 1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
- Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4th Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
- 3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
- 4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
- 5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
- 6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

Recommended Journals:

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland

BP803ET. PHARMA MARKETING MANAGEMENT

- **Scope** : The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.
- **Objectives:** The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

THEORYMax. Marks: 75Total hours: 453 Hours/weekExam. hours: 03

- Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.
- InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

- Marketing: Definition, general concepts and scope of marketing; 10 hours Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.
 Pharmaceutical market: Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and sociopsychological characteristics of the consumer; market segmentation& targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research.
 Product decision: Classification, product line and product mix 10 hours
- 2. **Product decision:** Classification, product line and product mix 10 hours decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.
- **3. Promotion:** Methods, determinants of promotional mix, promotional 10 hours budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.
- **4. Pharmaceutical marketing channels:** Designing channel, channel 08 hours members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.

Professional sales representative (PSR): Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.

5. Pricing: Meaning, importance, objectives, determinants of price; 07 hours pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority).

Emerging concepts in marketing: Vertical & Horizontal Marketing; RuralMarketing; Consumerism; Industrial Marketing; Global Marketing.

Recommended Books (Latest Editions)

- 1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
- 2. Walker, Boyd and Larreche: Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
- 3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
- 4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
- 5. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)
- 6. Ramaswamy, U.S & Nanakamari, S: Marketing Managemnt:Global Perspective, IndianContext,Macmilan India, New Delhi.
- 7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi

8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.

BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE

Scope : Objectives:	 This course is designed to impart the fundamental knowledge on the regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia, UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products. Upon completion of the subject student shall be able to; 1. Know about the process of drug discovery and development 2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 3. Know the regulatory approval process and their registration in Indian and international markets 		
THEORY	Max. Marks: 75Total hours: 453 HouExam	rs/week . hours: 03	
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.		
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Secti Question carry 10 Marks. Attempt any SEVEN questions from Sect Question carry 5 Marks.	on B. Each ion C. Each	
1.	New Drug Discovery and development: Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.	10 hours	
2.	Regulatory Approval Process: Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA. Regulatory authorities and agencies: Overview of regulatory authorities of India, United States, European Union, Australia, Japan,	10 hours	
3.	Registration of Indian drug product in overseas market: Procedure for export of pharmaceutical products, Technical documentation, Drug Master. Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD),	10 hours	

ASEAN Common Technical Document (ACTD) research.

- 4. Clinical trials: Developing clinical trial protocols, Institutional 08 hours Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials
- **5. Regulatory Concepts:** Basic terminology, guidance, guidelines, 07 hours regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book

Recommended Books (Latest Editions)

- 1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.
- The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences, Vol. 185. Informa Health care Publishers.
- 3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences, Vol.190.
- 4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc.
- 5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
- 6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
- 7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
- 8. Principles and Practices of Clinical Research, Second Edition Edited by John I. Gallin and Frederick P. Ognibene
- 9. Drugs: From Discovery to Approval, Second Edition By Rick Ng

BP 805ET: PHARMACOVIGILANCE

- **Scope** : This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.
- **Objectives:** At completion of this paper it is expected that students will be able to (know, do, and appreciate):

1. Why drug safety monitoring is important?

- 2. History and development of pharmacovigilance
- 3. National and international scenario of pharmacovigilance

	4. Dictionaries, coding and terminologies used in pharmacovigilance5. Detection of new adverse drug reactions and their assessment6. International standards for classification of diseases and drugs
	7. Adverse drug reaction reporting systems and communication in pharmacovigilance
	8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
	 9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation 10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in
	11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
	12. CIOMS requirements for ADR reporting
THEORY	13. Writing case narratives of adverse events and their quality.Max. Marks: 75Total hours: 453 Hours/week Exam. hours: 03
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each Question carry 5 Marks.
1.	 Introduction to Pharmacovigilance: History and development of 10 hours Pharmacovigilance, Importance of safety monitoring of Medicine, WHO international drug monitoring programme, Pharmacovigilance Program of India(PvPI). Introduction to adverse drug reactions: Definitions and classification of ADRs, Detection and reporting, Methods in Causality assessment, Severity and seriousness assessment, Predictability and preventability assessment, Management of adverse drug reactions Basic terminologies used in pharmacovigilance: Terminologies of adverse medication related events, Regulatory terminologies.
2.	 Drug and disease classification: Anatomical, therapeutic and 10 hours chemical classification of drugs, International classification of diseases, Daily defined doses, International Non proprietary Names for drugs. Drug dictionaries and coding in pharmacovigilance: WHO adverse reaction terminologies, MedDRA and Standardised MedDRA queries, WHO drug dictionary, Eudravigilance medicinal product dictionary. Information resources in pharmacovigilance: Basic drug

information resources, Specialised resources for ADRs.

Establishing pharmacovigilance programme: Establishing in a hospital, Establishment & operation of drug safety department in industry, Contract Research Organisations (CROs), Establishing a national programme.

Vaccine safety surveillance: Vaccine Pharmacovigilance, 10 hours
 Vaccination failure, Adverse events following immunization.
 Pharmacovigilance methods: Passive surveillance – Spontaneous

reports and case series, Stimulated reporting, Active surveillance – Sentinel sites, drug event monitoring and registries, Comparative observational studies – Cross sectional study, case control study and cohort study, Targeted clinical investigations

Communication in pharmacovigilance: Effective communication in Pharmacovigilance, Communication in Drug Safety Crisis management, Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media.

4. Safety data generation: Pre clinical phase, Clinical phase, Post 08 hours approval phase (PMS).

ICH Guidelines for Pharmacovigilance: Organization and objectives of ICH, Expedited reporting, Individual case safety reports, Periodic safety update reports, Post approval expedited reporting, Pharmacovigilance planning, Good clinical practice in pharmacovigilance studies.

5. Pharmacogenomics of adverse drug reactions: Genetics related 07 hours ADR with example focusing PK parameters.
Drug safety evaluation in special population: Paediatrics, Pregnancy and lactation, Geriatrics
CIOMS: CIOMS Working Groups, CIOMS Form
CDSCO (India) and Pharmacovigilance: D&C Act and Schedule Y, Differences in Indian and global pharmacovigilance requirements

Recommended Books (Latest Editions)

- 1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
- 2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
- 3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
- 4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
- 5. An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
- 6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
- 7. Textbook of Pharmacoepidemiolog edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Publishers.
- 8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karin NyfortHansen,Milap C. Nahata

- 9. National Formulary of India
- 10. Text Book of Medicine by Yashpal Munjal
- 11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna.
- 12. http://www.whoumc.org/DynPage.aspx?id=105825&mn1=7347&mn2=7259&mn 3=7297
- 13. http://www.ich.org/
- 14. http://www.cioms.ch/
- 15. http://cdsco.nic.in/
- 16. http://www.who.int/vaccine_safety/en/
- 17. http://www.ipc.gov.in/PvPI/pv_home.html

BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS

Scope : Objectives:	In this subject the student learns about the various methods and guidelines evaluation and standardization of herbs and herbal drugs. The subject a provides an opportunity for the student to learn cGMP, GAP and GLP traditional system of medicines. Upon completion of the subject student shall be able to; 1. know WHO guidelines for quality control of herbal drugs 2. know Quality assurance in herbal drug industry 3. know the regulatory approval process and their registration in Indian international markets 4. appreciate EU and ICH guidelines for quality control of herbal drugs	for also ' in and
THEORY	Max. Marks: 75 Total hours: 45 3 Hours/week	
	Exam. hours:	03
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 question (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.	ions arks ach)
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. E Question carry 10 Marks. Attempt any SEVEN questions from Section C. E Question carry 5 Marks.	lach lach
1.	Basic tests for drugs – Pharmaceutical substances, Medicinal plants 10 hour materials and dosage forms, WHO guidelines for quality control of berbal drugs Evaluation of commercial crude drugs intended for use	rs
2.	Quality assurance in herbal drug industry of cGMP, GAP, GMP 10 hour and GLP in traditional system of medicine. WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines, WHO Guidelines on GACP for Medicinal Plants.	ſS
3.	EU and ICH guidelines for quality control of herbal drugs. Research 10 hour Guidelines for Evaluating the Safety and Efficacy of Herbal	ſS

Medicines

- **4.** Stability testing of herbal medicines. Application of various 08 hours chromatographic techniques in standardization of herbal products. Preparation of documents for new drug application and export registration, GMP requirements and Drugs & Cosmetics Act provisions.
- 5. Regulatory requirements for herbal medicines. WHO guidelines on 07 hours safety monitoring of herbal medicines in pharmacovigilance systems, Comparison of various Herbal Pharmacopoeias. Role of chemical and biological markers in standardization of herbal products

Recommended Books (Latest Editions)

- 1. Pharmacognosy by Trease and Evans
- 2. Pharmacognosy by Kokate, Purohit and Gokhale
- 3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006.
- 4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
- 5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
- 6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
- 7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
- 8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
- 9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
- 10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
- 11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
- 12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

BP 807 ET. COMPUTER AIDED DRUG DESIGN

Scope : This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.

Objectives: Upon completion of the course, the student shall be able to understand

- 1. Design and discovery of lead molecules
- 2. The role of drug design in drug discovery process
- 3. The concept of QSAR and docking
- 4. Various strategies to develop new drug like molecules.
- 5. The design of new drug molecules using molecular modeling software

THEORYMax. Marks: 75Total hours: 453 Hours/week

Exam. hours: 03

Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

1. Introduction to Drug Discovery and Development: Stages of drug 10 hours discovery and development

Lead discovery and Analog Based Drug Design: Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.

Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies

- 2. Quantitative Structure Activity Relationship (QSAR): SAR 10 hours versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammet's substituent constant and Tafts steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.
- 3. Molecular Modeling and virtual screening techniques 10 hours Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening, Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. *De novo* drug design.
- **4. Informatics & Methods in drug design:** Introduction to 08 hours Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.
- 5. Molecular Modeling: Introduction to molecular mechanics and 07 hours quantum mechanics.Energy Minimization methods and Conformational Analysis, global conformational minima determination.

Recommended Books (Latest Editions)

- 1. Robert GCK, ed., "Drug Action at the Molecular Level" University Prak Press Baltimore.
- 2. Martin YC. "Quantitative Drug Design" Dekker, New York.
- 3. Delgado JN, Remers WA eds "Wilson & Gisvolds's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
- 4. Foye WO "Principles of Medicinal chemistry 'Lea & Febiger.
- 5. Koro lkovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
- 6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" John Wiley & Sons, New York.
- 7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
- 8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
- 9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.

BP808ET: CELL AND MOLECULAR BIOLOGY

- Scope : Cell biology is a branch of biology that studies cells their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function. This is done both on a microscopic and molecular level. Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.
- **Objectives:** Upon completion of the subject student shall be able to;
 - 1. Summarize cell and molecular biology history.
 - 2. Summarize cellular functioning and composition.
 - 3. Describe the chemical foundations of cell biology.
 - 4. Summarize the DNA properties of cell biology.
 - 5. Describe protein structure and function.
 - 6. Describe cellular membrane structure and function.
 - 7. Describe basic molecular genetic mechanisms.
 - 8. Summarize the Cell Cycle

THEORY	Max. Marks: 75	Total hours: 45	3 Hours/week	
			Exam. hours: 03	

InstructionsThe question paper contains 3 Sections. Section A (compulsory) have 10 questionsto the
paper-setter(2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks
each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each)
carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

- a) Cell and Molecular Biology: Definitions theory and basics and 10 hours Applications. b) Cell and Molecular Biology: History and Summation. c) Properties of cells and cell membrane. d) Prokaryotic versus Eukaryotic e) Cellular Reproduction f) Chemical Foundations – an Introduction and Reactions (Types)
- a) DNA and the Flow of Molecular Information b) DNA Functioning 10 hoursc) DNA and RNA d) Types of RNA e) Transcription and Translation
- **3.** a) Proteins: Defined **and** Amino Acids b) Protein Structure c) 10 hours Regularities in Protein Pathways d) Cellular Processes e) Positive Control and significance of Protein Synthesis
- 4. a) Science of Genetics b) Transgenics and Genomic Analysis c) Cell 08 hours Cycle analysis d) Mitosis and Meiosis e) Cellular Activities and Checkpoints
- 5. a) Cell Signals: Introduction b) Receptors for Cell Signals c) 07 hours Signaling Pathways: Overview d) Misregulation of Signaling Pathways e) Protein-Kinases: Functioning

Recommended Books (Latest Editions)

- 1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
- 2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
- 3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
- 4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
- 5. Rose: Industrial Microbiology.
- 6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
- 7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
- 8. Peppler: Microbial Technology.
- 9. Edward: Fundamentals of Microbiology.
- 10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
- 11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
- 12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of Recombinant DNA: ASM Press Washington D.C.
- 13. RA Goldshy et. al.,: Kuby Immunology.

BP809ET. COSMETIC SCIENCE

Scope:Objectives:
THEORYMax. Marks: 75Total hours: 453 Hours/week
Exam. hours: 03Instructions
to theThe question paper contains 3 Sections. Section A (compulsory) have 10 questions
(2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks)

paper-setter each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

- Classification of cosmetic and cosmeceutical products, Definition of 10 hours cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application Skin: Basic structure and function of skin. Hair: Basic structure of hair. Hair growth cycle. Oral Cavity: Common problem associated with teeth and gums.
- 2. Principles of formulation and building blocks of skin care 10 hours products: Face wash, Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmecuticals.

Antiperspants & deodorants- Actives & mechanism of action.

Principles of formulation and building blocks of Hair care products: Conditioning shampoo, Hair conditioner, anti-dandruff shampoo. Hair oils. Chemistry and formulation of Para-phylene diamine based hair dye. Principles of formulation and building blocks of oral care products: Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.

- Sun protection, Classification of Sunscreens and SPF.
 Role of herbs in cosmetics: Skin Care: Aloe and turmeric Hair care: Henna and amla. Oral care: Neem and clove Analytical cosmetics: BIS specification and analytical methods for shampoo, skin- cream and toothpaste.
- **4.** Principles of Cosmetic Evaluation: Principles of sebumeter, 08 hours corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties Soaps, and syndet bars. Evolution and skin benfits.
- 5. Oily and dry skin, causes leading to dry skin, skin moisturisation. 07 hours Basic understanding of the terms Comedogenic, dermatitis. Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor. Antiperspirants and Deodorants- Actives and mechanism of action

Recommended Books (Latest Editions)

- 1. Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin.
- 2. Cosmetics Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi.
- 3. Text book of cosmelicology by Sanju Nanda & Roop K. Khar, Tata Publishers.

BP810 ET. EXPERIMENTAL PHARMACOLOGY

Scope :	This subject is designed to impart the basic knowledge of preclinical studies ir experimental animals including design, conduct and interpretations of results.	
Objectives:	 Jpon completion of the course the student shall be able to, 1. Appreciate the applications of various commonly used laboratory animals. 2. Appreciate and demonstrate the various screening methods used in preclinical research 3. Appreciate and demonstrate the importance of biostatistics and researchmethodology 	
THEODY	4. Design and execute a research hypothesis independently	
THEORY	Max. Marks: 75 Total hours: 45 5 Hours/week Exam. hours: 03	
Instructions to the paper-setter	The question paper contains 3 Sections. Section A (compulsory) have 10 questions (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.	
Instructions to Candidates	Section A is compulsory. Attempt any TWO questions from Section B. Each Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each Question carry 5 Marks.	
1.	Laboratory Animals: Study of CPCSEA and OECD guidelines for 08 hours maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of	

- maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.
- 2. Preclinical screening models: a. Introduction: Dose selection, 10 hours calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study. b. Study of screening animal models for Diuretics, nootropics, anti-Parkinson's, antiasthmatics, Preclinical screening models: for CNS activity- analgesic,

antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease

- **3. Preclinical screening models:** for ANS activity, sympathomimetics, 10 hours sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants, drugs acting on eye, local anaethetics.
- **4. Preclinical screening models:** for CVS activity- antihypertensives, 10 hours diuretics, antiarrhythmic, antidyslepidemic, anti aggregatory, coagulants, and anticoagulants. Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.
- 5. Research methodology and Bio-statistics: Selection of research 07 hours topic, review of literature, research hypothesis and study design, Pre-clinical data analysis and interpretation using Students 't' test and One-way ANOVA. Graphical representation of data

Recommended Books (Latest Editions)

- 1. Fundamentals of experimental Pharmacology-by M.N.Ghosh
- 2. Hand book of Experimental Pharmacology-S.K.Kulakarni
- 3. CPCSEA guidelines for laboratory animal facility.
- 4. Drug discovery and Evaluation by Vogel H.G.
- 5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
- 6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard

BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES

Scope :	This subject deals wit quantitative analysis knowledge on the chromatographic hypl practical knowledge testing.	th the application of of drugs. This su principles and in henated techniques. on modern analytic	instrumental me bject is designe nstrumentation This also empha cal instruments	thods in qualitative and ed to impart advanced of spectroscopic and sizes on theoretical and that are used for drug
Objectives:	Upon completion of the	he course the student	shall be able to	
·	 understand the analysis understand the understand the understand the know analysis 	e advanced instrum chromatographic se calibration of variou of drugs using vario	ents used and i paration and ana is analytical inst us analytical inst	ts applications in drug lysis of drugs. ruments ruments.
THEORY	Max. Marks: 75	Total hours:	45	3 Hours/week
				Exam. hours: 03
Instructions to the paper-setter	The question paper co (2 marks each) carryin each) carrying 20 ma carrying 35 marks.	ontains 3 Sections. Sections 20 marks. Section rks. Section C have	ection A (compute B have 3 quest 9 questions (an	sory) have 10 questions ons (any two, 10 marks y seven, 5 marks each)

InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.

- 1. Nuclear Magnetic Resonance spectroscopy: Principles of H-NMR 10 hours and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications Mass Spectrometry-Principles, Fragmentation, Ionization techniques - Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications 2. Thermal Methods of Analysis: Principles, instrumentation and 10 hours applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) X-Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, X- ray Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.
- **3.** Calibration and validation-as per ICH and USFDA guidelines 10 hours Calibration of following Instruments: Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC.
- Radio immune assay: Importance, various components, Principle, 08 hours different methods, Limitation and Applications of Radio immuno assay
 Extraction techniques: General principle and procedure involved in

the solid phase extraction and liquid-liquid extraction

5. Hyphenated techniques-LC-MS/MS, GC-MS/MS, HPTLC-MS. 07 hours

Recommended Books (Latest Editions)

- 1. Instrumental Methods of Chemical Analysis by B.K Sharma
- 2. Organic spectroscopy by Y.R Sharma
- 3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
- 4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
- 5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
- 6. Organic Chemistry by I. L. Finar
- 7. Organic spectroscopy by William Kemp
- 8. Quantitative Analysis of Drugs by D. C. Garrett
- 9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
- 10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 812 ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS

- Scope : This subject covers foundational topic that are important for understanding the need and requirements of dietary supplements among different groups in the population. **Objectives:** This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to : 1. Understand the need of supplements by the different group of people to maintain healthy life. 2. Understand the outcome of deficiencies in dietary supplements. 3. Appreciate the components in dietary supplements and the application. 4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims. THEORY Max. Marks: 75 Total hours: 45 **3 Hours/week** Exam. hours: 03 Instructions The question paper contains 3 Sections. Section A (compulsory) have 10 questions to the
- to the (2 marks each) carrying 20 marks. Section B have 3 questions (any two, 10 marks each) carrying 20 marks. Section C have 9 questions (any seven, 5 marks each) carrying 35 marks.
- InstructionsSection A is compulsory. Attempt any TWO questions from Section B. Each
Question carry 10 Marks. Attempt any SEVEN questions from Section C. Each
Question carry 5 Marks.
 - 1. a. Definitions of Functional foods, Nutraceuticals and Dietary 07 hours supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.

b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community. c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

2. Phytochemicals as nutraceuticals: Occurrence and characteristic 15 hours features(chemical nature medicinal benefits) of following: a) Carotenoids- α and β -Carotene, Lycopene, Xanthophylls, leutin b) Sulfides: Diallyl sulfides, Allyl trisulfide. c) Polyphenolics: Reservetrol d) Flavonoids- Rutin , Naringin, Quercitin, Anthocyanidins, catechins, Flavones e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum f) Phyto estrogens : Isoflavones, daidzein, Geebustin, lignans g) Tocopherols h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional

foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.

- **3.** a) Introduction to free radicals: Free radicals, reactive oxygen 07 hours species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids. b) Dietary fibres and complex carbohydrates as functional food ingredients.
- 4. a) Free radicals in Diabetes mellitus, Inflammation, Ischemic 10 hours reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing. b) Antioxidants: Endogenous antioxidants enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, α Lipoic acid, melatonin, Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole. c) Functional foods for chronic disease prevention
- 5. a) Effect of processing, storage and interactions of various 06 hours environmental factors on the potential of nutraceuticals. b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods. c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

Recommended Books (Latest Editions)

- 1. Dietetics by Sri Lakshmi
- 2. Role of dietary fibres and neutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPunblication.
- 3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
- 4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
- 5. Prescription for Nutritional Healing by James F. Balch and Phyllis A. Balch 2nd Edn., Avery Publishing Group, NY (1997).
- 6. G. Gibson and C. williams Editors 2000 Functional foods Woodhead Publ. Co. London.
- 7. Goldberg, I. Functional Foods. 1994. Chapman and Hall, New York.
- 8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in *Essentials of Functional Foods* M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
- 9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition).
- 10. Shils, ME, Olson, JA, Shike, M. 1994 Modern Nutrition in Health and Disease. Eighth edition. Lea and Febiger

*BP813PW: Project work

Max. Marks: 150

12 Hours/week Exam. hours: 04

All the students shall undertake a projectunder the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages). The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the scheme of the examination.

SYLLABUS OF M.A. (PREVIOUS) HISTORY COURSE (ANNUAL SYSTEM) SCHEME OF EXAMINATIONS AND COURSES OF READING (w.e.f. 2018-19)

M.A. History Course shall be a Two-Year Degree Course of 1000 marks. The candidate shall take Five Papers in each year, i.e., Ten Papers in the full Course. Each Paper will carry 100 Marks. Out of 100 Marks, 80 marks shall be earmarked for Theory Exam and 20 Marks for Internal Assessment (Assessment Test) for the candidates appearing through the Distance Mode. However, there shall be no Internal Assessment for the candidates appearing through Private Mode and they shall be examined only on the basis of their Theory Exam which shall be of full 100 Marks in each Paper for such candidates.

M.A. (Previous) History:

SCHEME AND INSTRUCTIONS OF EXAMINATION W.E.F. 2018-2019

Note: 1. There shall be Five Papers (including the Specialization Paper-3 with internal choice of two Optional Papers). The candidate has to take all Five Papers. In case of the Specialization Paper-3, the candidate has to opt any one out of the two Optional Papers. The candidate opting for a particular Specialization in M.A. Previous, shall take the same Specialization in M.A. Final

	Specialization in W.A. I mai.			
Paper No.	Nomenclature	Theory	Internal	Time
		Exam	Assessment	
Paper-1	Medieval Societies	80	20	3
				Hrs.
Paper-2	Modern World	80	20	3
				Hrs.
Paper-3	Polity and Economy of Medieval India	80	20	3
(Specialization	(1200-1750)			Hrs.
Paper) (Opt-i)				
Paper-3	Colonial India (1757-1857)	80	20	3
(Specialization				Hrs.
Paper) (Opt-ii)				
Paper-4	History of China and Japan in Modern	80	20	3
	Times			Hrs.
Paper-5	History of Europe (1789-1914)	80	20	3
_				Hrs.

Syllabus and Courses of Reading

Paper-1: Medieval Societies

Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

Note: - The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread

over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.

- Unit I Medieval Europe: Transition from Ancient Society to Medieval Society; Medieval State and Church; Clergy and its Socio-Economic Role; Feudalism: Agrarian Structure and Relations, Manorial System, Agrarian Technology
- Unit II Organization of Non-Agricultural Production under Feudalism; Trade and Commerce; Urbanization: Urban Centers and Society; Artisans and Merchants; Decline of Feudalism
- Unit III Arabia before Islam; Rise of Islam; Evolution of Islamic State from Pious Caliphs to the Abbasids; Society and Economy under the Prophet and the Caliphs; Art and Architecture; Education; Intellectual Contributions: Language, Literature and Sciences
- Unit IV Advent of Islam in India and its Impact; Nature and Administrative Set up of Delhi Sultanate

Suggested Readings:

Aghnides, N.	Muhammad an Theories of Finance		
Anderson, Perry	Passages from Antiquity to Feudalism		
Bloch, March	h Feudal Society, 2 Vols.		
Satish Chandra	Medieval India : From Sultanate to the Mughals, VolI		
Cipolla, Carlo (ed.)	The Fontana Economic History of Europe : The Middle		
	Ages		
Dobb, Maurice & Sweezy Dobb	Studies in the Development of Capitalism		
Faruqqi, Amar	Prachin Aur Madhyakalin Samajik Sanrachanayen aur		
	Sanskritiyan (Hindi)		
Ganshof, F.L.	Feudalism		
Granebaum	Medieval Islam		
Habib, Muhammad & Nizami,	Comprehensive History of India, Vol. V		
K.A. (ed.)			
Heaton, Herbert	Economic History of Europe		
Hilton, Rodni (ed.)	The Transition from Feudalism to Capitalism		
Hitti, P.K.	History of Arabs		
Hodgett, A.J. Gerald	A Social and Economic History of Medieval Europe		
Jackson, P	The Delhi Sultanate		
Kulke, Hermann	The State in India (AD 1000-1700)		
Lamblon	Landlords and Peasants in Persia		
Levy, P	The Social Structure of Islam		
Pirenne, Henri	Economic and Social History of Medieval Europe		
Rolls, Eric	History of Economic Thought		
Richards, J.F.	New Cambridge History of India : Mughal Empire		
Sahu, K.P.	Islam : Udbhav Aur Vikas (Hindi)		
Sharma, G.D.	Madhyakalin Bharat Ki Rajnaitik Avm Arthik		
	Sansthayein (Hindi)		
Takashesh et.	The Transition from Feudalism to Capitalism		
Verma, H.C. (ed.)	Madhyakalin Bharat (Hindi), Vol. I		
White, Lynn	Medieval Technology and Social Change		
	10(173)		

Paper-2: Modern World

Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note:** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Transition from Feudalism to Capitalism in Europe; Renaissance and its Impact; Reformation and its Impact; Enlightenment and Scientific Revolution; Rise of Capitalism: Mercantile Revolution – Origins, Nature and Impact; Economic Development during the 16th Century: Shift of Economic Balance from the Mediterranean Region to Atlantic Region
- Unit II Old Colonial System and its Consequences; Rise of Liberalism: 'Glorious' Revolution – Nature and Impact; American Revolution – Nature and Impact; French Revolution – Nature and Impact; Growth of Capitalism: Industrial and Technological Revolution – Origins, Nature and Impact; Nationalism in Central Europe
- Unit III Imperialism: Origins, Interpretations and Consequences; World War-I: Origins and Consequences; Socialism and Bolshevik Revolution in Russia; Growth of Liberalism: Parliamentary Reforms in Europe; Paris Peace Settlement and its Consequences; Working of the League of Nations; Collective Security and Disarmament
- Unit IV Economic Depression and its Effects; Rise of Fascism: Italy and Germany; World War-II: Origins and Consequences; United Nations Organization and World Peace; Nationalist Movements and De-Colonization in Asia and Africa; The Cold War: Origins, Strategic Alliances and Phases

Suggested Readings:

Samkalin Europe (Hindi)
The Western Intellectual Tradition
The Bolshevik Revolution, 1917-23, 3 Vols.
1917 : Before and After
Europe Ka Itihas (Hindi)
Adhunik Paschim Ka Uday (Hindi)
Before the Industrial Revolution: European Society and
Economy1000-1700
Revisions in Mercantilism
Outline History of the World
The Rise of the Atlantic Economics
Studies in the Developments of Capitalism
Europe in the 20th Century
A History of Europe
History of Europe 1915-1960
Europe Ka Itihas (Hindi)
From Galileo to Newton
The Industrial Revolution on the Continent
From Reformation to Industrial Revolution
Lenin and the Russian Revolution
Transition From Feudalism to Capitalism
The Age of Revolution

Hobsbawn, E.J.	Age of Extremes ; The Short 20th Century (1914-1991)
Joll, James	Europe Since 1870: An International History
Joll, James	1870 Se Europe (Hindi)
Joll, James	Origins of the First World War
Keenigsberger, H.G. and G. L.	Europe in the Sixteenth Century
Mosse	
Langer, W.L.	Diplomacy of Imperialism
Lefebvre, Georges	Coming of the French Revolution
Lucass, Colin	The French Revolution and the Making of Modern Political Culture, 2 Volumes
Mergan, R.P.	German Social Democracy and the First International
Morgan, K.O.	Oxford Illustrated History of Britain (1789-1983), 2 Volumes
Palmer, R.A. and Cotton Joel	A History of Modern World
Parker, G.	Europe in Crisis 1598-1648
Parks, H.B.	The United States of America
Parry, J.P.	The Age of Renaissance
Porter, Andrew	European Imperialism 1860-1914
Rabb, Theodore K.	The Struggle for Stability in Early Modern Europe
Roberts, J.M.	Europe 1880-1945
Roth, J.J. (ed.)	World War II : A Turning Point in Modern History
Rude, George	Revolutionary Europe
Sinha, Manoj	Samkalin Bharat (Hindi)
Soboul, Albert	History of the French Revolution, 2 Volumes
Stavrianes, L.S.	The World Since 1500
Stephen, J. Lee.	Aspects of European History 1494-1789
Taylor A.J.P.	The Struggle for Mastery in Europe
Taylor, A.J.P.	The Origins of the Second World War
Thompson, David	Europe Since Napoleon
Wiskemann, E.	Europe of the Dictators

Paper-3 (Specialization Paper) (Opt-i): Polity and Economy of Medieval India (1200 - 1750)

Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note: -** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Sources: Archival, Archaeological, Contemporary Historical Writings, Travel Accounts, European Factory Records; Nature of the Delhi Sultanate and the Mughal State; Theories of Kingship; Nature and Administrative set up of Regional States with special reference to Vijaynagar and Bahmani Kingdoms
- Unit II Growth of Institutional Structure: Iqta, Amaram, Mansab and Jagir; Central and Provincial Administration; Ruling Classes: Evolving Compositions, Local Alliances and Conflicts

Unit-III	Agrarian Economy : Land Ownership and Production; Nature and Magnitude
	of Taxation; Agrarian Relations ; Textiles and Agro-Industries; Metal
	Technology; Artisans; Mercantile Groups and their Role in Production; Trade
	and Commerce; Medium of Exchange; Currency, Banking and Hundi System;
	Process of Urbanization

Unit – IV Systemic Crisis: Tensions and Conflicts Inherent in the Imperial System; Patterns of Resistance; Collapse of the Mughal Empire; Interpreting the 18th Century

Suggested Readings :

Alam, Muzaffar and Subramanyam,	The Mughal State
Sanjay (ed.)	
Alavi, Seema (ed.)	Eighteen Century in India
Ali, M. Athar,	The Mughal Nobility under Aurangzeb
Ali, M. Athar,	Mughal India
Satish Chandra	Medieval India : Society The Jagirdari Crisis and the Village
Satish Chandra	Parties and Politics in the Mughal Court, 1707-1740
Satish Chandra	The Eighteenth Century in India : Its Economy and the Role of the Marathas, the Jats, the Sikhs and the Afghans
Satish Chandra	Medieval India : From Sultanate to Mughals, Vol. I – II
Chaudhuri, K.N.	Trade and Civilization in the Indian Ocean
Digby, Simon	War Horse and Elephant in the Delhi Sultanate : A Study in Military Supplies
Fukazawa Hiroshi	The Medieval Decan : Peasants, Social System and States- Sixteenth to Eighteenth Centuries
Gordon, Stewart	The Marathas 1600-1818
Grewal, J.S. (ed)	State and Society in Medieval India
Habib, Irfan	Agrarian System of Mughal India 1526-1707
Habib, Irfan	Essays in Indian History : Towards a Marxist Perception
Habib, Irfan	Madhyakalin Bharat (Hindi), 4 Volumes
Habib, Mohammad	Politics and Society in Early Medieval Period, Vols. I & II
Habib, Mohammad and	Comprehensive History of India, Vol. V AD 1206-1526
K.A.Nizami (ed.)	
Hasan, S. Nurul	Thoughts on Agrarian Relations in Mughal India
Jackson, P	The Delhi Sultanate
Khan, A.R.	Chieftains in the Mughal Empire During the Reign of Akbar
Kulke, Hermann	The State in India (AD 1000-1700)
Marshall, P.J. (ed.)	Eighteen Century India : Evolution or Revolution
Moosvi, Shireen	Economy of the Mughals Empire : A Statistical Study
Naqvi, H.K.	Urbanization and Urban Centers under the Great Mughals 1556-1707
Nigam, S.B.P.	Nobility under The Sultans of Delhi
Nizami, Khaliq A.	Religion and Politics in the Thirteenth Century
Raychaudhri, Tapan and Irfan Habib (eds.)	Cambridge Economic History of India, Vol. I, 1200 to 1750
Richards, J.F.(ed.)	The Imperial Monetary System of Mughal India
Richards, J.F.(ed.)	New Cambridge History of India: The Mughal Empire
Sangwan, R.S.	Jodhpur and the later Mughals, A.D. 1707-1752
Sharma, G.D.	Madhyakalin Bharat Ki Rajnetik Aur Aarthik Sansthayen

	(Hindi)
Singh, Chetan	Region and Empire : Punjab in the 17th Century
Singh, Chetan	Madhyakalin Bharat : Sultanate Se Mughal Kal Tak Vols. I-II
	(Hindi)
Stein, Burton	New Cambridge History of India : Vijaynagar
Streusand, Douglas E.	The Formation of the Mughal Empire
Verma, H.C. (ed.)	Madhyakalin Bharat (Hindi), 2 Volumes
Wink, Andre	Land and Sovereignty in India : Agrarian Society and Politics
	under the Eighteenth Century Maratha Swarajya

Paper-3 (Specialization Paper) (Opt-ii): Colonial India (1757-1857)

(7.7. 1.)

Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note: -** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Sources Archival Records, Private Papers, News Papers, Periodicals and Oral Traditions; Pre-Colonial Order Polity, Economy and Society; British Mercantilism and India
- Unit II Colonial Expansion : Bengal, Mysore, Marathas, Awadh, Sindh and Punjab; Subsidiary Alliance System; Doctrine of Lapse; Evolution of British Paramountcy : Motives and Phases; The British Imperialist Ideology : Political, Economic and Cultural Theories
- Unit III Construction of the Colonial State : The 'Iron' Framework Armed Forces and Law; The 'Steel' Framework - Civil Administration and Bureaucracy; British Policy Towards Indian Society : Role of Orientalists, Evangelicals and Utilitarians
- Unit IV Social Reforms; Introduction of Modern Education; Rise of Capitalism and Transition in Economy; The Pre-1857 Risings; The Uprising of 1857: Causes, Nature and Consequences

Suggested Readings:

Amold, David and	Nature, Culture and Imperialism : Essays on the
Ramachandra Guha (eds.)	Environmental History of South Asia
Bayly, C.A.	Indian Society and the Making of the British Empire (New
	Cambridge History of India)
Bipan Chandra	India's Struggle for Independence
Bipan Chandra	Bharat Ka Swatantra Sangharsh (Hindi)
Brown, Judith	Modern India: The Origin of an Asian Democracy
Chicherov, A.L.	Indian Economic Development in the Seventeenth and
	Eighteenth Century
Desai, A.R.	Social Background of Indian Nationalism
Fisher, M.H. (ed.)	Policies of the British Annexation of India 1757-1857
Gopal S.	British Policy in India
Guha, Ranjit (ed.)	Subaltern Studies: Writings on South Asian History and
	Society, Vols. I - XI
Habib, Irfan	Essays in Indian History: Towards a Marxist Perception
	10(177)

Joshi, P.C.	Rebellion – 1857
Kumar, Dharma (ed.)	Cambridge Economic History of India, Vol. – II
Mishra, Girish	Economic History of Modern India
Mishra, Girish	Adhunik Bharat Ka Arthik Itihas(Hindi tr.)
Panigrahi, D.N. (ed.)	Economy, Society and Politics in Modern India
Rai, Satya Murti (ed.)	Bharat Mein Upniveshwad Aur Rashtrawad (Hindi)
Ravindra Kumar	Social History of Modern India
Raychandhary, Tapan	Indian Economy in the 19th Century : A Symposium
Sarkar, Sumit	Modern India, 1885-1947
Sarkar, Sumit	Audhunik Bharat 1885-1947 (Hindi)
Shukla, Ram Lakhan (ed.)	Adhunik Bharat Ka Itihas (Hindi)
Siddiqui, Aisya (ed.)	Trade and Finance in Colonial India

Paper-4: History of China and Japan in Modern Times

Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note:** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Shaping Forces of Modern China; The Canton System of Trade and Opium Wars; The Taiping Revolt; The Boxer Uprising; Socio-Economic Changes and Intellectual Awakening 1895-1911; Revolution and the Republic of 1911; Dr. Sun Yat Sen Ideology and Work
- Unit II The May 4th Movement ; Rise of the Communist Party and its Relations with Kuo Min Tang; The Civil War and Communist Revolution 1945-1949; Mao Tse Tung - Ideology and Work; Cultural Revolution; Structure of the Communist State; Land Collectivization and Economic Reforms
- Unit III Japan in the 19the Century; Western Contact and its Implications; The Meiji Restoration - Causes, Nature and Significance; Reforms in Polity, Society, Education and Economy 1895-1931; Political Party System and its Drawbacks; Growth of Militarism - Expansion and Aggression
- Unit IV Japan and World War-II; Post-War Japan Disarmament and Demilitarization; Democratization - New Political System; Economic, Social and Educational Remodeling up to 1960

Suggested Readings :

Akita, George	Foundation of the Constitutional Government in Modern
	Japan
Allen, George C.	Modern Japan and its Problem
Allen, George C.	A Short Economic History of Modern Japan 1867-1937
Bakmann, George M.	The Making of the Meiji Constitution

Beasley, W.G. The Modern History of Japan Bianco, Lucien Origins of the Chinese Revolution 1915-1949 Mao Tse-Tung and the Chinese Revolution Chen, Jerome China from the 1911 Revolution to Liberation Chesneaux Jean et al China from Opium Wars to 1911 Revolution Chesneaux, Jean et al Clyde, P.H. Far East Clyde, P.H. Sudoor Purva (Hindi tr.) Dengarfield, R.J. The New Japan Fairback ,John K. The United States of China Fairback ,John K. The Great Chinese Revolution Fairback, John K. East Asia : Modern Transformation Fine, S.M. Japan's Post-War Industrial Recovery Hall, John W. Japan From Prehistory to Modern Times Modern Japan and Shinto Nationalism Holtam, D.C. Hsia. R. Economic Planning in Communist China Hsu, T.Immannuel The Rise of Modern China The Rise and Fall of the Japanese Empire James. David H. The Cambridge History of Japan, Vols. V to VI Jansen M.B. (ed.) Jansen, M.B. Japan and China : From War to Peace 1894-1972 Johnson, C. A. Peasant Nationalism and Communist Power : The Emergence of Red China, 1937-1945 Kostan, E.E.N Militarism and Foreign Policy in Japan Lockwood, William The Economic Development of Japan : Growth and Structural Change Mao Tse Tung Selected Works Mohanti, Manoranjan The Political Philosophy of MaoTse Tung Mohanti, Manoranjan (ed.) Cheenee Kranti (Hindi) Myers, Ramon H. and Mark R. The Japanese Colonial Empire 1895-1945 Patric (eds.) Norman, E.H. Japan's Emergence as a Modern State Purcell. Victor The Boxer Uprising : A Background Study Pyle, Kenneth B. The Making of Modern Japan Scalapino, Robrt A. Democracy and the Party Movement in Pre-War Japan Schwartz, Benjamin I. Chinese Communism and the Rise of Mao Smith, Thomas C. Political Change and Industrial Development in Japan : Government Enterprise Tanin, O and Yohan, E. Militarism and Fascism in Japan Thomas, S.B. Government and Administration in Communist China Thomas, S.B. Recent Political and Economic Developments in China Tse-Tung, Chow The May Fourth Movement : Intellectual Revolution in Modern China Vinayake Poorvi Asia Ka Itihas (Hindi) Wright, Mary C. China in Revolution : The First Phase 1900-1913 Yanaga, Chitoshi Japan Since Parry Young, A. Morgan Imperial Japan 1926-1938

Paper-5: History of Europe (1789-1914)

Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note: -** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I The French Revolution: Causes, Course and Impact; Napoleon Bonaparte: Emergence and Downfall; Congress of Vienna and Reconstruction of Europe; The Concert of Europe: Nature, Growth and Failure; The Metternich System
- Unit II Nature and Impact of the Revolutions of 1830 and 1848; The Eastern Question- Independence of Greece and Crimean War; Unification of Italy and Germany; Bismarck and Beginning of the Diplomatic Alignments: Three Emperors' League, Dual Alliance, Triple Alliance and Re-Insurance Treaty
- Unit III Franco-German Relations 1870-1890; Russo-Turkish War and Berlin Congress; European Imperialist Interests in Africa and its Partition; France-Russian Alliance; Anglo-French Alliance; Anglo-Russian Alliance and the Formation of Tripe Entente
- Unit IV Shifting Position of Italy; Nature of the Triple Alliance and Triple Entente 1907-1914; Morocco Crisis, Bosnian Crisis and Agadir Crisis; Anglo-German Naval Rivalry; Balkan League and Balkan Wars; World War – I : Origins and Responsibility

Suggested Readings :

Bartbelt, C.J.	Peace, War and European Powers 1814-1914
Cipolla, C.M.	Fontana Economic History of Europe, Vol. III
Chauhan, D.S.	Europe Ka Itihas (Hindi)
Chauhan, D.S.	Samkalin Europe (Hindi)
Fay, S.B.	Origins of the First World War
Gooch, G.P.	History of Modern Europe 1878-1920
Grant and Temperley	Europe in the Nineteenth and Twentieth Centuries
Gupta, Parthasarthi (ed.)	Europe Ka Itihas (Hindi)
Gupta, Parthasarthi (ed.)	Adhunik Pashchim Ka Uday (Hindi)
Hamerow, T.S.	Restoration, Revolution and Reaction: Economy and
	Politics in Germany
Hazen, C.D.	Modern Europe upto 1945
Hobsbawm, E.J.	Nation and Nationalism
Hunt, Lynn	Policies, Culture and Class in the French Revolution
Jelavich, Charles	Establishment of the Balkan National States 1840-
	1920
Joll, James	Europe Since 1870
	10(180)
Joll, James

Langer, W.L. Langer, W.L. Lefebvre, George Lucas, Colin

Marriot, J.A.R. Marriot, J.A.R. Porter, Andrew Post, Ken Roberts, J.M. Robertson, C.G. Roth, J.J. (ed.) Smith, Meak Soboul, Albert Stevenson, David Taylor, A.J.P. Taylor, A.J.P. Thomson, David Wood, Anthony

1870 Se Europe (Hindi)

The Diplomacy of Imperialism European Alliances and Alignments Coming of the French Revolution The French Revolution and the Making of Modern Political Culture, 2 Vol.

The Eastern Question The Remaking of Modern Europe European Imperialism 1860-1914 Revolution and European Experience 1789-1914 Europe 1880-1945 Bismarck World War I : A Turning Point in Modern History Italy : A Modern History, Vol. I History of the French Revolution The Outbreak of the First World War Bismarck : The Man and Statesman Struggle for Mastery in Europe Europe Since Napoleon History of Europe 1815-1860

SYLLABUS OF M.A. (FINAL) HISTORY COURSE (ANNUAL SYSTEM) SCHEME OF EXAMINATIONS AND COURSES OF READING (w.e.f. 2019-20)

M.A. History Course shall be a Two-Year Degree Course of 1000 marks. The candidate shall take Five Papers in each year, i.e., Ten Papers in the full Course. Each Paper will carry 100 Marks. Out of 100 Marks, 80 marks shall be earmarked for Theory Exam and 20 Marks for Internal Assessment (Assessment Test) for the candidates appearing through the Distance Mode. However, there shall be no Internal Assessment for the candidates appearing through Private Mode and they shall be examined only on the basis of their Theory Exam which shall be of full 100 Marks in each Paper for such candidates.

M.A. (Final) History:

SCHEME AND INSTRUCTIONS OF EXAMINATION W.E.F. 2019-2020

Note: There shall be **Five** Papers (including the Specialization Paper-8 with internal choice of two Optional Papers). The candidate has to take all **Five** Papers. In case of the Specialization Paper-8, the candidate has to opt any one out of the two Optional Papers. The candidate who opted for a particular Specialization in M.A. Previous, shall take the same Specialization in M.A. Final.

Paper No.	Nomenclature	Theory	Internal	Time
-		Exam	Assessment	
Paper-6	Historiography	80	20	3 Hrs.
Paper-7	History of Haryana	80	20	3 Hrs.
Paper-8	Society and Culture in Medieval India	80	20	3 Hrs.
(Specialization	1200-1750			
Paper) (Opt-i)				
Paper-8	Modern India 1858-1947	80	20	3 Hrs.
(Specialization				
Paper) (Opt-ii)				
Paper-9	Social History of India 1200-1947	80	20	3 Hrs.
Paper-10	Economy and Business in India 1200-	80	20	3 Hrs.
_	1947			

Syllabus and Courses of Reading

Paper-6: Historiography

Maximum Marks: 100 Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

Note: - The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of our short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.

- Unit I History: Meaning, Nature and Scope; History and Allied Disciplines; Historical Evidence: Nature and Transmission; Objectivity in History; Causation in History; Collection and Selection of Historical Data
- Unit II Early Trends of Historiography: Greco-Roman, Chinese and Ancient Indian; Medieval Historiography: Western, Arabic and Persian
- Unit III *Approaches of History*: The Idealistic Approach with Special Reference to W.G.F Hegel; The Positivist Approach: Auguste Comte and Leopold Von Ranke; The Materialistic Approach with Special Reference to Karl Marx; The Annals Tradition and the Idea of Total History; The Post-Modernist Approach
- Unit IV *Approaches of Indian History* : Early Imperialist Historiography; Cambridge School; Nationalist Historiography; Marxist Historiography; Subaltern School; Historiography on Lower Castes' Movements

Ali, B. Sheikh	History : Its Theory and Method
Bajaj, Satish K.	Recent Trends in Historiography
Barns, H.D.	A History of Historical Writing
Bentley, Michael (ed.)	A Companion to Historiography
Bloch, Marc	The Historian's Craft
Buddha Prakash	Itihas Darshan (Hindi)
Burtens, Hans	The Idea of Post Modern : A History
Carr, E.H.	What is History ?
Clark, Stuart	The Annals Historians
Collingwood, R.G.	The Idea of History
Comte, Auguste	The Course of Positivist Philosophy
Croce, Benedito	Philosophy of Spirit
Dray, Arthur	On History and Philosophers of History
Elton, G.R.	Practice of History
Evans, J. Richard	In Defense of History
Foucault, Michael	Madness and Civilization: A History of Insanity in the Age of
	Reason
Gardener, Patrick	Theories of History
Gooch, G.P.	History and Historians in the Nineteenth Century
Habib, Irfan	Interpreting Indian History
Hardy, Peter	Historians of Medieval India
Hughes, Warrington	Fifty Key Thinkers on History
Jenkins, Keith (ed.)	Post Modern History Reader
Johnson, Allen	Historian and Historical Evidence
Ladurie, L. R.	Territory of the Historian
Leonard, M.M.	The Nature of Historical Inquiry
Majumdar, R.K. & A.N.	Historiography
Srivastava	

Marwick, Aurther	The Nature of History
Marwick, Aurther	What History Is and Why It is Important ?
Marx, Karl	Das Capital
Marx, Karl	The Communist Manifesto
Moon, Vasant (ed.)	Dr. Babasaheb Ambedkar: Writings and Speeches, Vols. I, II, V & IX
Omvedt, Gail	Cultural Revolt in A Colonial Society: The Non Brahman Movement in Western India
Omvedt, Gail	Dalits and the Democratic Revolution: Dr. Ambedkar and the Dalit Movement in Colonial India
Philips, C.H.	Historians of India, Pakistan and Ceylon
Renier, G.T.	History : Its Purpose and Method
Sen, S.P.	Historians of Modern India
Sridharan, E.	A Textbook of Historiography
Sridharan, E.	Itihas Lekh (Hindi)
Thompson, J.W.& Holm	A History of Historical Writing, Vols. I & II
Bernord	
Topolski, Jarzy	Methodology of History
Walsh, W.H.	Philosophy of History
Widgery, G.A.	The Meaning of History
William S.H.	Some Twentieth Century Historians
William, S.H.	The Modern Historian
Zenkins, Keeth	Why History : Reflections on the Possible End of History and Ethics under the Impact of Post-Modernism

Paper- 7: History of Haryana

Maximum Marks: 100 Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note: -** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Concept of Regional History; Haryana Region: Sources of Medieval and Modern History; Establishment of the Turkish Hegemony: Local Resistance and Conciliation; Polity and Administrative Set up under the Sultans and the Mughals; The Imperial Decline and the Rise of Sikhs, Jats, Marathas and George Thomas
- Unit II *Medieval Haryana* : Social Institutions and Social Life; Economic Conditions – Agriculture and Land Revenue Systems; Industries, Handicrafts and Trade; Education and Literature; Arts and Architecture; Process of Urbanization

- Unit III Establishment of the British Rule in Haryana; Administration of East India Company 1803-1857: Civil, Judicial and Land Revenue; Resistance to the British Rule: The Pre-1857 Risings; The Uprising of 1857 : Causes, Nature and Impact; Aftermath of the Revolt : Merger with Punjab and New Administrative Set up
- Unit IV
 Colonial Haryana : Growth of Modern Education; Transition in Economy with Special Reference to Agrarian Changes; Transition in Society : Urban and Rural; Socio-Religious Reform Movements: Arya Samaj and Sanatan Dharma Sabha; National Movement in Haryana – Phases of Anti-Imperialist Struggle; Politics of Unionist Party and the Role of Sir Chhotu Ram; Partition and Rehabilitation of the Displaces People; Creation of Haryana State

Bajaj, Satish K.	Recent Trends in Historiography
Buddha, Prakash	Glimpses of Haryana
Buddha Prakash	Haryana Through the Ages
Chhotu Ram	Bechara Kisan (Hindi tr. by K.C. Yadav)
Darling, Malcolm	Punjab Peasantry in Prosperity and Debt
Gopal, Madan	Sir Chhotu Ram : A Political Biography
Griffin, L.H.	The Rajas of Punjab
Gupta, H.R.	The Marathas and Panipat
Hussain, Azim	Fazl-i-Hussain : A Political Biography
Jagdish Chandra	Freedom Movement in Haryana
Jagdish Chandra	Gandhi and Haryana
Jones, K.W.	Arya Dharma : Hindu Consciousness in the 19th Century Punjab
Jones, K.W.	Socio-Religious Reform Movements in British India
Juneja, M.M.	History of Hisar
Kayo, Johan William	Life of Lord Metcalfe, Vols. I-II
Kundu, C.L. and Udai	Education in Haryana
Shankar	
Mittal, S.C.	Haryana : A Historical Perspective
Muztar, B.K.	Haryana : Political and Cultural
Nanda, J.	Punjab Uprooted : A Survey of the Punjab Riots and Rehabilitation Problems
Naqvi, H.K.	Urbanization and Urban Centres under the Great Mughals
Nurullah, S. & J.P.Naik	History of Education in India
Phadke, H.A.	Haryana : Ancient and Medieval
Prem Chaudhury	Punjab Politics and the Role of Sir Chhotu Ram
Saini, B.S.	Social and Economic History of Punjab
Sarkar, J.N.	Fall of the Mughal Empire
Satish Chandra	The Eighteenth Century in India : It Economy and Role of the
	Marathas, the Jats, the Sikhs and the Afghans
Sen, S.N. (ed.)	Sources of Indian History
Sharma, S.R.	Haryana Ke Swantantrata Sainani (Hindi)

Shukla, S.P.	Indian Freedom Struggle and the Role of Haryana
Singh, Amarjit	Punjab Divided: Politics of the Muslim League and Partition 1935- 1947
Singh, Chattar	Social and Economic Change in Haryana
Singh, Chetan	Region and Empire : Punjab in the 17th Century
Singh, Fauja	History of Punjab
Singh, Pardaman, and S.P.	Freedom Struggle in Haryana and Indian National Congress 1885-
Shukla	1985
Singh, Ranjit	Haryana Ke Arya Samaj Ka Itihas (Hindi)
Talbot, Ian	Punjab and the Raj
Tanwar, R.	The Politics of Sharing Power : The Punjab Unionist Party
Tanwar, R.	Reporting Partition of Punjab 1947 : Press, Public and Other
	Opinions
Verma, D.C.	Sir Chhotu Ram: Life and Times
Yadav, B.N.S.	Society and Culture of Northern India in the 12th Century
Yadav, K.C.	Haryana: Studies in History and Culture
Yadav, K.C.	The Revolt of 1857 in Haryana
Yadav, K.C.	Haryana : Itihas Evam Sanskriti (Hindi), Vols. I-II
Yadav, K.C. (ed.)	Journal of Haryana Studies, Various Issues

Paper-8 (Specialization Paper) (Opt-i): Society and Culture in Medieval India 1200-1750

Maximum Marks: 100 Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note:** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Continuity and Change in Medieval Indian Society: Composition and Stratification; Urban and Rural Society; Caste and Social Mobility; Slavery; Conditions of Women; Systems of Education; Growth of Literature: Persian, Sanskrit and Hindi; Patronage of Learning; Way of Life
- Unit II Origins and Growth of Sufi Movement: Chisti, Qadiri, Suhrawardi and Naqashbandi Silsilahs; Origins and Growth of Bhakti Movement: Nath Panthis, Kabir, Nanak, Raidas, Dadu, Chaitanya, Tulsidas and Maharashtra Dharma

Unit – III	Development of Architecture under the Sultans of Delhi : Mamluqs,
	Khaljis, Tughlaqs and Lodhis; Regional Architecture – Vijayanagar and
	Sharqi; Mughal Architecture : The Early Phase, Development from
	Akbar to Shahjahan, The Later Stage

Unit – IV Visual and Performing Arts : Mughal, Rajput and Kangra Schools of Painting; Dance and Music; Elements of Conflict and Synthesis in Medieval Indian Society: Ruling Groups, State and Orthodoxy; Muslim Revivalist Movement under Sheikh Ahmad Sarhindi; Sectarian Communities; Evolution of Composite Culture

Ashraf, K.M.	Life and Conditions of the People of Hindustan
Ali, M. Athar	Mughal India : Studies in Polity, Ideas, Society and Culture
Asher, Catherine B.	Architecture of Mughal India
Aziz, Ahmad	Studies in Islamic Culture in the Indian Environment
Banga, Indu (ed.)	The City in Indian History : Urban Demography, Society and Politics
Beach, Moloch	Mughal and Rajput Paintings
Brown, Percy	Indian Architecture and Painting under the Mughals
Chopra, P.N.	Life and Letters under the Mughals
Eaton, Richards M. (ed.)	India's Islamic Tradition
Grewal, J.S. (ed.)	The State and Society in Medieval India
Habib, Irfan	Medieval India 1200-1750
Habib, Irfan	Medieval Technology : Exchanges between India and Islamic World
Habib, Muhammad	Politics and Society in Early Medieval Period, Vols. I & II
Hasan, S. Nural	Religion, State and Society in Medieval India (ed. by Satish Chandra)
Hovel, E.B	Indian Architecture Through the Ages
Jackson, Peter	The Delhi Sultanate
Karashima, N.	Towards a New Formation : South Indian Society under Vijayanagar
Koch, Ebb	Mughal Architecture : An Outline of its History and Development 1528-1858
Koch, Ebb	Mughal Art and Imperial Ideology
Nigam, S.B.P.	Nobility under the Sultans of Delhi
Nizami, K.A.	Religion and Politics in the 13th Century India
Qaisar, A.J.	Indian Response to European Technology and Culture
Rashid, A.	Society and Culture in Medieval India
Richards, J.F.	The Mughal Empire
Rizvi, S.A.A.	History of Sufism, Vols. I-II
Rizvi, S.A.A.	Muslim Revivalist Movement in Northern India in the 16th – 17th Centuries
Rizvi, S.A.A.	Religious and Intellectual History of the Muslims in Akbar's Reign
Satish Chandra	Medieval India : Society, Jagirdari Crisis and the State
Siddiqui, I.H.	Essays On Intellectual Thought and Culture
Srivastava, A.L.	Medieval Indian Culture
Stein, Burton	New Cambridge History of India : Vijayanagar
	10(187)

Stein, Burton Tara Chand Umar, Muhammad Umar, Muhammad Verma, S.P. Peasant, State and Society in Medieval South India Influence of Islam on Indian Culture Muslim Society in North India During the 18th Century Urban Culture in North India During the 18th Century Mughal Painters and Their Works

Paper-8 (Specialization Paper) (Opt-ii): Modern India 1858-1947

Maximum Marks: 100 Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note: -** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I *The British Raj*: Transfer of Power from East India Company to the Crown; Authorities at London; British Indian Government; Provincial Government; Local Self Government; Colonial Control: Land Revenue Administration; Civil Administration Indian Civil Services and Bureaucracy; Law and Judicial Administration; Fiscal and Financial Administration
- Unit II Foreign Relations: Afghanistan, North-West Frontier, Burma, Tibet and Persian Gulf; Relations with Princely States; Process of Modernization: Capitalist Change and Emergence of New Social Order; Patterns of Urbanization; Growth of Press and its Impact; Growth of Literature – Bengali and Hindi; Cultural Renaissance
- Unit III Emergence of Indian Nationalism; Founding of Indian National Congress; The Moderates: Ideology and Politics; Rise of the Extreme Nationalism: Ideology and Politics; Partition of Bengal and the Swadeshi Movement; Rise of Communalism: Founding of the Muslim League and its Politics; World War-I and India: Luchnow Pact and the Home Rule Movement; Emergence of Mahatma Gandhi: Rowlatt Satyagraha, Khilafat and Non-Cooperation Movement; Civil-Disobedience Movement; Quit India Movement
- Unit IV Politics of Swaraj Party; Rise of the Left Wing in Indian Politics; Round Table Conference and the Conclusion of Poona Pact; Trade Union Movement; Peasant Movements; Revolutionary Movement; Congress Socialist Party; Muslim Communal Politics in 1930s: Rise of the Demand of Pakistan; Cripps Mission and Indian Politics; Gandhi-Jinnah Negotiations and Wavell Plan; Subhas Chandra Bose and Indian

National Army; Cabinet Mission and Mountbatten Plan: Partition and Independence

Agrow, D.	Moderates and Extremists in the Indian National Movement
Ambedkar, B.R.	Pakistan or the Partition of India
Bilgrani, Ashgar H.	Afghanistan and British India : A Study in Foreign Relations
Bhuyan, Arun	The Quit India Movement
Bipan, Chandra	Rise and Growth of Economic Nationalism in India
Bipan Chandra	Colonialism and Nationalism in India
Bipan Chandra	Essays on Communalism
Bipan Chandra et. al.	India's Struggle For Independence
Brown, Judith	Gandhi's Rise to Power: Indian Politics 1915-22
Brown, Judith	Gandhi : The Prisoner of Hope
Desai, A.R.	Social Background of Indian Nationalism
Desai, A.R.	Peasant Struggle in India
Dube, S.C.	Contemporary India and its Modernization
Dutt, R.C.	Economic History of India, Vols. I & II
Ghosh, P.C.	The Indian National Congress
Gopal, S.	British Policy in India
Guha, Ranjit	Elementary Aspects of Peasant Insurgency in Colonial India
Guha, Ranjit (ed.)	Subaltern Studies, Vols. I – XI
Gupta, M.N.	History of the Revolutionary Movement in India
Hasan, Mushirul	India's Partition : Process, Strategy and Mobilization
Hasan, Mushirul	Nationalism and Communal Politics in India 1916-1928
Hasan, Zoya	Politics and State in India
Heimsath, Charles	Indian Nationalism and Hindu Social Reform
Joshi, Shashi and	Struggle for Hegemony in India, Vols. I-III
Bhagwan Josh	
Kulkarani, V.B.	British Dominion in India and After
Kumar, Dharma (ed.)	Cambridge Economic History of India, VolII
Kumar, Kapil	Peasants in Revolt
Lal Bahadur	Muslim League
Low, D.A. (ed.)	Congress and the Raj : Facets of the Indian Struggle 1917-1947
Majumdar, R.C.	History of the Freedom Movement in India, Vols. I-IV
Majumdar, R.C. (ed.)	British Paramountcy and Indian Renaissance, Vols. IX-X
Mehrotra, S.R.	The Emergence of the Indian National Congress
Mishra, B.B.	The Administrative History of India 1834-1947
Mohan, Kamlesh	Militant Nationalism in the Punjab
Moon, Penderal	Divide and Quit
Moore, R.J.	Crisis of Indian Unity
Munshi, K.M.	Pilgrimage to Freedom
Nanda, B.R.	Gandhi and his Critics
Page, David	Prelude to Partition
Pannikar, K.N.	National and Left Movements in India

Pavlov, V.I.	The Indian Capitalist Class : A Historical Study
Roy, Satya Murti (ed.)	Bharat Me Upniveshvad Evam Rashtravad (Hindi)
Sarkar Sumit	Modern India 1885-1947
Shankar, Girija	The Socialist Trends in the Indian National Congress
Sharma, M.P.	Local Self -Government in India
Shukla, R.L. (ed.)	Adhunik Bharat Ka Itihas (Hindi)
Singh, Amarjit	Punjab Divided : Politics of the Muslim League and Partition 1935-1947
Singh, Anita Inder	The Origins of the Partition of India 1936-1947
Singh, L.P.	The Left Wing in India
Sitaramaya, P.	History of the Indian National Congress, Vols. I-III
Stein, Burton	Thomas Munro : The Origins of the Colonial State and his Vision of the Empire
Tanwar, R.	Reporting Partition of Punjab 1947 : Press, Public and Other Opinions
Tara Chand	History of the Freedom Movement in India, Vols. I-IV
Tomlinson, B.R.	Economy of Modern India 1860-1970
Vajpeyi, J.N.	The Extremist Movement in India

Paper – 9: Social History of India 1200-1947

Maximum Marks: 100 Theory Exam: 80 Internal Assessment: 20 Time: 3 Hours

- **Note: -** The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.
- Unit I Social History of India: Sources and Approaches; Indian Social Institutions: Tribe, Caste (as well as Untouchability), Class and Community; Advent of Islam in India: Impact on Indian Society; Religious Cults of Islam; Religious Cults in Early Medieval India; Medieval Indian Society: Urban and Rural
- Unit II Socio-Religious Movements in Medieval India : Sufi and Bhakti Their Ideology, Nature and Impact; Rise of Silsilahs and Panthas; Social Transition in Medieval India: Stratification and Mobility; Position of Women; Educational Systems and Institutions; Syncretic Tradition and Cultural Synthesis
- Unit III *Colonial Intervention and Social Change*: The British Social Policy and Western Ideas – Role of Orientlists, Evangelicals and Utilitarians; Social Legislation and Social Reforms; Growth of Modern Education; Rise of New Social Classes; Transition in Caste-Ridden Society –

DebateonSanskritizationandDe-Sanskritization/Dalitization;ConflictbetweenTraditionandModernity;Changing Position of WomenWomenConflictConflictConflict

Unit – IV Social Movements in Modern India : Brahmo Samaj; Arya Samaj; Ram Krishan Mission; Theosophical Society; Aligarh Movement; Sri Narayan Dharma Movement; Satyashodhak Samaj; Self-Respect Movement; Singh Sabha Movement; Depressed Class Movement with Special Reference to the Role of Dr. B.R.Ambedkar; Tribal Movements

Ahmad, Aziz	Studies in Islamic Culture in the Indian Environment
Altekar, A.S.	Position of Women in Hindu Civilization
Ambedkar, B.R.	The Untouchables
Ambedkar, B.R.	What Congress and Gandhi have Done to the Untouchables
Ashraf, K.M.	Life and Conditions of the People of Hindustan
Ballahatchet, K.S.	Social Policy and Social Change in Western India
Basu, Aparna	The Growth of Education and Political Development 1898- 1920
Bayly, Susan	Caste, Society and Politics in India from the Eighteenth Century to the Modern Age
Beteitte, Andre	Caste, Class and Power
Bhatnagar, S. (ed.)	Studies in Social History
Chahal, S.K.	Dalits Patronized : Indian National Congress and the
	Untouchables of India 1921-1947
Chopra, P.N.	Some Aspects of Social Life during the Mughal Age(1526- 1707)
Datta, K.K.	Social History of Modern India
Desai, A.R.	Social Background of Indian Nationalism
Dube, S.C.	Indian Society
Dube, S.C.	Contemporary India and its Modernization
Gore, M.S.	Social Context of An Ideology : Ambedkar's Political and
	Social Thought
Guha, Ranjit (ed.)	Subaltern Studies, Vols. I-XI
Habib, Irfan	Interpreting Indian History
Habib, Mohammad	Politics and Society during the Early Medieval Period
Heimsath, Charles	Indian Nationalism and Hindu Social Reform
Jain, M.S.	The Aligarh Movement
Jha, D.N.	Economy and Society in Early India : Issues and Paradigms
Jones, K.W.	Arya Dharma : Hindu Consciousness in the 19th Century Punjab
Jones, K.W.	Socio-Religious Reform Movements in British India
Joshi, Barbara	Untouchable! Voices from the Dalit Liberation Movement
Joshi, V.C. (ed.)	Rammohan Roy and Process of Modernization in India
Krishnamurthi, J.	Women in Colonial India

Kumar, Ravindra Majumdar, B.B	Social History of Modern India History of Indian Social and Political Ideas : From Rammohan to Dayananda
Majumdar, R.C.	British Paramountcy and Indian Renaissance, Vol. X
Majumdar, R.C.	The History and Culture of Indian People, Vols. V & VII
Mishra, B.B.	The Indian Middle Classes : Their Growth in Modern Times
Moon, Vasant (ed.)	Dr. Babasaheb Ambedkar: Writings and Speeches, Vols. I, II, V & IX
Nizami, K.N.	Some Aspects of Religion and Politics in the Thirteenth Century
Nurullah, S. & J.P. Naik	History of Education in India
O' Malley, L.S.S.	Modern India and the West
Omvedt, Gail	Cultural Revolt in A Colonial Society : The Non-Brahman
	Movement in Western India
Omvedt, Gail	Dalits and the Democratic Revolution : Dr. Ambedkar and the
	Dalit Movement in Colonial India
Patil, P.G. (tr.)	Collected Works of Mahatma Jyotirao Phooley, Vols. I -II
Potts, E. Daniel	British Baptist Missionaries in India 1793-1837
Rashid, Abdul	Society and Culture in Medieval India
Rizvi, S.A.A.	Religious and Intellectual History of the Muslims in Akbar's Reign
Rizvi, S.A.A.	History of Sufism in India, Vols. I-II
Sarkar, Sumit	Writing Social History
Sarkar, Sumit	Modern India 1885-1947
Shah, A.B. & C.R.M. Rao	Tradition and Modernity in India
Sharma, R.S.	Social Changes in Early Medieval India
Smith, W.C.	Modern Islam in India
Srinivas, M.N.	Social Change in Modern India
Srinivas, M.N.	Caste in India and Other Essays
Stokes, Eric	The English Utilitarians and India
Tara Chand	Influence of Islam on Indian Culture
Tara Chand	Society and State in the Mughal Period
Vidyarathi, L.P.	Tribal Culture of India
Wilson, C.H.	The Sects of the Hindus

Paper No. - 10: Economy and Business in India 1200-1947

Maximum Marks: 100 Theory Exam 80 Assessment Test 20 Time: 3 Hours

Note: - The question paper will consist of nine questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*, consisting of four short answer type conceptual / thematic questions of equal marks spread over the whole syllabus. The candidate shall attempt *four* more questions selecting at least *one* from each Unit. Each question will carry equal marks.

- Unit I Sources of Medieval and Modern Indian Economic History; Problems and Issues of Indian Economic History: Different Approaches and their Limitations; Structure of Medieval Indian Economy: Rural and Urban; Economic Basis of Medieval Indian State; Mode of Production: Agricultural and Non-Agricultural (Handicraft); Indian Manufactures for External Market; Debate on Agrarian Crisis
- Unit II Business in Pre-Colonial India: Caste and Business Communities; Trade and Commerce Internal and External; Important Trade Centres; Credit and Indigenous Banking System; Potentialities of Capitalist Growth; European Trading Interests in India upto 1757; East India Company's Trade during 1757-1883; British Private Trade in India in the Eighteenth Century; Role of European Agency Houses during 1793-1848; Indigenous Bankers 1800-1850; Origins and Growth of Managing Agency System
- Unit III Rise of the New Colonial Mode of Production: Emphasis on Export Crops and Commodities; Agrarian Settlements and Land Revenue; Commercialization of Agriculture; Change in Land Relations and Problem of Rural Indebtedness; Flow of Foreign Capital and its Impact; Decline of Handicraft Industry; Rise of Modern Industries: Cotton Textile, Jute, Iron and Steel; Tariff and Excise Duties; Drain of Wealth; Famines and the British Policy
- Unit IV Expansion of Trade and Business : Railways, Roads and Telegraphs Their Impact on Business and Trade; British Monetary Policy and Emergence of Modern Banking System – Impact on Business and Trade; European Chambers of Commerce –Their Business Interests in India; Rise of Indian Industrial Houses with particular reference to Tata; Founding of Indian Chamber of Commerce; Conflict between British and Indian Business Interests and its Impact on Indian Politics; National Planning Committee and the 'Bombay Plan'

Bhatia, B.M.	Famines in India
Bagchi, A.K.	The Presidency Banks and the Indian Economy 1876-
	1914
Banerjee, T.D.	Internal Market of India 1834-1900
Bipan Chandra	The Rise and Growth of Economic Nationalism in India
Bipan Chandra	Colonialism and Nationalism in India
Bhattacharya, S.	Adhunik Bharat Ka Arthik Itihas (Hindi)
Bloch, Marc	Early English Tracts of Commerce
Brahmanand (ed.)	Famines in Colonial India
Buchanan, D.H.	The Development of Capitalist Enterprise in India

Chatterji, Basudeb Chaudhuri, K.N. Doraiswami, S.V Dutt, R.C. Freedenberg, R.E. Guha, R. Habib, Irfan Habib, Irfan Hasan, Nurul Jain, L.C. Kumar, Dharma (ed.) Lowden, David Mishra, Girish Mishra, Girish Mittal, S.C. Morris D., Morris et. al. Mukherjee, Mridula Mukherjee, Mridula Mukherjee, Nilmani Mukherjee, R.K. Muranjan, S.K. Ray, Rajat (ed.) Raychaudhury, Tapan & Irfan Habib (eds.) Richards, J.F. Roy, Tirthankar Rungta, R.S. Sanyal, R.N. Stein, Burton Tomlinson, B.R.

Tomlinson, B.R.

Trade, Tariff and Empire The Economic Development of India under the East India Company Indian Finance, Currency and Banking The Economic History of India, Vols. I-II Land Control and Social Structure in India A Rule of Property for Bengal : Essays in the Idea of Permanent Settlement Essays in Indian History: Towards a Marxist Perception The Agrarian System of Mughal India 1556-1707 Thought on Agrarian Relations in Mughal India Indigenous Banking in India The Cambridge Economic History of India, Vol. II An Agrarian History of South Asia Economic History of India Adhunik Bharat Ka Arthik Itihas (Hindi) Bharat Ka Samajik Aur Aarthik Itihas 1758-1947 The Indian Economy in the Nineteenth Century Colonizing Agriculture : The Myth of Punjab Exceptionalism Peasants in India's Non-Violent Revolution Rvotwari System in Madras 1792-1827 The Economic History of India 1600-1800 Modern Banking in India Entrepreneurship and Industry in India 1800-1847 The Cambridge Economic History of India, Vols. I & II The Imperial Monetary System of Mughal India Economic History of India 1857-1947 The Rise of Business Corporation in India 1851-1900 Development of Indian Railways The Making of Agrarian Policy in British India 1770-1900 The Political Economy of the Raj 1914-1947

Economy of Modern India 1860-1970

Annexure-I

DEPARTMENT OF GEOGRAPHY, KURUKSHETRA UNIVERSITY KURUKSHETRA (Established by State Legislature Act-XII of 1956)

('A+' Grade, NAAC Accredited)

Scheme of Examinations for M.Phil Geography (CBCS) w.e.f. 2017-18

Paper No.	Title	Credit	Max. Marks	End Somostor	Internal Assessment	Time
				Marks	Marks	
GEO-501	Research Designs and Methods	2	50	40	10	3 Hours
	in Geography					
GEO-502	Advanced Quantitative Methods	2	50	40	10	3 Hours
	in Geographic Research					
GEO-503	Research Methods in Human	2	50	40	10	3 Hours
	Geography					
GEO-504	Research Methods in Physical	2	50	40	10	3 Hours
	Geography					
GEO-505	Seminar-I	2	50			
				Every can	didate shall de	eliver two
GEO-506	Seminar-II	2	50	seminar	during the	academic
				session		

ANNUAL SYSTEM

Note: In addition, every candidate shall submit a dissertation or project work/problem or design work (hereinafter as Dissertation) and appear in viva-voce on the Dissertation.

GEO-501

RESEARCH DESIGNS AND METHODS IN GEOGRAPHY

Maximum Marks: 40 Time: 3 Hours

Note: There will be Six questions in all, three from each unit. The candidate has to answer FOUR questions in all selecting two questions from each units. All questions carry equal marks

- **Objective:** The objective of this paper is to introduce the M.Phil students to the concept of research with special reference to nature of geographical research. It aims to impart knowledge about research designs and explanations in geographical research.
- **Outcome:** M.Phil Students shall learn about the nature of research and different routes of explanation in geographical studies.

Unit-I

- 1. Defining Research problems and objectives of research, Types of research Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, and Conceptual vs. Empirical; Selection of research problem, Research design and methods, Research proposal and features of good research design.
- 2. Research Ethics, plagiarism, copy rights intellectual property rights.
- 3. Literature review Its objectives and importance, Sources and types of geographical literature, Procedure of critical literature review and ideal literature review, Identifying gap areas from literature review, Citation and acknowledgement.

Unit II

- 4. Observations, Conceptualization, Hypotheses, Models, Laws and Theories, Explanation Induction and Deduction, generalization and interpretation
- 5. Paradigms in geographic research-Positivism, Structuralism, Marxism, Gender Perspective and Postmodernism.
- 6. Report and thesis writing Structure and components of scientific report and theses, Analysis of data, illustrations and tables, Bibliography, referencing and footnotes -Oral presentation

- 1. Allan Bryman (2016) Social Research Methods, OUP.
- 2. Black James and Champion D.J. (1976) Methods and Issues in social Research, New York, Jolm Wiley and Sons.
- 3. Derek Gregory and Rex Walford (1989) Horizons in Human Geography.
- 4. Goode and Hat: Research Methodology in Social Sciences, Oxford University Press, New Delhi.

- 5. Har Prasad (1992) Research Methods and Techniques in Geography, Rawat Publication, Jaipur.
- 6. Johnston R.J. (1991) A Question of Place: Exploring the Practices of Human Geography, Blackwell.
- 7. Keith Hoggard (2002) Researching Human Geography, OUP.
- 8. M.H. Qureshi, Paradigms in Geographical Research, Concept, New Delhi.
- 9. Mishra H.N. and Singh V.P. (ed.) (1998) Research Methodology: Social, Spatial and Policy Dimensions, Rawat Publishers, Jaipur.
- 10. Paul Fyrabend, Against Methods, Vera.
- 11. Young P.V. (1986) An Introduction to Research Methodology.

GEO 502

ADVANCED QUANTITATIVE METHODS IN GEOGRAPHIC RESEARCH

Maximum Marks: 40 Time: 3 Hours

- Note: There will be Six questions in all, three from each unit. The candidate has to answer FOUR questions in all selecting two questions from each units. All questions carry equal marks
- **Objective:** This course involves the study of statistical approaches to the analysis of spatial information and processes. Emphasis will be given to *geographic research* using descriptive, inferential, bi-variate and multi-variate analyses.
- **Outcome:** Students are equipped with the skills of articulation and critical analysis of research material and in formulation of research proposals.

Unit-I

- 1. Theory of distribution, Inferential Statistics: Sampling, Significance, Uses and their measures.
- 2. Variability and Measure of Inequality: Significance, Uses and Measures such as Nearest Neighbour Analysis, Location Quotient, Lorenz Curve, Gini's Coefficient.
- 3. Bi -Variate Analysis: Significance and techniques such as- Correlation Karl Pearsons Product Moment Correlation Coefficient, Spearman's Rank correlation (rho), Nonparametric Tests : Chi-square test, test of significance and hypothesis testing.

Unit II

- 4. Causal Relationship and Estimation: Simple Linear Regression and Residuals; Logistic regression.
- 5. Multivariate Analysis: Partial and Multiple Correlation, Multiple and step-wise regression, Composite, Cluster Analysis, Discriminant Analysis.
- 6. Use of Computer and Statistical Software: Excel and SPSS

- 1. Aslam Mahmood: Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi, 1993.
- 2. A. Reza Hoshmand (second edition): Statistical Methods for Environmental and Agricultural Sciences, CRC Press, New York, 1998.
- 3. A. Stewart Fotheringham, Chris Brunsdon, M. Charlton: Quantitative Geography: Perspective on Spatial Data Analysis, Sage Publishers, 2000.
- 4. G.S. Monga, Statistical Mehtods
- 5. Jack Levin and J.A. Fox: Elementary Statistics in Social Research, 10th edition, Peason Education, New Delhi, 2006.

- 6. Robert Hanmund and Patric McCullagh: Quantitative Techniques in Geography: An Introduction Clarenden Press, 1974.
- 7. R. J. Johnston: Multivariate Statistical Analysis in Geography, Longman Scientific and Technical, John Wiley & Sons, 1989 (4th edition).
- 8. P.A. Rogerson: Statistical Methods for Geography, (A Student's Guide), 3rd Edition, Sage Publication, New Delhi, 2010.
- 9. Saroj K. Paul : Statistics for Geoscientists: Techniques and Applications, Concept Publishing Company, New Delhi, 1998
- 10. Suzanne, Davies W: Quantitative Methods in Human Geography, Oxford University Press, 2013.
- 11. S. Gregory : Statistical Methods and the Geographers, Longman, London, 1964.

GEO-503

RESEARCH METHODS IN HUMAN GEOGRAPHY

Maximum Marks: 40 Time: 3 Hours

Note: There will be Six questions in all, three from each unit. The candidate has to answer FOUR questions in all selecting two questions from each units. All questions carry equal marks

- **Objective:** It is an applied course of methods in human geography which is aimed at providing knowledge about the data sources, methods and techniques to study different aspects of human geography. It aims to inculcate basic research skill about the applications of various tools to study research problems related to various dimensions of human geography such as demographic, social, urban development, rural settlement and transport.
- **Outcome:** This course shall sharpen the understanding of students about applications of different methods and techniques to study research problems related to human geography.

Unit-I

- 1. Methodological issues in population geography; population data sources their scope applications and mapping.
- 2. Techniques in measurement of fertility and mortality; life tables; Parameters of human Development, Human Development Index, Gender Development Index and their applications.
- 3. Techniques in demarcation of CBD, rural urban fringe and umland; Urban development: urban infrastructure and household amenities; Smart city: concept and methods of evaluation of smart cities in India.

Unit II

- 4. Methods of concentration, dispersal and spacing of rural settlements.
- 5. Measurement of shape of rural settlements; type of settlements based on dispersion index.
- 6. Structural analysis of transportation network: Connectivity: (i)Road network connectivity; cyclomatic number, alpha index, beta index, gama index (ii)Centrality within network based on Koning number;(iii) The spread of network; the Kansky formula of Eta(n) index and (iv) the Detour index and aggregate transport score. Accessibility: Associated number and Shimbel index.

- 1. Bradford, M.G. and Kent, W.A. (1984) Human Geography: Theories and their Applications, Oxford.
- 2. Cassen, Robert and Bates, Lisa M. (1994) Population Policy: A New Consensus, Overseas Development Council, Washington, D.C.
- 3. Cater, Herald (1972) The study of Urban Geography, Edward Arnold, London.

- 4. Chandna, R.C. (1998) A Geography of Population: Concepts, Determinants and Patterns, Publishers, New Delhi.
- 5. Chorley, R.J. and Hagget, P. (1970) Socio Economic Models in Geography, Methuen, London.
- 6. Clout, H.D. (1972) Rural Geography: An Introductory Survey, Pergmon, N.York.
- 7. Demko, G. J. and others (Eds.) (1971) Population Geography, Reader, McGraw-Hill Books Co., New York
- 8. Gibbs, J.P. (1966) Research Methods, Von Nostrand company, Inc. New York.
- 9. Grover, Neelam (1954) Rural settlement: a cultural Geographical Analysis, Inter India Publication, N. Delhi.
- 10. Hagget, P. (1971) Locational Analysis in Human Geography, Martin's Press, N.York.
- 11. Hassan, I. (2010) Population Geography.
- 12. Johnson, James (Eds.) (1974) Suburban Growth, John Wiley and sons, London.
- 13. Kitchen, R. and Tae, N.J. (2000) Conducting Research into Human Geography: Theory, Methodology and Prctice, Prentice Hall, London.
- 14. Laboritz, S. and Hagedorn, R. (1971) Introduction to Social Research, McGraw Hills, USA.
- 15. Mahajan, N (2014) Population Geography, R.K. publishers, Delhi
- 16. Mandal, R.B. (1979) Introduction to Rural Settlements, Concept, New Delhi.
- 17. Mayer H.M. and Kohn, C.F. (1968) Readings in Urt. The University of Chicago Press, Chicago.
- 18. Michanel Pacione (2004) Urban Geography: A Global Perspective, Routledge, USA.
- 19. Newbold, K Bruce (2016) Population geography: Tools and Issues,
- 20. Northem, R.M. (1980) Urban Geography, Croom Helm, London.
- 21. Petrov, V. (1985) India: Spotlight of Population, Progress Publishers, Moscow.
- 22. Qazi, S.A. (2010) Population Geography, APH publishers.
- 23. Singh R.L. and Singh, K.N. (1975) Reading in Rural Settlement Geography, NGSI, Research publication no. 14, National Geographical Society of India, Varanshi.
- 24. Singh R.L. and Singh, R.P.B (1978) Transformation of Rural Habitat in Indian Perspective, A Geographical Dimension.
- 25. Singh R.L. and Singh, R.P.B. (1980) Rural Habitat Transformation in World Frontiers, 24 IGC publication, Tokyo.
- 26. Ramachandra, R. (1992) Urbanization and Urban System in India, Oxford, London.
- 27. Raymond and Murphy (1960) American cities: An Urban Geography, McGraw Hills, New York.
- 28. Saxena, H.M. (2005) Transport Geography, Rawat, Delhi.
- 29. Sinha, S.P. (1984) Processes and Pattern of Urban Development in India: A study of Haryana, The associated Publishers, Ambala Cantt.

GEO-504

RESEARCH METHODS IN PHYSICAL GEOGRAPHY

Maximum Marks: 40 Time: 3 Hours

- Note: There will be six questions in all with three questions from each unit. The candidate has to answer four questions in all selecting at least two questions from each unit. All questions carry equal marks.
- **Objective:** The goal of the course is to provide an overview to students about various techniques used in the investigation of physical geography.
- **Outcome:** This course shall sharpen the understanding of students about different techniques which will develop the scientific understanding pertaining to earth and atmospheric system.

UNIT-I

- 1. Types and techniques of data collections, their verification, main branches of physical geography enquiry
- 2. Geomorphological and land system mapping, slope classifications maps, measurement of sediment and dissolved load, measurements of channel cross sections and mass movements.
- 3. Soil profile, textural analysis of soil, equipments used in soil sample collections, measurement of soil erosion, moisture, permeability and soil water content, soil and water conservation measures.

UNIT-II

- 4. Techniques of measurement of elements of hydrological cycle, hydrograph analysis and base flow separation; probability analysis for hydrological extremes, determination of missing hydrologic data and adjustment of records.
- 5. Meteorological instruments, measurement techniques of weather elements and processing of weather data, comfort indices, weather forecasting.
- 6. Coding, decoding and plotting of synoptic data, evidences of climate change, dendrochronlogy, carbon dating and thermoluminescence, climatic data management.

- 1. Bridges EM. 1986. Principles and Applications of Soil Geomorphology. Halsted Press, New York.
- 2. Brikeland, PW. 1984. Soils and Geomorphology. Oxford University Press, London.
- 3. Bunting, BT. 1976. The Geography of Soils. Hutchinson, London.

- 4. Dackombe, RV and Gardiner V. 1983. Geomorphological Field Manual. George Allen and Urwin, London.
- 5. Ghosh, RK. 1999. Practical Hydrology. Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal.
- 6. Goudie, A (ed.). 1981. Geomorphological Techniques. George Allen and Urwin, London.
- 7. Gregory, KJ and Walling, DE. 1973. Drainage Basin form and Process-A Geomorphological Approach. Edward Arnold, London.
- 8. Kale, VS and Gupta, A. 2001. Introduction to Geomorphology. Orient Longman, Calcutta.
- 9. King, C.A.M. 1967. Techniques in Geomorphology. Edward Arnold, London.
- 10. Lowe, JJ and Walker, MJC. 1984. Reconstructing Quaternary Environments. John Wiley and Sons, New York.
- 11. Mutreja, KN. 1990. Applied Hydrology. Tata MC-Graw Hill Publishing Company, New Delhi.
- 12. Oliver, John E. 1981. Climatology-Selected Applications. Winston and Sons, London.
- 13. Pitty, AF. 1978. Geography of Soil Properties. University Press, London.
- 14. Thornthwaite, CW and Mather JR. 1987. Instructions and Tables for Computing Potential Evapotranspiration and Water Balance. Laboratory of Climatology, Drexel Institute of Technology, Centerton.
- 15. World Meteorological Organization. 1966. Climatic Change. Technical Note No.79, World Meteorological Organization, Geneva.
- 16. World Meteorological Organization. 1966. Some Methods of Climatological Analysis. Technical Note No.81, World Meteorological Organization, Geneva.
- 17. World Meteorological Organization. 1983. Guide to Meteorological Instruments and Methods of Observations. Technical Bulletin No. 8, World Meteorological Organization, Geneva.

DEPARTMENT OF PUBLIC ADMINISTRATION KURUKSHETRA UNIVERSITY KURUKSHETRA (Established by the State Legislature Act, XII of 1956) (A+ Grade NAAC Accredited)

SCHEME OF EXAMINATION OF M.PHIL. PUBLIC ADMINISTRATION (2018-19) AS PER CBCS PATTERN

- 1. The M.Phil. Public Administration Course is under annual system.
- 2. The M.Phil. Public Administration Course is of 12 Credits.
- 3. There are three components of M.Phil. Programme i.e. A, B & C as placed below:-A. Section comprises two papers:-

Paper – 1: Research Methods in Public Administration.

Paper – 2: Advanced Public Administration.

B. Seminars: Two Seminars each 50 marks from Paper – I and Paper – II mentioned in Section – A.

C. Dissertation:

Every M.Phil. student will submit Dissertation under the Supervision of an eligible Teacher as partial fulfillment to complete the M.Phil. Degree. The candidate shall appear in Viva-Voce Examination on the Dissertation submitted by him/her.

On the successful declaration of Papers I & II, and the successful completion of the evaluation of the dissertation including viva-voce, the M.Phil. Degree will be awarded.

SECTION	PAPER	NOMENCLATURE	EXTERNAL	INTERNAL	CREDITS (THEORY)
А	Paper - I	Research Methods in	80	20	4
		Public			
		Administration			
	Paper - II	Advanced Public	80	20	4
		Administration			
В	Paper III	Seminar – I		50	2
		Seminar – II		50	2
C		Dissertation	-	_	_
Total			30)0	12

Total marks: 300 Total credits: 12 Section C: Dissertation

There will be grading system in dissertation as:-

- i) Grade 'O' (Outstanding) If the candidate deserves 85 to 100% marks.
- ii) Grade 'A+' (Excellent)If the candidate deserves between 75% to 84% marks.
- iii) Grade 'A' (Very Good)If the candidate deserves between 65% to 74% marks.
- iv) Grade 'B+' (Good) If the candidate deserves 55 to 64% marks.
- v) Grade 'F' (Fail) If the candidate deserves less than 55% marks.

PAPER –I RESEARCH METHODS IN PUBLIC ADMINISTRATION

Max. Marks: 100 External Marks: 80 Internal Marks: 20 Credit: 4 Time: 3 hours

Note:- The question paper will consist of Nine questions. The candidate will have to attempt Five questions selecting One question from each unit. The first question will be compulsory and will include 8 short-answer questions spread over entire syllabus. The remaining EIGHT questions will be set taking TWO questions from each unit.

Course Objectives:

Research methods for Social Science explains different research methods used today for conducting research in particular with public administration, governance and public policy. This course is intended as a sound introduction to study the research methods with an objective of understanding the difference between qualitative and quantitative research and able to use appropriative tools and techniques for problem solving.

UNIT-I

Social Science Research:Utility & Limitations; Scientific Method; Identification and Formulation of Research Problem. Hypothesis and testing of hypothesis;

UNIT-II

Research Designs and their types; Basic Principles and types of sampling. Types and Sources of Data; Methods of Data Collection: Observation, Questionnaire, Interview and Case Study.

UNIT-III

Presentation and Analysis of Data; Classification, Tabulation and Graphical Representation of data. Statistical Techniques of analysing data; Measure of Central Tendency and Variability.

UNIT-IV

Concept and Use of SPSS in Social Science Research. Report Writing: Components and Characteristics of Good Report; Precautions: Reference Writing. **Books Recommended:**

- 1. Goode and Hatt: Methods in Social Research, Mc Graw-Hill Books Co., New Delhi, 1987.
- 2. Settiz, C. Hahedam: Research Methods in Social Relations, Holt Rinc Hort & Wiston, New York, 1951.

- 3. Broota, KD, Experimental Design in Behavioral Research, Wiley Eastern, 1992.
- 4. Young, PV, Scientific Social Survey and Research, Prentice Hall, New Delhi, 1973.
- 5. Lazzersfeld, Paul F., On Social Research and Its language, Chicago University Press, Chicago, 1993.
- 6. Miller, Handbook of Research Designs and Social Analytical Measurement.
- 7. Garrelt, H.E., Statistics in Psychology and Education, Vakils, Bombay.
- 8. Galtung John, Theory and Methods of Social Research, New York, Columbia University, Press, 1967.
- 9. Jain, BM, Research Methodology, Research Publications, Jaipur.
- 10. Trivedi, R.N. & Shukla, O.P., Research Methodology, Research Publications, Jaipur.
- 11. Kothari, S.R., Methods and Techniques (2nd Ed.), Wiley Eastern Ltd. New Delhi.
- 12. Pearson, C.J., Thesis and Project Work, A Guide to Research and Thesis Writing, London, Allena and Unwin, 1973.
- 13. Ajai S. Gaur & Sanjay S. Gaur, Statistical Methods for Practice and Research: A Guide to Data Analysis Using SPSS, Sage Publications, 2006.

PAPER-II ADVANCED PUBLIC ADMINISTRATION

Max. Marks: 100 External Marks: 80 Internal Marks: 20 Credit: 4 Time: 3 hours

Note:- The question paper will consist of Nine questions. The candidate will have to attempt Five questions selecting One question from each unit. The first question will be compulsory and will include 8 short-answer questions spread over entire syllabus. The remaining EIGHT questions will be set taking TWO questions from each unit.

Course Objectives:

The paper will familiarize the students with the frontiers and Emerging Areas in the discipline of Public Administration i.e. Public Choice Perspective, Ethics in Public Services, E-Governance & Administrative Reforms. It will also covers with the basis features of Indian Constitution, particularly those having relevance for the administrative set up in India. The paper will focus on the focus on the Accountability Reforms and Innovation in Administration.

UNIT-I

Theory of Public Administration: Evolution of Public Administration New Public Administration, in India. New Public Management Paradigm, Public Choice Perspective. Good Governance; Transparency with special reference to RTI; E-Governance- Problems and Prospects;.

UNIT-II

Emerging Politico-Administrative Scenario; Centre-State Relations; Human Rights and Human Rights Commission; Globalisation and Public Administration; Administrative Reforms. Judicial Activism; Consumer Protection

UNIT-III

Professionalism and Responsiveness in Bureaucracy; Administrative Culture; Organisational Efficiency and Effectiveness-Challenges and Remedies; Ethics in Public Services, Citizen Charter.

UNIT-IV

Constitutional Framework and Administration; Constitutional Reforms; National Constitutional Review Commission; 73rd - 74th Constitutional Amendments and impact.

Books Recommended:

- 1. Daj Bata K., Good Governance-Parametric Issues: A Futures Vision, Uppal Publishing House, New Delhi, 2002.
- 2. Henry Nicholas, Public Administration and Public Affairs, Prentice Hall, New Jersey, 2005.

- 3. Ostoom Vincen, The Intellectual Crisis in American Public Administration, University of Alabama Poess, Alabama, 1974.
- 4. Muller Dennis. L., Public Choice, Cambridge University Press, 1979.
- 5. Osborne, David and Gaebler, Ted., Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector, Prentice Hall of India, New Delhi, 1992.
- 6. Frederickson Goerge, New Public Administration, Alabama, University of Alabama Press, 1990.
- 7. Heady Farrel, Public Administration: A Comparative Perspective, Nareel Dekker, 2002.
- 8. Jain R.B., Public Administration in India: 21st Century Challenges for Good Governance, Deep and Deep Publications, New Delhi, 2001.
- 9. Arora Ramesh K., Corporate Governance, Mangal Publication, Jonpur, 2003.
- 10. Barthwal C.P., Good Governance, Deep & Deep Publications, 2005.
- 11. Singh Hoshiar, Local Government in India, Britain, France and America, Kitab Mahal, Allahabad, 2005.
- 12. Sachdeva Pardeep, Urban Local Government and Administration in India, Kitab Mahal, 2000.
- 13. Ginni H.A., Centre State Relations and Sarkaria Commission, Deep & Deep Publications, New Delhi, 2004.
- 14. Bawa Noorjahan, Public Administration in the 21st Century, IIPA, New Delhi, 2004.
- 15. Indian Journal of Public Administration, IIPA, New Delhi.
- 16. Administrative Change, Jaipur.

Bachelor of Technology (Computer Science & Engineering) Scheme of Studies/Examination Semester VII

_	Jeinestei VII									
S. No.	Course No.	Subject	L:T:P	Hours/ Week	E	Examination Schedule				
					Major Test	Minor Test	Practical	Total		
1	CSE 401N	Unix & Linux Program- ming	4:0:0	4	75	25	0	100	3	
2	CSE 403N	Computer Graphics and Animation	4:0:0	4	75	25	0	100	3	
3	PE-I	Elective* – I	3:0:0	3	75	25	0	100	3	
4	PE-II	Elective* – II	3:0:0	3	75	25	0	100	3	
5	CSE 405N	Computer Graphics Lab	0:0:2	2	0	40	60	100	3	
6	CSE 407N	Project-I**	0:0:9	9	0	100	100	200	3	
7	CSE 409N	Unix & Linux Program- ming Lab	0:0:2	2	0	40	60	100	3	
8	CSE 411N	Seminar	0:0:2	2	0	100	0	100		
9	CSE 413N	Industrial Training (Viva- Voce)***				100	0	100		
		l otal		29	300	480	220	1000		

Code	PE-I	Code	PE-II
CSE-415N	Object Oriented Software Engineering	CSE-421N	Agile Software Engineering
CSE-417N	Cyber Security	CSE-423N	Big Data and Analytics
CSE-419N	Cryptography & Information Security	CSE-425N	Expert Systems

Note:

*The students will choose any two departmental electives courses out of the given elective list in 7thSemester.

**Project should be initiated in the beginning of 7thsemester, and should be completed by the end of 8thsemester with good Report and power-point Presentation etc.

***4-6 weeks hand on training completed after 6thSemester Exams.

CSE-401N	Unix & Linux Programming								
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time			
4	0	0	75	25	100	3 Hrs.			
Purpose	Introduce	s command	s and numero	us programmin	g concepts ar	nd application			
	domains	domains to cover important topics for implementation of the Unix							
	programm	programming concepts.							
			Course Outcor	mes (CO)					
CO1	To learn ba	asic and adv	anced Unix Co	mmands.					
CO2	Expose the	Expose the role of filters and file compression techniques.							
CO3	To explore	knowledge	of programming	g language deve	opment tools.				
CO4	To expand	knowledge	of Unix/Linux sy	ystem administra	tion and netwo	rking.			

Unit I: Basic Command Usage

Linux Startup: User accounts, accessing Linux - starting and shutting processes, Logging in andLogging out, Unix commands like zip, unzip, pack, unpack, compress, uncompress, Shell Programming, Unix file system: Linux/Unix files, i-nodes and structure, file systemrelated commands, Shell as command processor, shell variables, creating command substitution, scripts, functions, conditionals, loops, customizing environment

Unit II: Filters and File Compression

Regular Expressions and Filters: Introducing regular expressions patterns, syntax, character classes, quantifiers, introduction to grep, egrep, sed, programming with awk and perl, File Compression Techniques: data redundancy elimination using fingerprint generation deduplication and data similarities removal using delta techniques for data reduction storage, parallel compression with Xdelta utility.

Unit III: Program Development Tools

The C Environment: C compiler, vi editor, compiler options, managing projects, memory management, use of makefile, cmake, dependency calculations, memory management – static and dynamic memory, static and dynamic libraries, dynamic loader, debugging tools like gdb, fixed-size and variable-size blocks of data files chunks divisor chunking techniques like Frequency Based Chunking and Content Defined Chunking Unix based open source coding.

Unit IV: Process Control

Processes in Linux: Processes, starting and stopping processes, initialization processes, rc and init files, job control - at, batch, cron, time, network files, security, privileges, authentication, password administration, archiving, Signals and signal handlers, Threading, Linux I/O system, Networking tools like ping, telnet, ftp, route, Firewalls, Backup and Restore tar, cpio, dd. Case Study: PCOMPRESS open source free software

Text Books:

- 1. John Goerzen: Linux Programming Bible, IDG Books, New Delhi, 2014.
- 2. Sumitabha Das: Unix Concept and Applications, Fourth Edition TMH, 2015.
- 3. Neil Matthew, Richard Stones: Beginning Linux Programming, 4th. Edition, Wrox-Shroff, 2011.
- 4. Welsh & Kaufmann: Running Linux, O'Reiley & Associates, 2013.

Reference Book:

1. B.M. Harwani, Unix and Shell Programming, Oxford University Press, 2013.

CSE-403N	Computer Graphics and Animation								
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time			
4	0	0	75	25	100	03 Hrs.			
Purpose	Introduces	s Computer	Graphics that	t help in design	ing different	t kinds of static			
	and mova	and movable objects.							
			Course Outco	mes (CO)					
CO1	Explore the	e backgroun	d and standard	line and circle d	rawing algorit	hms.			
CO2	Exposure	of various tra	insformation ap	proaches and its	s comparative	analysis.			
CO3	Illustrate P	Illustrate Projection and clipping with explore different techniques.							
CO4	Apply designed surface tec	gn principles chniques.	to create differ	ent curves and e	explore hidde	n lines and			

Unit-I

Computer Graphics applications, Display Devices, Point & Positioning Devices, Plotting Techniques for point and Line, Line drawing algorithms: DDA, Bresenhams's Circle drawing algorithms, Filled area algorithms: Scan line, Polygon filling algorithms, Boundary filled algorithms.

Unit-II

Window to view port transformation, Window to view port mapping, Two Dimensional transformation: translation, scaling, rotation, reflection and Shear, Homogeneous Coordinate system.

3-D transformation: Rotation, Shear, translation, Numerical Problems of transformation viewing pipeline.

Unit-III

Clipping: Point & Line clipping algorithm, 4-bit code algorithm, Cohen-Sutherland Line clipping algorithms, Liang-Barsky line clipping algorithms. Polygon clipping: Sutherland-Hodgeman Polygon clipping algorithm. Curve clipping, Text clipping.

Projection: Parallel, Perspective, Vanishing Points.

Unit-IV

Representation of 3-D Curves and Surfaces: interpolation and approximation alpines, parametric conditions, Geometric continuity conditions, Beizer curves and surfaces: properties of beizer curves, beizer surfaces.

Hidden Surfaces removal: Hidden surface elimination, depth buffer algorithm, scan line coherence and area coherence algorithm, priority algorithm

Text Books

- 1. Donald Hearn & M.Pauline Baker, Computer Graphics, 2nd Edition, Pearson Education.
- 2. William M. Newmann & Robert F. Sproull, Principles of Interactive Computer Graphics, Tata McGraw-Hill Second Edition, New Delhi, India.
- 3. Zhigang Xiang & Roy A Plastock , Computer Graphics, Second Edition, Schaum's Outline, Tata McGraw Hill Education Private Limited, New Delhi, India.

Reference Book

1. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3rd edition in C.

CSE-415N	Object Oriented Software Engineering							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time		
3	0	0	75	25	100	3 Hrs.		
Purpose	To provide the thorough knowledge to use the concepts and their design attributes for Object Oriented Software Engineering approaches and platforms to solve real time problems.							
			Course Outco	omes (CO)				
CO1	To learn th	To learn the basic concepts of object oriented systems and software engineering.						
CO2	To get ex and desig	To get exposure of various object modeling methodologies, tools for analyzing and designing software based systems using UML.						
CO3	To explore collaborat	To explore problems using Use Cases, analyzing relations, responsibilities and collaborations among classes and their behavior in problem domain.						
CO4	To evaluatinterfaces	te object orie designs and	ented design p d communicati	rocesses using mo on mechanisms fo	odels, design p r performing re	oatterns, equired tasks.		

Unit - I

An Overview of Object-Oriented system Development, Objects Basis, Class Hierarchy, Inheritance, Polymorphism, Object Relationships and Associations, Aggregations and Object Containment, Object Persistence, Meta-Classes, Object Oriented Systems Development Life Cycle: Software Development Process, Object Oriented Systems Development: A Use-Case Driven Approach.

Unit - II

Object Oriented Methodologies:Rumbaugh Methodology, Jacobson Methodology, BoochMethodology, Patterns, Frameworks, The Unified approach, Unified Modeling Language (UML)

Unit - III

Object Oriented Analysis Process, Use Case Driven Object Oriented Analysis, Use Case Model,Object Analysis: Classification, Classification Theory, Approaches for identifying classes, Responsibilities and Collaborators, Identifying Object Relationships, Attributes and Methods: Associations, Super-Sub Class relationships, A-Part-of-Relationships-Aggregation, Class Responsibilities, Object Responsibilities.

Unit - IV

Object Oriented Design process and Design Axioms, Corollaries, Design Patterns, Designing Classes: Object Oriented Design Philosophy, UML Object Constraint Language, Designing Classes: The Process, Class Visibility, Refining Attributes, Designing Methods and Protocols, Packages and Managing classes, View Layer: Designing Interface objects, Designing View layer Classes, Macro and Micro Level Interface Design Process.

Text Books:

- 1. Ali Bahrami, Object Oriented Systems Development, McGraw Hill Publishing Company Limited, New Delhi, 2013.
- 2. Rumbaugh *et al.*, Object Oriented Modeling and Design, PHI, 2006.
- 3. Robert Laganière and Timothy C. Lethbridge, Object-Oriented Software Engineering: Practical Software Development, McGraw-Hill Publishing Company Limited, New Delhi, Sixth Print 2008.

- 1. Ivar Jacobson, MagnosChristerson, Patrick Jonsson, Gunnar Overgaard, Object-oriented Software Engineering: A Use Case Driven Approach, Pearson Education, New Delhi, Seventh Edition Reprint, 2009.
- 2. David C. Kung, Object-Oriented Software Engineering: An Agile Unified Methodology, McGraw-Hill Publishing Company Limited, New Delhi, 2013.

CSE-417N		Cyber Security								
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time				
2	0	•	75	25	400	2 1 1 1 1 1				
5	U	U	/5	25	100	3 Hrs.				
Purpose	To gain a	broad under	rstanding in or	der to get pred	lictive ways ou	ut related to cyber				
	security.	security.								
			Course Ou	Itcomes						
CO1	To facilitate	e the basic k	nowledge of cy	/ber security.						
CO2	To explore	To explore and sort issues related to different types of activities in cyber crime.								
CO3	To get ena	ble to fix the	various cyber	attacks.						
CO4	To deal wi	th the digital	forensics and r	elated scenaric	s of cyber crin	nes.				

3. Bernd Bruegge, Allen H. Dutoit, Object-Oriented Software Engineering Using UML, Patterns, and Java: Pearson New International, Third Edition, 2013.

Unit-I

Introduction: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime: crime against individual,Crime against property, Cyber extortion, Drug trafficking, cyber terrorism.

Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

Unit-II

Cyber Crime Issues: Unauthorized Access to Computers, Computer Intrusions, Viruses and Malicious Code, Internet Hacking and Cracking, Virus and worms, Software Piracy, Intellectual Property, Mail Bombs, Exploitation, Stalking and Obscenity in Internet, Password Cracking, Steganography, Key loggers and Spyware, Trojan and backdoors, phishing, DOS and DDOS attack, SQL injection, Buffer Overflow.

Unit-III

Introduction to cyber attacks: passive attacks, active attacks, Cyber crime prevention methods, Application security (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control, Hardware protection mechanisms, OS Security

Unit-IV

Digital Forensics: Introduction to Digital Forensics, historical background of digital forensics, Forensic Software and Hardware, need for computer forensics science, special tools and techniques digital forensic life cycle, challenges in digital forensic.

Law Perspective: Introduction to the Legal Perspectives of Cybercrimes and Cyber security, Cybercrime and the Legal Landscape around the World, Why Do We Need Cyber laws, The Indian IT Act, Cybercrime Scenario in India, Digital Signatures and the Indian IT Act, Cybercrime and Punishment.

Text Books:

1. Nelson Phillips and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.

- 1. Robert M Slade," Software Forensics", Tata McGraw Hill, New Delhi, 2005.
- 2. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd.

CSE-419N	Cryptography and Information Security							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time		
3	0	0	75	25	100	3 Hrs.		
Purpose	The cour	se will be	useful for	students who	plan to do	research/product		
	development/analysis in areas related to secure computing in their career.							
			Course Outco	omes (CO)				
CO1	To learn b	asics of net	work security	and cryptograph	у.			
CO2	Exposing	the knowle	dge about net	twork authentica	ation mechanis	sm, with security		
	algorithms	6.						
CO3	To explore	e the knowle	dge of key ex	change protocol	S.			
CO4	To realize	the effect o	n digitized sec	curity.				

Unit I: Basics of Cryptography

Introduction to cryptography, security threats, types of cryptography, Classical cryptography and their cryptanalysis, perfect secrecy, Shannon's theorem, stream ciphers, Security attacks

Unit II: Authentication Mechanism and Security Algorithms

Access control mechanism, Discretionary v/s mandatory access control, CPA-secure encryption, Pseudorandom permutations, practical block ciphers (3-DES, AES), RSA, modes of operation, MACs, Hash functions-Tiger Hash, Gear hash, pseudorandom generators, Public key infrastructure.

Unit III: Key Exchange Protocols

CCA-secure encryption, Diffie-Hellman key exchange, Public key crypto systems (EI Gamal, Paillier, Rabin, Goldwasser-Micali), Key exchange protocols, example protocol such as PGP, Kerberos, IPSEC/VPN, SSL, S/MIME etc., PKCSv1.5.

Unit IV: Digitized Security

Digital signatures,-MD5, SHA1, Rabin Finger Print, digital certificates, DSS, firewall and intrusion detection systems, Byzantine agreement, secure multiparty computation, interactive proof systems

Text Books:

- 1. Y. Lindell and J. Katz. Introduction to Modern Cryptography. MIT press, 2012.
- 2. OedGoldreich. Foundations of Modern cryptography: Parts I and II, Cambridge Press, 2011.
- 3. A. Menezes, P.C. Van Oorschot and S.A. Vanstone. Handbook of Applied Cryptography, CRC Press, 2010.
- 4. William Stalling, Cryptography and Network Security: Pearson Education, 2013.

- 1. Michael EWhitman& Herbert J. Mattord, Principles of Information Security, Vikash Publishing House PVT. LTD., New Delhi, 2015.
- 2. Charles P. Pfleeger, Security in Computing, 4th Edition, Prentice Hall, 2011.
- 3. Jeff Crume, Inside Internet Security Addison Wesley, 2014.

CSE-421N	Agile Software Engineering							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time		
3	0	0	75	25	100	3 Hrs.		
Purpose	Introduce	s the busir	ness value of	adopting Agil	e approache	s and provide		
	complete understanding of the Agile development practices							
			Course Outco	mes (CO)				
CO1	Understan	d the backg	ground and dri	ving forces for	taking an Agi	le approach to		
	software d	evelopment.		-				
CO2	Understan	d the busine	ss value of ado	pting Agile appr	oaches.			
CO3	Drive deve	Drive development with unit tests using Test Driven Development.						
CO4	Apply desi	gn principles	and refactoring	g to achieve Agi	lity.			

Unit I: Fundamentals of Agile

The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools

Unit II: Agile Scrum Framework

Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

Unit III: Agile Testing

The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

Unit IV: Agile Software Design and Development

Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

Text Books:

- 1. Ken Schawber, Mike Beedle, *Agile Software Development with Scrum*, Pearson publications.
- 2. Robert C. Martin, *Agile Software Development, Principles, Patterns and Practices*, Prentice Hall.
- 3. Lisa Crispin, Janet Gregory, *Agile Testing: A Practical Guide for Testers and Agile Teams*, Addison Wesley.

- 1. Alistair Cockburn, *Agile Software Development: The Cooperative Game*, Addison Wesley.
- 2. Mike Cohn, User Stories Applied: For Agile Software, Addison Wesley.
| CSE-423N | | Big Data and Analytics | | | | | | | | |
|----------------------|-------------|--|------------------------|------------------|-------------|-------------|------|--|--|--|
| Lecture | Tutorial | Practical | Major Test | Minor Test | Total | Time | | | | |
| 3 | 0 | 0 | 75 | 25 | 100 | 3 Hrs. | | | | |
| Purpose | To provid | To provide knowledge of Big Data Analytics and Distributed File Systems. | | | | | | | | |
| Course Outcomes (CO) | | | | | | | | | | |
| CO1 | To learn ir | n details the o | concepts of big | data. | | | | | | |
| CO2 | Expose th | e criteria of b | oig data analytic | s and big data s | storage. | | | | | |
| CO3 | To explore | e knowledge | of big data com | pression technic | ques. | | | | | |
| CO4 | To exploi | re learning tation for big | of big data t
data. | ools and state | -of-the-art | knowledge w | vith | | | |

Unit I: Big Data Background

Big data definition and features of big data, big data value, development of big data, challenges of big data, NoSQL databases, technologies related to big data including cloud computing, Internet of Things, data center, Hadoop, relationship between IoT and big data, relationship between hadoop and big data, big data generation and acquisition includes data collection, data transmission, data pre-processing, big data applications.

Unit II: Big Data Analytics and Storage

Big data analysis, big data analytic methods and tools, Pig, Hive, Flume, Mahout, Big data storage, distributed storage system for massive data, storage mechanism for big data GFS, HDFS, HBase, MongoDB, Cassandra, big data storage deduplication techniques, fixed-size and variable-size blocks based deduplication, content defined chunking, frequency based chunking, byte and multibyte indexing techniques, Cloud storage.

Unit III: Big Data Compression

Big data delta compression, Xdelta implementation, Message Digest (MD5), Secure Hash Algorithm (SHA-1/SHA-256), Gear Hash, Tiger Hash, Rabin and Incremental Secure Fingerprint based deduplication, lossless duplicate and similar data elimination approaches, Parallel deduplication and compression using PCOMPRESS, Scalable Decentralized Deduplication Store (SDDS) using Cassandra.

Unit IV: Big Data Processing

Installation procedure with system requirements for Apache Hadoop, Cassandra, Spark, Pig, Hive, HBase, MongoDB large scale distributed storage systems, Map Reduce programming model working, YARN architecture, Apache Pig and Hive architecture, Single node and Multi-nodes Hadoop Cluster Set up and running a Big Data example, NoSQL implementation.

Text Books:

- 1. "Big Data" by Viktor Mayer-Schönberger, Kenneth Cukier, ISBN:978-0544002692, Eamon Dolan/Houghton Mifflin Harcourt 2013.
- "Big Data Now", by O'Reilly Media Inc., ASIN: B0097E4EBQ, O'Reilly 2012. 2.
- 3. "Hadoop Operation", by Eric Sammer, ISBN: 978-1449327057, O'Reilly 2012.
- "MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and 4. Other Systems", by Donald Miner, Adam Shook, ISBN:978-1449327170, O'Reilly 2012.

- "Programming Hive", by Edward Capriolo, ISBN: 978-1449319335,O'Reilly 2012. 1.
- "HBase: the Definitive Guide", by Lars George, ISBN: 978-1449396107, O'Reilly 2011. 2.
- "Mahout in Action", by Sean Owen, Robin Anil, Ted Dunning, Ellen Friedman, ISBN: 3. 978-1935182689, Manning 2011.
- 4. "Programming Pig", by Alan Gates, ISBN: 978-1449302641, O'Reilly 2011.
- "Cassandra, the Definitive Guide", by Eben Hewitt ISBN: 978-1449390419 O'Reilly 2011. 5.
- "MongoDB: The Definitive Guide" by Kristina Chodorow, Michael Dirolf, ISBN: 978-6. 1449381561, O'Reilly, 2010.

CSE-425N		Expert Systems							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time			
3	0	0	75	25	100	3 Hrs.			
	In this c	ourse the	student will lea	arn the methodo	logies used	to transfer the			
Purpose	knowledg	e of a hum	an expert into a	n intelligent progra	am that can	be used to solve			
	real-time	problems.							
Course Outcomes(CO)									
CO1	Examinin	g the funda	mentals and terr	ninologies of expe	ert system.				
CO2	To facilita	te students	to implement va	arious knowledge	representatio	n techniques for			
002	acquisitio	n and valida	ate various struc	tures in experts sy	stem domaiı	١.			
CO3	Signifying	I AI techniqu	ues to solve soc	ial, industrial and	environmenta	al problems.			
CO4	Application of professional aspects in multi-disciplinary approach to meet global								
004	standards	s towards de	sign, realizing a	and manufacturing					

Introduction to AI programming languages, Blind search strategies, Breadth first – Depth first – Heuristic search techniques Hill Climbing – Best first – A Algorithms AO* algorithm – game tress, Min-max algorithms, game playing – Alpha beta pruning.

Knowledge representation issues predicate logic – logic programming Semantic nets- frames and inheritance, constraint propagation; Representing Knowledge using rules, Rules based deduction systems.

Unit-II

Introduction to Expert Systems, Architecture of expert system, Representation and organization of knowledge, Basics characteristics, and types of problems handled by expert systems.

Expert System Tools: Techniques of knowledge representations in expert systems, knowledge engineering, System-building aids, support facilities, stages in the development of expert systems.

Unit-III

Building an Expert System: Expert system development, Selection of tool, Acquiring Knowledge, Building process.

Unit-IV

Problems with Expert Systems: Difficulties, common pitfalls in planning, dealing with domain expert, difficulties during development.

Text Books

- 1. Elain Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw-Hill, New Delhi, 2008.
- 2. Waterman D.A., "A Guide to Expert Systems", Addison Wesley Longman, 1985.

- 1. Staurt Russel and other Peter Norvig, "Artificial Intelligence A Modern Approach", Prentice Hall, 1995.
- 2. Patrick Henry Winston, "Artificial Intelligence", Addison Wesley, 1979.
- 3. Patterson, Artificial Intelligence & Expert System, Prentice Hall India, 1999.
- 4. Hayes-Roth, Lenat and Waterman: Building Expert Systems, Addison Wesley, 1983.
- 5. Weiss S.M. and Kulikowski C.A., "A Practical Guide to Designing Expert Systems", Rowman & Allanheld, New Jersey, 2011.

CSE-405N	Computer Graphics Lab								
Lecture	Tutorial	Practical	Minor Test	Practical	Total	Time			
0	0	2	40	60	100	3Hrs.			
Purpose	To Desig	To Design and implement various Line and Circle Drawing Algorithms.							
			Course Outco	mes (CO)					
CO1	To Impler	nent basic al	gorithms relate	d to Line & Circle	e Drawing.				
CO2	Implemen	t various Lin	e & Circle Drav	ving Algorithms.					
CO3	Hands on experiments on 2-D transformations.								
CO4	Conceptu	al implemen	tation of Clippin	ig and other drav	ving algorithn	ns			

List of Practicals

- 1. Write a program to implement DDA line drawing algorithm.
- 2. Write a program to implement Bresenham's line drawing algorithm.
- 3. Implement the Bresenham's circle drawing algorithm.
- 4. Write a program to draw a decagon whose all vertices are connected with every other vertex using lines.
- 5. Write a program to move an object using the concepts of 2-D transformations.
- 6. Write a program to implement the midpoint circle drawing algorithmany Object Oriented Programming Languagelike Python, C++, Java.
- 7. Implement the line clipping algorithm using any Object Oriented Programming Language like Python, C++, Java.
- 8. Implement boundary fill algorithm using any Object Oriented Programming Language like Python, C++, Java.
- 9. Implement the depth buffer algorithm using any Object oriented language like Python, C++,Java.
- 10. Perform the Polygon Clipping Algorithm using any Object oriented language like Python, C++,Java.
- 11. Draw a Rectangle using Bresenham's and DDA Algorithm using any Object oriented language like Python, C++, Java.

Note: At least 5 to 10 more exercises are to be given by the teacher concerned.

CSE-409N	Unix & Linux Programming Lab							
Lecture	Tutorial	Practical	Minor Test	Practical	Total	Time		
0	0	2	40	60	100	3 Hrs.		
Purpose	To provid	e experimer	ntal knowledge	e of Unix & Lin	ux Programs			
Course Outcomes (CO)								
CO	Exploring I	Exploring knowledge by implementation of programs using UNIX/LINUX.						

List of Practicals

- 1. Familiarize with Unix/Linux logging/logout and simple commands.
- 2. Familiarize with vi editor.
- 3. Using Bash shell develop simple shell programs.
- 4. Develop advanced shell programs using grep, fgrep&egrep.
- 5. Compile and debug various C programs using different options. Content defined chunking, frequency based chunking, delta/Xdelta, Rabin Fingerprint Generator, Parallel Compression pcompress.
- 6. Learning of installation and upgradation of Linux operating system.
- 7. Install Linux on a PC having some other previously installed operating system. All operating systems should be usable.
- 8. As supervisor create and maintain user accounts, learn package installation, taking backups, creation of scripts for file and user management, creation of startup and shutdown scripts using at, cron etc.

Note: At least 5 to 10 more exercises are to be given by the teacher concerned.

Annexure-3

Bachelor of Technology (Computer Science & Engineering) Scheme of Studies/Examination Semester VIII

S. No.	Course No.	Subject	L:T:P	Hours/ Week		Examination Schedule			
					Major Test	Minor Test	Practical	Total	
1	CSE 402N	Neural Networks & Fuzzy Logic	4:0:0	4	75	25	0	100	3
2	PE-III	Elective*-	4:0:0	4	75	25	0	100	3
3	PE-IV	Elective* - IV	4:0:0	4	75	25	0	100	3
4	CSE 404N	Mobile Apps Developm ent	4:0:0	4	75	25	0	100	3
5	CSE 406N	Mobile Apps Developm ent Lab	0:0:2	2	0	40	60	100	3
6	CSE 408N	Computer Hardware & Troublesh ooting Lab	0:0:2	2	0	40	60	100	3
7	CSE 410N	Project-II	0:0:9	09	0	100	100	200	3
8	CSE 424N	General Fitness & Profession al Aptitude			0	0	100	100	8
		Total		29	300	280	320	900	

Code	PE-III	Code	PE-IV
CSE-412N	Software Testing	CSE-418N	Parallel Computing
CSE-414N	Graph Theory	CSE-420N	Cloud Computing
CSE-416N	Data Mining	CSE-422N	Natural Language Processing

Note:

*The students will choose any two departmental electives courses out of the given elective list in VIII Semester.

CSE-402N	Neural Networks & Fuzzy Logic								
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time			
4	0	0	75	25	100	3 Hrs.			
Purpose	To provid	To provide knowledge of various artificial neural networks, fuzzy logic							
	technique	techniques and Genetic Engineering approach for optimization							
			Course Outco	mes (CO)					
CO1	To learn th	e basics of a	artificial neural r	networks concep	ots.				
CO2	Expose de	tailed explar	nation of various	s neural network	s architectur	e.			
CO3	To explore	To explore knowledge of special types of Artificial neural networks.							
CO4	To explore	fuzzy logic t	techniques and	genetic algorith	ms in neural	networks.			

Unit I: Fundamentals of Artificial Neural Networks

Introduction: Concepts of neural networks, Characteristics of Neural Networks, Applications of Neural Networks. Fundamentals of Neural Networks: The biological prototype, Neuron concept, Single layer Neural Networks, Multi-Layer Neural Networks, terminology, Notation and representation of Neural Networks, Training of Artificial Neural Networks. Representation of perceptron, perceptron learning and training, Classification, linear Separability

Unit II: Neural Networks

Hopfield nets: Structure, training, and applications, Back Propagation: Concept, Applications and Back Propagation Training Algorithms. Counter Propagation Networks: Kohonan Network, Grossberg Layer & Training, applications of counter propagation, Image classification.

Bi-directional Associative Memories: Structure, retrieving a stored association, encoding associations.

Unit III: Special Neural Networks

ART: ART architecture, ART classification operation, ART implementation and characteristicsof ART. Image Compression Using ART, Optical Neural Networks: Vector Matrix Multipliers, Hop field net using Electro optical matrix multipliers, Holographic correlator, Optical Hopfield net using Volume Holograms, Cognitrons and Neocognitrons: structure and training.

Unit IV: Fuzzy Logic

Fuzzy Logic:Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets,Membership Function, Fuzzy rule generation, Operations on Fuzzy Sets: Compliment, Intersections,Unions, Combinations of Operations, Aggregation Operations, Fuzzy Arithmetic: Fuzzy Numbers,Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations, Introduction of Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks, Genetic Algorithms: genetic algorithm implementation in problem solving and working of genetic algorithms evolving neural networks, Differential Evolution optimization for engineering problems.

Text Books:

- 1. Li Min Fu, "Neural Networks in Computer Intelligence", McGraw-Hill, Inc. 2012.
- 2. S N Sivanandam, "Neural Networks using MATLAB 6.0", TMH, 4th. Reprint 2015.
- 3. S N Sivanandam, "Principles of Soft Computing", 2nd. Edition, Wiley, Reprint 2014.

- 1. Simon Haykin, "Neural Networks: A Comprehensive Foundations", Prentice-Hall International, New Jersey, 2013.
- 2. Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, 2014.

CSE-412N		Software Testing							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time			
4	0	0	75	25	100	3 Hrs.			
Purpose	To provide	e an underst	anding of conc	epts and techni	ques for te	sting software and			
	assuring its quality.								
Course Outcomes (CO)									
CO1	Expose the	e criteria and	parameters for	r the generation	of test case	es.			
CO2	Lea	arn the desig	n of test cases	and generating	test cases.				
CO3	Be	familiar with	test managem	ent and software	testing ac	tivities.			
CO4	Be expose	d to the sign	ificance of soft	ware testing in w	eb and Ob	ject orient			
	techniques	S.							

UNIT – I

Introduction: Overview of software evolution, SDLC, Testing Process, Terminologies in Testing: Error, Fault, Failure, Verification, Validation, Difference between Verification and Validation, What is software testing and why it is so hard? Test Cases, Test Oracles, Testing Process, Limitations of Testing.

UNIT - II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

UNIT - III

Reducing the number of test cases:Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, and Slice based testing

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

UNIT - IV

Object oriented Testing: Definition, Issues, Class Testing, Object Oriented Integration and System Testing.

Testing Web Applications: What is Web testing?, User interface Testing, Usability Testing, Security Testing, Performance Testing, Database testing, Post Deployment Testing.

Text Books:

- 1. Naresh Chauhan "Software Testing Principles and Practices" Oxford Publications, 2012.
- 2. Louise Tamres, "Software Testing", Pearson Education Asia, 2002.
- 3. Robert V. Binder, "Testing Object-Oriented Systems-Models, Patterns and Tools", Addison Wesley, 1999.
- 4. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.

- 1. CemKaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- 2. K.K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International Publishers, New Delhi, 2005.
- 3. Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
- 4. Boris Beizer, "Black-Box Testing Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
- 5. Gopalaswamy Ramesh, Srinivasan Desikan, Software Testing : Principles and Practices, Pearson India, 2005.

CSE-414N		Graph Theory								
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time				
4	0	0	75	25	100	3Hrs.				
Purpose	To familiarize the students with the fundamentals of Graph Theory and Graph algorithms.									
			Course Outo	omes						
CO1	To get ena	bled about t	he various conc	epts of graph the	ory.					
CO2	To explore	different tre	es, graphs and	algorithms.	•					
CO3	To deal wit	h the conce	pt of planar grap	oh and its related	algorithms.					
CO4	To implem graph.	ent the cor	ncept of vector	s, colouring, cov	vering and pa	irtitioning of a				

UNIT- I

Introduction: Graphs, Isomorphism, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, directed graphs, types of directed graphs, Euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

UNIT- II

Trees: Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

UNIT- III

Fundamentals of Cut sets: Cut sets Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets, connectivity and separability, network flows.

Planar Graphs: Planer graphs, different representation of a planar graph, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

UNIT- IV

Vector: Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix.

Graph Colouring, covering and partitioning: Colouring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem.

Text Books:

- 1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI.
- 2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH.

- 1. Robin J. Wilson, Introduction to Graph Theory, Pearson Education.
- 2. Harary, F, Graph Theory, Narosa Publication.
- 3. Bondy and Murthy: Graph theory and application. Addison Wesley.
- 4. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH.
- 5. GeirAgnarsson, Graph Theory: Modeling, Applications and Algorithms, Pearson Education.

CSE-416N	Data Mining							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time		
4	0	0	75	25	100	3 Hrs.		
Purpose	To provide the knowledge of data mining and its techniques.							
Course Outcomes (CO)								
CO1	To learn da	ata mining co	oncepts in detai	ls.				
CO2	Expose the	e criteria for o	data generaliza	tion.				
CO3	To explore knowledge of mining associations, correlations and classification.							
CO4	To evaluat	e various typ	es of data mini	ng.				

Unit I: Data Mining and Data Preprocessing

Introduction :Data Mining, Functionalities, Data Mining Systems classification, Integration with Data Warehouse System, Data summarization, data cleaning, data integration and transformation, data reduction. Data Warehouse:Need for Data Warehousing, Paradigm Shift, Business Problem Definition, Operational and Information Data Stores, Data Warehouse Definition and Characteristics, Data Warehouse Architecture and Implementation, OLAP.

Unit II: Data Generalization

Data Mining Primitives, Query Language and System Architecture, Concept Description, Data generalization, Analysis of attribute relevance, Mining descriptive statistical measures in large databases, Data deduplication methodologies.

Unit III: Mining Associations and Correlations

Mining association rules in large databases:Association rule mining, Mining single dimensional boolean association rules from transactional databases, mining multilevel association rules from transaction databases, Relational databases and data warehouses, correlation analysis, classification and prediction, Data redundancy detection and elimination techniques.

Unit IV: Cluster Analysis and Mining

Introduction to cluster analysis, Mining complex type of data: Multidimensional analysis and descriptive mining of complex data objects, Spatial databases, Multimedia databases, Mining timeseries and sequence data, Mining text databases, Mining World Wide Web, Data Chunking Techniques.

Text Books

- 1. J.Han, M.Kamber, Data Mining: Concepts and Techniques, Academic Press, Morgan Kanfman Publishers, 2015.
- 2. Pieter Adrians, DolfZantinge, Data Mining, Addison Wesley 2013.
- 3. C.S.R. Prabhu, Data Ware housing: Concepts, Techniques, Products and Applications, Prentice Hall of India, 2014.

- 1. Berry and Lin off, Mastering Data Mining: The Art and Science of Customer Relationship Management, John Wiley and Sons, 2012.
- 2. Seidman, Data Mining with Microsoft SQL Server, Prentice Hall of India, 2016.

CSE-418N			Paral	el Computing				
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time		
4	0	0	75	25	100	3 Hrs.		
Purpose	To enable paradigms performan programmi	To enable students to compare various architectural taxonomies and design paradigms of parallel computers and computational models, parallelism approaches, performance metrics and techniques to parallelize and schedule loops and their programming constructs.						
			Course Outco	mes (CO)				
C01	Classify va well as ide computers	arious synch entify some	ronous and asy of the taxonor	nchronous para nies for archite	digms of para ctural classific	llel computing as cation of parallel		
CO2	Compare different pe	various par erformance r	rallel computat metrics in paral	tion models ar lel computers.	nd approache	s and describe		
CO3	Distinguish explainvar disadvanta reliable co	Distinguish shared memory and distributed memory multiprocessors and explainvarious parallel programming models and relative advantages and disadvantages of interconnection networks based on network parameters for reliable connections and achieving efficient speed.						
CO4	Examine v scheduling	/arious tech I.	niques of para	allelizing loops a	and sequentia	al programs and		

Introduction: The state of computing, system attributes to performance, Paradigms of parallel computing: Synchronous – Vector/ Array, SIMD, systolic, Asynchronous- MIMD, reduction paradigm.

Hardware Taxonomy: Flynn's classification, Feng's classification, handler's classification. **Software taxonomy**: Kung's taxonomy.

Unit-II

Abstract parallel computational models: combinational circuits, sorting network, PRAM models, VLSI complexity model, Interconnections RAMs, Parallelism approaches- data parallelism, control parallelism, Conditions of parallelism: Data, control and resource dependencies, Hardware and software parallelism.

Performance metrics: Laws governing performance measurements, Metrics- speedups, efficiency, utilization, communication overheads, single/ multiple program performances.

Unit-III

Parallel processors: taxonomy and topology: shared memory multi processors, distributed memory multicomputer, static and dynamic interconnections.

Parallel programming: shared memory programming, distributed memory programming, object orientedprogramming, data parallel programming, functional and data flow programming.

Unit-IV

Scheduling and parallelization: Loop parallelization and pipelining-Loop transformation theory, parallelization and wave fronting, tiling and localization, software pipelining, Scheduling parallel programs, program partitioning and scheduling: Grain size, latency, grain packing and scheduling, loop scheduling, Parallelization of sequential programs.

Text Books

- 1. Kai Hwang and Naresh Jotwani, Advanced Computer Architecture, Second Edition, McGraw Hill, New Delhi, India, 2012.
- 2. M.J. Quinn, Parallel Computing: Theory and Practice, Second Edition, McGraw Hill, New Delhi, India, 2008.
- 3. D.Sima, T.Fountain, P.Kasuk, Advanced Computer Architecture-A Design spaceApproach, Pearson Education,India, 2009. Reference Books
- 1. J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative approach, 5th Edition, Morgan Kaufmann/Elsevier-India.
- 2. T.G.Lewis, Parallel Programming: A machine Independent approach, IEEE Computer Society Press, Los Alamitos, 1994.
- 3. T.G.Lewis and H. El-Rewini, Introduction to parallel computing, Prentice Hall, New Jersey, 1998.

CSE-420N		Cloud Computing							
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time			
4	0	0	75	25	100	03 Hrs.			
Purpose	To famili	To familiar the concepts of cloud services and storageto deploy various							
	resources and arbitrary software.								
Course Outcomes (CO)									
CO1	Facilitate	Facilitate the basic usage and applicability of computing paradigm.							
CO2	Explore v services.	arious cloud	service and d	eployment mo	dels to utili	ze different cloud			
CO3	To get enabled for various data, scalability & cloud services in order to get efficient database for cloud storage.								
CO4	To deal w safe cloud	ith various se services.	ecurity threats a	nd their contro	lling mecha	nism for accessing			

Overview of Computing Paradigm: Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, evolution of cloud computing, Business driver for adopting cloud computing.

Cloud Computing (NIST Model), History of Cloud Computing, Cloud service providers, Properties, Characteristics & Disadvantages, Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing, Role of Open Standards.

Unit-II

Cloud Computing Architecture: Cloud computing stack, Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models (XaaS) - Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), Deployment Models- Public cloud, Private cloud, Hybrid cloud, Community cloud.

Unit-III

Service Management in Cloud Computing: Service Level Agreements (SLAs), Billing & Accounting, comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data- Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing.

Case study: Eucalyptus, Microsoft Azure, Amazon EC2.

Unit-IV

Cloud Security: Infrastructure Security, Network level security, Host level security, Application level security, Data security and Storage, Data privacy and security Issues, Jurisdictional issues raised by Data location, Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations.

Text Books

- 1. Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2010.
- 2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Cloud Computing: Principles and Paradigms, Wiley, 2011.

- 1. Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer, 2012.
- 2. Ronald L. Krutz, Russell Dean Vines, Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley-India, 2010.

CSE-422N		Natural Language Processing									
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time					
4	0	0	75	25	100	3 Hrs.					
Purpose	To provide the understanding of the mathematical and linguistic foundations										
	underlying approaches to the various areas in NLP.										
		C	Course Outcom	es (CO)							
CO1	Be familiar	with syntax	and semantics i	n NLP.							
CO2	To impleme	ent various c	oncepts of knov	vledge represen	tation using	I Prolog.					
CO3	To classify	different par	sing techniques	and understand	d semantic r	networks.					
CO4	To identify/	explain varic	ous applications	of NLP.							

Fundamental components of Natural Language Processing: Lexicography, syntax, semantics, prosody, phonology, pragmatic analysis, world knowledge.

Knowledge Representation schemes: Semantic net, Frames, Conceptual Dependency, Scripts.

Unit-II

Representing knowledge using rules: Logic Programming, Introduction to LISP and Prolog, Rules based deduction systems, General concepts in knowledge acquisition.

Syntax Analysis: Formal Languages and grammars, Chomsky Hierarchy, Left- Associative Grammars, ambiguous grammars, resolution of ambiguities.

Unit-III

Computation Linguistics: Recognition and parsing of natural language structures- ATN and RTN, General Techniques of parsing- CKY, Earley and Tomitas algorithm.

Semantics: Knowledge representation, semantics networks logic and inference pragmatics, graph models and optimization.

Unit-IV

Applications of NLP: Intelligent work processor, Machine translation, user interfaces, Man-Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

Text Books:

- 1. Daniel Jurafsky, James H. Martin, "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", 2nd edition, Pearson Edu., 2013.
- 2. James Allen, "Natural Language Understanding", Pearson Education, Second Edition, 2003.

- 1. Ivan Bratko, "Prolog: Programming for Artificial Intelligence", 3rd Edition, Pearson Education, Fifth Impression 2009.
- 2. G. Gazder, "Natural Language processing in prolog", Addison Wesley, 1989.

CSE-404N		Mobile Apps Development										
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time						
4	0	0	75	25	100	3 Hrs.						
Purpose	To introdu	To introduce the concepts of developing the mobile applications.										
Course Outcomes (CO)												
CO1	Be expose	ed to technol	ogy and Mobile	e apps developn	nent aspects	•						
CO2	Be compe	tent with the	characterizatio	on and architectu	ire of mobile	applications.						
CO3	CO3 Appreciation of nuances such as native hardware play, location awareness, graphics and multimedia.											
CO4	Perform te	sting, signin	g, packaging a	nd distribution of	f mobile apps	6.						

Unit I: Introduction to Mobility

Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, Setting up the Mobile App Development environment along with an Emulator.

App User Interface Designing – Mobile UI resources (Layout, UI elements, Drawable, Menu).

Unit II: Building blocks of Mobile Apps

Activity- States and Life Cycle, Interaction amongst Activities.

App functionality beyond user interface - Threads, Async task, Services – States and Life Cycle, Notifications, Broadcast receivers, Content provider.

Unit III: Sprucing up Mobile Apps

Graphics and animation – Custom views, Canvas, Animation APIs, Multimedia – Audio/Video playback and record, Location awareness.

Native data handling-file I/O, Shared preferences, Mobile databases such as SQLite, and Enterprise data access (via Internet/Intranet).

Unit IV: Testing Mobile Apps

Debugging mobile apps, White box testing, Black box testing, and test automation of Mobile apps, JUnit for Android.

Text Books:

- 1. Barry Burd, Android Application Development All in one for Dummies, Wiley publications, 2nd Edition 2015.
- 2. Android Developer Fundamentals Course– Concepts (Learn to develop Android applications) Concepts Reference *Developed by Google Developer Training Team, 2016.*
- 3. Valentino Lee, Heather Schneider, and Robbie Schell, Mobile Applications: Architecture, Design, and Development, Prentice Hall, 2004.
- 4. Rick Boyer, Kyle Mew, Android Application Development Cookbook Second Edition, 2016.

- 1. Carmen Delessio, Lauren Darcey, Teach Yourself Android Application Development In 24 Hours , SAMS, 2013.
- 2. Brian Fling, Mobile Design and Development, O'Reilly Media, 2009.
- 3. Maximiliano Firtman, Programming the Mobile Web, O'Reilly Media, 2010.
- 4. Christian Crumlish and Erin Malone, Designing Social Interfaces, O'Reilly Media, 2009.
- 5. Jerome F. DiMarzio, Beginning Android Programming with Android Studio, 4th edition, 2016.
- 6. Max Lemann ,Android Studio: App Development on Android 6, 2016.

CSE-406N			Mobile Ap	os Development	Lab				
Lecture	Tutorial	Practical	Minor Test	Practical	Total	Time			
0	0	2	40	60	100	3 Hrs.			
Purpose	Design ar	nd Implemer	nt various mobi	ile applications us	sing emulators	and learn how			
	to Deploy applications to hand-held devices.								
Course Outcomes (CO)									
CO1	Know the	Know the components and structure of mobile application development frameworks							
	for Androi	d based mo	biles.						
CO2	Understar	nd how to wo	ork with various	mobile application	n developmer	nt frameworks.			
CO3	Learn the	basic and	important des	sign concepts an	d issues of a	development of			
	mobile ap	plications.							
CO4	Understar	nd the capat	ilities of mobile	e devices.					

List of Practicals:

- 1. Develop an application that uses GUI components, Font and Colours
- 2. Develop an application that uses Layout Managers and event listeners.
- 3. Develop a native calculator application.
- 4. Write an application that draws basic graphical primitives on the screen.
- 5. Implement an application that implements Multi threading
- 6. Develop a native application that uses GPS location information.
- 7. Implement an application that writes data to the SD card.
- 8. Implement an application that creates an alert upon receiving a message.
- 9. Write a mobile application that creates alarm clock.
- 10. Develop a sign-in page with appropriate validation.
- 11. Develop a real life application that makes use of database.

Note: At least 5 to 10 more exercises are to be given by the teacher concerned.

CSE-408N		Com	puter Hardwa	re & Trouble	eshooting Lab					
Lecture	Tutorial	Practical	Minor Test	Practical	Total	Time				
0	0	2	40	60	100	3 Hrs.				
Purpose	To study	the curre	nt personal	computer	hardware inc	luding personal				
computer assembly upgrading, setup configuration and troubleshooting.										
Course Outcomes (CO)										
CO1	To understand the fundamental hardware components that makes up a computer's									
	hardware a	and the role c	of each of thes	e component	S.					
CO2	Assemble/	setup and up	grade persona	al computer h	ardware.					
CO3	Perform in	stallation, co	nfiguration, ar	nd upgrading	of microcomp	uter hardware and				
	software.									
CO4	Diagnose	and troubles	hoot microcor	nputer syste	ms hardware a	and software, and				
	other perip	heral equipm	ient.							

List of Practicals:

- 1. To make the comparative study of various motherboards.
- 2. To study various cables used in computer communication.
- 3. To study various connections and ports used in computer communication.
- 4. To study various cards used in a computer System like Ethernet, sound, video card etc.
- 5. To study different microprocessor like P-IV, dual core, i3, i5, i7 etc.
- 6. To study SMPS and UPS.
- 7. To study rotational and loading mechanisms of the following drives: (Floppy disk drive, Hard disk, CD ROM, CD-R/RW, DVD-ROM, DVD recordable drives, DUAL LAYER DVD-R/W)
- 8. To study monitor and its circuitry (CRT (Cathode Ray Tube), LCD (Liquid Crystal Display), LED (Light-Emitting Diodes), Plasma (OLED).
- 9. To study different types of printers and its installation.
- 10. To study working of keyboard and mouse.
- 11. To assemble a PC and trouble shooting.
- 12. To install different Operating System and install different hardware components.

Text Books:

- 1. How Computers WorkBy, Ron White and Timothy Edward Downs, 10th Revised edition, Pearson Education, 2014.
- 2. Upgrading and Repairing PCs, Scott Mueller,22nd Edition,Que Publishing, 2015.
- 3. Learning PC Hardware, Ramesh Bangia, Khanna Book Publishing, 2nd revised edition, 2012.

- 1. Pc Hardware: The Complete Reference 1st Edition, Craig Zacker, McGraw Hill Education; 1st edition, 2001.
- 2. Modern Computer Hardware Course, Manahar Lotia, Pradeep Nair, PayalLotia, BPB Publications, 2nd Revised Edition, 2007.

Bachelor of Technology (Electronics & Communication Engineering) Scheme of Studies/Examination Semester VII

S. No.	Course	Subject	L:T:P	Hours/Week	Exai	nination Scl	nedule (Mark	ks)	Duration of
	No.				Theory	Sessionals	Practical	Total	Exam (Hrs)
1	ECE-401N	Microcontroller & Embedded Systems Design	3:0:0	3	75	25	0	100	3
2	ECE-403N	Digital Image Processing	4:0:0	4	75	25	0	100	3
3	ECE-405N	Power Electronics	3:0:0	3	75	25	0	100	3
4		Core Elective - I**	3:0:0	3	75	25	0	100	3
5		Core Elective - II**	3:0:0	3	75	25	0	100	3
6	ECE-407N	Microcontroller & Embedded Systems Design Lab	0:0:3	3	0	40	60	100	3
7	ECE-409N	Digital Image Processing Lab	0:0:3	3	0	40	60	100	3
8	ECE- 411N***	Project-1	0:0:10	10	0	100	100	200	3
9	ECE- 413N*	Industrial Training Viva	2:0:0	2	0	100	0	100	
		Total		34	375	405	220	1000	

* The performance of the student will be evaluated by the technical training (undertaken after 6th semester) seminar and the report submitted by the student which should also include the Industrial/Research problems faced & suggested solutions.

** The students should select two departmental electives subjects from the list of core elective subjects.

***The project should be initiated by the student in the 7th semester beginning and will be evaluated in the end of the semester on the basis of a presentation and report submitted to the department.

Bachelor of Technology (Electronics & Communication Engineering) Scheme of Studies/Examination Semester VIII

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Examination Schedule (Marks)				Duration of Exam (Hrs)
					Theory	Sessionals	Practical	Total	
1	ECE- 402N	Wireless & Mobile Communication	4:0:0	4	75	25	0	100	3
2	ECE- 404N	Microwave Engineering	3:0:0	3	75	25	0	100	3
3		Core Elective - III**	3:0:0	3	75	25	0	100	3
4		Core Elective - IV**	3:0:0	3	75	25	0	100	3
5	ECE- 406N ***	Project-II	0:0:14	14	0	100	100	200	3
6	ECE- 408N	Wireless & Mobile communication lab	0:0:3	3	0	40	60	100	3
7	ECE- 410N	Microwave Engineering Lab	0:0:3	3	0	40	60	100	3
8	ECE- 412N *	Seminar & Report Writing	2:0:0	2	0	100	0	100	3
		Total		35	300	380	220	900	
9	ECE- 440N****	General Fitness & Professional Aptitude						100	3

* The performance of the student will be evaluated by the presentation delivered and the report submitted by the student related to Industrial/Research problems & its suggested solutions.

** The students should opt two departmental electives subjects from the list of core elective subjects.

***The project should be initiated by the student in continuation of the 7th semester and will be evaluated in the end of the semester on the basis of a presentation and Report.

**** A viva of the students will be taken by external examiner (Principal/Director/Professor/or any senior Person with Experience more than 10 years) at the end of the semester and grades will be given according to the grade chart.

S. No.		Core Electives-7th Sem.	S. No.		Core Electives-8th Sem.
1	ECE-415N	Advance Digital Communication	1	ECE-414N	DSP Processor
2	ECE-417N	Nano Electronics	2	ECE-416N	Mobile Communication Networks
3	ECE-419N	Optical Communications	3	ECE-418N	MEMS
4	ECE-421N	Adaptive Signal Processing	4	ECE-420N	Transducers & Its Applications
5	ECE-423N	Satellite Communication	5	ECE-422N	Radar Engineering
6	ECE-425N	Digital VLSI Design	6	ECE-424N	High Frequency Circuit and Systems
7	ECE-427N	Analog CMOS IC Design	7	ECE-426N	Biomedical Signal Processing
8	ECE-429N	Consumer Electronics	8	ECE-428N	Multimedia Communications
9	ECE-431N	Robotics	9	ECE-430N	Mixed VLSI Design
10	ECE-433N	Non-Conventional Energy Resources	10	ECE-432N	Microstrip Antenna
11	ECE-435N	Microstrip line Analysis	11	ECE-434N	Strategic Electronics
12	ECE-437N	Software Defined Radios	12	ECE-436N	Cognitive Radios

	κυ	NUNSHEI	NA UNIVER	311 I, KUKUKSHI	LINA	
ECE-401N		MICROCO	NTROLLER A	AND EMBEDDED S	YSTEM DESIG	N
Lecture	Tutorial	Practical	Theory	Sessionals	Total 100	Time 3 Hr.
3	0	0	75	25		
		ŀ	Pre-requisites:	Microprocessor		
			Course (Jutcomes		
CO1	Acquired kn	wledge abo	out the archited	cture of microcontro	ollers.	
CO2	Acquired kn language.	wwledge abo	out instruction	set and programmir	ig concepts in C	and assembly
CO3	To understa	nd periphero	ıl interfacing t	o microcontrollers.		
CO4	To design th	ie systems /m	nodels based of	n microcontrollers		

VIDINZCHETDA UNIVEDCITY VIDINZCHETDA

Unit- I

INTRODUTION: Microprocessor and Microcontroller, Different types of Microcontrollers, 4 bit, 8 bit, 16 bit, and 32 bit Microcontrollers, Processor Architectures: Harvard & Princeton, CISC & RISC, Microcontrollers memory types, Microcontrollers features, Criteria for choosing a microcontroller, Applications of microcontrollers.

Embedded System, Embedded Processors, Hardware units, Devices and Software in a system, Embedded system on chip, Complex Systems design and processors, Design examples.

Unit- II

8051 ARCHITECTURE: 8051 Architecture, On-chip memory organization – general purpose registers, SFR registers, Internal RAM and ROM, Oscillator and Clock circuits. Pin Diagram of 8051, I/O Pins, Port, Connecting external memory, Counters and Timers, Purpose of TCON & TMOD registers, Serial data transmission/reception and transmission modes, Purpose of SCON & PCON registers, Different Types of Interrupts, Purpose of Time Delays.

Unit- III

8051 INSTRUCTION SET AND PROGRAMMING: Instruction syntax, Assembler directives, Addressing modes, Data transfer instructions, arithmetic and logical instructions, Jump and Call instructions, I/O port, Timer and Counter programming, Serial port and Interrupt programming.

PIC MICROCONTROLLER ARCHITECTURE: Introduction to PIC Microcontroller families, Different features of PIC16 Microcontrollers, PIC16 Architecture and Pipelining, Pin Configuration of PIC16, Program memory considerations, Register file structure, Addressing modes, Instruction set.

Unit-IV

APPLICATION DESIGN & HARDWARE INTERFACING WITH 8051: Interfacing Matrix Keyboards, LCD, ADC, DAC, Temperature Sensor, Stepper and DC motor, Relay and PWM. Introduction of Advanced Microcontrollers: AVR and ARM microcontrollers. Text Books:

- 1. Kenneth Ayala," The 8051 Microcontroller" 3rd ed. CENGAGE Learning.
- 2. M.A. Mazidi, J.G. Mazidi, R. D. McKinlay," The 8051 Microcontroller and Embedded systems using assembly and C" -2nd Ed, Pearson Education.
- 3. John. B. Peatman, "Design with PIC Microcontroller", Pearson Education, 2003.

- 1. Myke Predko, "Programming and Customizing the 8051 Microcontroller", TMH.
- 2. Manish K Patel,"Microcontroller based embedded system", McGraw Hill Education.
- 3. Raj Kamal, "Embedded systems architecture, programming and design"-2nd nd. McGraw-Hill Companies.
- 4. Intel's manual on "Embedded Microcontrollers".
- 5. Myke Predko, "Programming and customizing PIC microcontroller" Mc- Graw Hill.

- 6. M.A. Mazidi, R. D. McKinlay, Causey," The PIC microcontroller and Embedded Systems using assembly and C for PIC18" -2nd Ed, Pearson.
- 7. M.A. Mazidi, Naimi" The AVR microcontroller and Embedded Systems using assembly and C" -2nd Ed, Pearson.

ECE-		DIC	GITAL IMAG	E PROCESSING							
403N											
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time					
4	0	0	75	25	100	3 Hr.					
	Course Outcomes										
CO1	Students should be able to explain the basics of Digital Image processing										
CO2	Student will	be able to ex	plain sampling	g and quantization of a	ligital image						
CO3	CO3 Student will be able to analyze the image enhancement operations on digital image										
CO4	Students will	l be able to ar	alyze the varia	ous image analysis and	l computer vision	algorithm					

Unit-I

Introduction: Processing and applications, Image representation and modeling, Image Enhancement, Restoration, analysis, reconstruction from Projections, Image Data Compression. Image Perception: Light, Luminance, Brightness, Contrast, MFT of visual System, Visibility Function, Image fidelity, Color representation, color matching and reproduction, color vision Model

Unit-II

Image sampling and Quantization: Introduction, Two dimensional sampling theory, practical limitations in sampling and reconstruction, Image quantization, Optimum mean square or Lloyd-Max quantizer.

Unit-III

Image Enhancement: Introduction, Point Operation, Histogram Modeling, Spatial Operations, Transform Operations, Multispectral Image enhancement, Color Image enhancement.

Unit-IV

Image Analysis and Computer Vision: Introduction, Spatial Feature Extraction, Transform features, Edge Detection, Boundary Extraction, Shape features, Image segmentation.

Text Books:

- 1. Digital Image Processing, third edition by Rafael C. Gonzalez and Richard E Woods. Publisher: Pearson Education.
- 2. Digital Image Processing by S. Sridhar, Publisher: Oxford

Reference Books:

1. Fundamentals of Digital Image Processing by Anil K Jain, Publisher: Prentice Hall

ECE-405N		POWER ELECTRONICS									
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time					
3	0	0	75	25	100	3 Hr.					
Purpose	To understand and acquire knowledge about various power semiconductor devices. To prepare the students to analyze and design different power converter circuits.										
		С	ourse Outcon	ies							
C01	Acquire knowle electronics.	dge about fu	ndamental cor	ncepts and techniqu	es used in po	ower					
CO2	Ability to analy understand the	ze various si ir application	ngle phase an s.	d three phase powe	r converter	circuits and					
CO3	Foster ability application.	Foster ability to identify basic requirements for power electronics based design application.									
CO4	To develop skill	s to build, an	d troubleshoo	t power electronics of	circuits.						

Unit-1

Introduction: Concept of Power Electronics, Applications of power electronics, Advantages and disadvantages of power-electronic converters, Power electronic systems, Power semiconductor devices, Types of power electronic converters. Power semiconductors: The p-n junction, Basic structure of power diodes, Characteristics of power diodes, Power transistors, Power MOSFETS, Insulated gate bipolar transistor, Static induction transistor.

Unit-II

Thyristors :Terminal characteristics of thyristors, thyristor turn on methods, Switching characteristics of thyristors, Thyristor gate characteristics, Two-transistor model of a thyristor, Thyristor ratings, Thyristor protection, Improvement of thyristor characteristics, Series and parallel operation of thyristors, Gate turn off thyristor, Firing circuits for thyristors.

Thyristor Commutation: Class A commutation: Load commutation, Class B commutation: Resonant commutation, Class C commutation: Complementary commutation, Class D commutation: Impulse commutation, Class E&F commutation.

Unit–III

Phase Controlled Rectifiers: Principle of phase control, Full wave controlled converters, Single phase full wave converters, Single phase symmetrical and asymmetrical semi converters, three phase rectifiers and thyristor converters, Performance parameters of three phase full converters, Effect of source impedance on the performance of converters. Principle of chopper operation, Control strategies, Step up choppers, Types of chopper circuits, Single phase voltage source inverters: Operating principle, Force commutated thyristor inverters, Voltage control in single phase inverters.

Unit-IV

AC Voltage Controllers: Principle of phase control, Principle of integral cycle control, single phase ac voltage controller with R load and RL load.

Cycloconverters: Principle of cycloconverter operation, step up and step down cycloconverters, Three phase half wave converters, Output voltage equation for a cycloconverter, Load commutated cycloconverter.

Text Books

1. P S Bimbhra: Power Electronics, Khanna Publishers.

Reference Books

1. M. H. Rashid. : Power Electronics – circuits, devices & applications, Pearson Education.

ECE-407N		MICROCONTROLLER AND EMBEDDED SYSTEM DESIGN LAB									
Lecture	Tutorial	Practical	Sessionals	Practical	Total	Time(Hrs)					
0	0	3	40	60	100	3					
Course Objectives	Course Objectives1. To design of microcontroller based systems.2. To impart practical knowledge of 8051 and PIC Microcontrollers										
		Cou	rse Outcomes								
CO1	To familiar	ization with 80	051 and PIC Mic	crocontrollers.							
CO2	Ability to w	rite a C langu	age and assembl	ly language progra	am for 8051 M	icrocontroller.					
CO3	Ability to in	terfacing the	various Peripher	al to 8051 Microc	ontrollers.						
CO4	Ability to de	esign the embe	edded systems ba	used on 8051 Micr	ocontrollers.						

List of experiments to be performed using 8051 Microcontrollers

1. (a) To study different commands of 8051 trainer kit with their function.

(b) To study architectural block and pin diagram of 8051 microcontroller and PIC16C74 microcontroller.

- 2. To write an ALP to perform addition, subtraction, multiplication and division of two unsigned numbers.
- 3. To write an ALP to perform logical operation i.e., AND, OR, XOR and Complement of two unsigned numbers.
- 4. To write an ALP to perform multi byte addition and subtraction of two unsigned number.
- 5. To write an ALP to perform rotate operations i.e., RL, RLC, RR, RRC.
- 6. To write an ALP for flashing message "WELCOME M51-02 KIT" on LCD screen.
- 7. To write an ALP for identifying pressed number is even or odd. If number is even, message displays on LCD "NUMBER IS EVEN" and if number is odd, message displays on LCD "NUMBER IS ODD".
- 8. To write an ALP to perform data transfer between internal & external memory using all available addressing modes.
- 9. To write an embedded C program for interfacing LCD to port P0 and display message "LCD Display" on LCD screen.
- 10. To write an embedded C program for interfacing keypad to port P0 .Whenever a key is pressed; it should be displayed on LCD.
- 11. To write an embedded C program for interfacing a switch and a buzzer to two different pins of a Port such that the buzzer should sound as long as the switch is pressed.
- 12. To write an embedded C program for interfacing stepper motor to rotate clockwise and anticlockwise directions.
- 13. To write an embedded C program for interfacing relay and buzzer.
- 14. To write an embedded C program for interfacing PWM module to control speed of motor.
- 15. To write an embedded C program for interfacing LED to glow in different pattern i.e., even odd, rotate left, rotate right.
- 16. To write an embedded C program for interfacing temperature sensor.
- 17. Design an Obstacle Detector system through Ultra Sonic obstacle detection using ultrasonic transmitter receiver.

ECE- 409N		DIGITAL IMAGE PROCESSING LAB									
Lecture	Tutorial	Practical	Sessionals	Practical	Total	Time					
-	-	3	40	60	100	3 Hr.					
			Course Outo	omes							
C01	Students sh	ould be able t	o explain the bas	tics of Digital Imag	e processing						
CO2	Student will	l be able to ex	plain sampling o	und quantization of	digital image						
CO3	Student will	be able to an	alyze the image	enhancement opera	tions on digita	l image					
CO4	Students will algorithm	ll be able to a	nalyze the variou	as image analysis ar	nd computer vis	sion					

List of Experiments:

- 1. Study of Image processing toolbox of Matlab.
- 2. WAP to read and show various images of at least five different formats.
- 3. WAP to extract R, G, B component of Color Image.
- 4. WAP to convert a color image into gray scale and save it in new format.
- 5. WAP to invert a gray scale image.
- 6. WAP to implement Morphological operations on an image.
- 7. WAP to implement Histogram equalization.
- 8. WAP to implement various edge detection algorithms.
- 9. WAP to implement image segmentation
- 10. WAP to implement boundary extraction of basic structure.

ECE-402N		WIREI	ESS & MOBILE	COMMUNICAT	TION				
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time			
4	0	0	75	25	100	3			
Purpose	To introduce	e the concept.	s of wireless / mo	bile communicatio	n using celluld	ar environment.			
	To make th	e students to	know about the	e various modula	tion technique	es, ppropagation			
	methods, an	d multi acces	s techniques used	in the mobile co	mmunication.				
	······································								
Course Outcomes									
00.1	Course Outcomes								
COI	It deals with the fundamental cellular radio concepts such as frequency reuse and								
	handoff.								
CO 2	This also a	demonstrates	the principle o	f trunking efficie	ency and how	v trunking and			
	interference	issues betw	een mobile and	base stations co	ombine to aff	fect the overall			
	capacity of c	ellular system	15	cuse stations ee	interité te egy				
	eupueuy oj e	cereater system							
CO 3	It provides	idea about a	nalog and digital	modulation techn	iques used in	wireless			
	communicat	ion.							
CO 4	It presents a	lifferent ways	to radio propaga	tion models and p	redict the large	e – scale			
	effects of rad	lio propagatio	on in many operati	ng environment.	0				

Unit–I

Introduction to Wireless Communication Systems: Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

Modern Wireless Communication Systems: Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

Unit-II

Introduction to Cellular Mobile Systems: Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Unit– III

Multiple Access Techniques for Wireless Communication: Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

Unit-IV

Wireless Standards-GSM, IS-95, UMTS-IMT-2000, Signaling, Call Control, Mobility Management and location Tracing.

Suggested Books:

- 1. Theodore S.Reppaport, Wireless Communications Principles and Practice, IEEE Press, Prentice Hall.
- 2. William C.Y.Lec, Mobile Cellular Telecommunications, Analog and Digital Systems, Mc-Graw Hill Inc.
- 3. Kamilo Feher, Wireless Digital Communications, Modernization & Spread Spectrum Applications, Prentice Hall of India, New Delhi.
- 4. Kaveh Pahlavan and Allen H. Levesque "Wireless Information Networks", Wiley Series, John Wiley and Sons Inc.

ECE-404N		Μ	IICROWAVE	ENGINEERING					
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time			
3	0	0	75	25	100	3 Hrs			
Purpose	As a part of RF communication technology the purpose of this course is to create awareness about conventional microwave resonators, generators, components and devices along with the importance of scattering parameters so that the learner is able to design and apply these basic approaches in commercial as well as defense applications.								
			Course Ou	tcomes					
CO1	Learner wil to measure	l be able to 1 microwave p	nathematically parameters such	design basic reso as impedance, fr	nator cavities a equency and V	und will be able SWR etc.			
CO2	Learner wil	l learn the co	onventional met	hods to generate	the microwaves	5.			
CO3	Learner will know about the importance of scattering parameters along with its applications in the analysis of basic microwave components.								
CO4	Learner wil detail.	l learn abou	t transferred ele	ctron and avalan	che transit time	e devices in			

Unit-I

Microwave Resonators: Brief description of waveguides, coplanar waveguides, cavity resonators: rectangular, cylindrical, spherical and coaxial, excitation and coupling of cavities, Q factor. Microwave Measurements: Measurement of Frequency, Impedance (using slotted section) attenuation, power, dielectric constant, measurement of V.S. W. R., insertion loss and permeability

Unit-II

Microwave Generators: Construction, characteristics, operating principle and typical applications of Klystron(two cavity, multicavity), Reflex Klystron, magnetron(Cylindrical magnetron and description of Π mode applications) and Traveling Wave Tube (TWT).

Unit-III

Matrix Description of Microwave Circuits: Scattering Matrix: properties, measurement of scattering coefficients, scattering matrices for common microwave systems. Microwave Components: Waveguide tees- E-plane, H-plane, magic tee, rat race, directional coupler, tuning screws and stubs, isolators and circulators-their constructional features and applications. Microwave filters, Phase shifters, attenuators, and frequency meter.

Unit-IV

Solid State Microwave Devices: Transferred Electron Devices- Gunn Effect; negative differential resistance phenomenon, field domain formation, Gunn diode structure. Avalanche transit time devices: IMPATT, TRAPATT, BARITT diodes, Parametric amplifiers

Text Book:

1. Samuel Y. Liao, Microwave Engineering, Pearson Education 3rd/4th/ higher Ed.

- 2. Annapurna & Sisir K. Das, Microwave Engineering, Tata McGraw-Hill.
- 3. David M. Pozar, Microwave Engineering, John Wiley and Sons Inc.

ECE-408N	WIRELESS & MOBILE COMMUNICATION LAB									
Lecture	Tutorial	Practical	Sessionals	Practical	Total	Time				
-		3	40	60	100	3 Hour				
Purpose	To give the students an idea about the Wireless communication theory and technology using the NI-Labview software and RF communication module.									
			Course O	utcomes						
CO 1	To study the	e wireless con	nmunication u	sing NI-Lab	view					
CO 2	To learn ab	out the functi	ioning of Univ	ersal Softwai	re Radio Perip	oheral (USRP)				
CO 3	To learn the	e implementa	tion of differe	nt analog mo	dulation schei	mes using the USRP.				
CO 4	To learn the	e implementa	tion of differe	nt digital moa	lulation schen	nes using the USRP.				

List of Experiments:

- 1. Introduction to NI-LabVIEW and familiarization with its basic functions.
- 2. Study of modulation toolkit and its usage in Wireless Communication.
- 3. Study the interfacing of hardware (USRP module) with the PC and configuring the same.
- 4. Implementation of AM using Software Defined Radio (SDR).
- 5. Implementation of FM using SDR with application such as transfer of files
- 6. Implementation of M-PSK transmitter using SDR concept.
- 7. Implementation of M-PSK receiver using SDR
- 8. Implementation of M-QAM transmitter using SDR.
- 9. Demonstrates the use of the Bluetooth functions to set up data transfer via Bluetooth between a server VI and a client VI.
- 10. Design two-dimensional convolution to perform image edge detection.
- 11. Implementation of M-QAM receiver using SDR.
- 12. Implementation of PSK Modulation system with Convolutional Coding.
- 13. Implementation of FSK Modulation system with BCH Coding.
- 14. Implementation of QAM Modulation system with Golay Coding

ECE-410N	MICROWAVE ENGINEERING LAB									
Lecture	Tutorial	'utorialPracticalSessionalsPracticalTotalTime								
-		3	40	60	100	3 Hour				
Purpose	To give the students an idea about the study and analysis of components used in Microwave Engg.									
	Course Outcomes									
CO 1	Students w	ill learn the s	teps to analyze m	icrowave compo	nents.					
CO 2	Students w	ill be able to j	find the characte	ristics of microw	ave componen	ts.				
CO 3	Students w	Students will learn the steps to analyze various antennas.								
CO 4	Students w	ill be able to j	find the characte	ristics of various	antennas.					

List of Experiments:

- 1. To study microwave components.
- 2. To study the characteristics of the reflex Klystron tube and to determine its electronic tuning range.
- 3. To determine the frequency and wavelength in a rectangular waveguide working in TE $_{10}$ mode.
- 4. To determine the standing wave ratio and reflection coefficient.
- 5. To study the I-V characteristics of gunn diode.
- 6. To study the magic Tee.
- 7. To study the isolator and attenuator.
- 8. To measure the coupling coefficient and directivity of a waveguide directional coupler.
- 9. To measure the polar pattern and the gain of a waveguide horn antenna.
- 10. To measure the insertion loss and attenuation.

ECE-415N	Advance Digital Communication								
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time			
4	0	0	75	25	100	3 Hr.			
Purpose	To understar	nd and acquir	e knowledge	about various powe	r semiconduc	ctor devices.			
	To prepare the students to analyze and design different power converter circuits.								
Course Outcomes									
CO1	Acquire know communicati	Acquire knowledge about fundamental concepts and techniques used in digital communications							
CO2	Ability to analyze various techniques of communication and understand their applications.								
CO3	Foster ability	y to identify b	asic requirem	ents for power digi	tal communic	ation based			
	design applic	ation.							
CO4	To develop s	kills to build, d	and troublesh	oot on digital comm	unication circ	ruits			

Unit-I

Probability and Stochastic Processes: Probability: Random Variables, Probability Distribution, and Probability Densities, Functions of Random Variables, Statistical Average of Random Variables, Some Useful Probability Distributions, Upper Bounds on the Tail Probability, Sums of Random Variables and Central Limit Theorem.Stochastic Processes: Statistical Averages, Power Density Spectrum, Response of a Linear Time - Invariant System to a Random Input Signal, Sampling Theorem for Band- Limited Stochastic Processes, Discrete-time Stochastic Signals and Systems, Cyclostationary processes.

Unit -II

Source coding: Mathematical Models for Information Sources, A Logarithmic Measure of information: Average Mutual Information and Entropy, Information Measure for Continuous Random Variables. Coding for Discrete Sources: Coding for Discrete Memory less sources, Discrete Stationary Sources, The Lempel-Ziv Algorithm.Coding for Analog Sources-Optimum Quantization: Rate- Distortion Function, Scalar Quantization, Vector Quantization. Coding Techniques for Analog Sources: Temporal Waveform Coding, Spectral Waveform Coding, Model- Based Source Coding.

Unit -III

Characterization of Communication Signal and Systems: Signal Space Representation: Vector Space Concept, Signal Space Concept, Orthogonal Expansion of Signals, Gram Schmitt Procedure.

Optimum Receivers for the Additive White Gaussian Noise Channel: Performance of the Optimum Receiver for Memory Less Modulation: Probability of Error for Binary Modulation, Probability of Error for M- ary Orthogonal Signals, Probability of Error for M- ary Binary- Coded Signals, Probability of Error for M- ary PAM, Optimum Receiver for Binary Signals.

Unit -1V

Carrier and Symbol Synchronization: Signal Parameter Estimation: The Likelihood Function, Carrier Recovery and Symbol Synchronization in Signal Demodulation.Carrier Phase Estimation: Maximum Likelihood Carrier Phase Estimation, The Phased – Locked Loop, Effect of Additive Noise on the Phase Estimate, Decision Directed Loops, Non- Decision Directed Loops.

Text Book: *Digital Communication*, J.G. Proakis, Prentice Hall India. Reference Book: *Principles of Communication Systems*, Taub & Schilling, McGraw Hill Education; 3rd.

ECE-417N	NANO ELECTRONICS								
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time			
4	0	0	75	25	100	3 Hour			
Course Outcomes									
CO 1 Students will be using physics, mathematics, and material science engineering to understand the latest development in the area of Microelectronics leading to Nanoelectronics.									
CO 2	Students be able to understand the fundamentals of classical CMOS technology and issues in scaling MOSFET in the sub-100nm regime								
CO 3	Understand nano mate	ling basic pri erials.	nciples of non	-classical transistor	rs with new dev	ice structure and			
CO 4	Understand the issues in realizing Germanium and compound semiconductor MOSFET.								
CO5	Students wi	ll learn mate	rials character	ization techniques o	extensively.				

Unit-I

Overview: Nano devices, Nano materials, Definition of Technology node, Basic CMOS Process flow, MOS Scaling theory, Issues in scaling, Short channel effects, Description of a typical 65 nm CMOS technology, Requirements for Non classical MOS transistor, MOS capacitor, Role of interface quality and related process techniques, Gate oxide thickness scaling trend, SiO2 vs High-k gate dielectrics. Integration issues of high-k, Interface states, bulk charge, band offset, stability, etc.

Unit-II

Metal Gate Transistor : Motivation, requirements, Integration Issues, Transport in Nano MOSFET, velocity saturation, ballistic transport, injection velocity, velocity overshoot, SOI - PDSOI and FDSOI., Ultrathin body SOI - double gate transistors, Vertical transistors - FinFET and Surround gate FET, Metal source/drain junctions - Properties of schotky junctions on Silicon, Germanium and compound semiconductors –Work function pinning, Germanium Nano MOSFETs : strain , quantization , Advantages of Germanium over Silicon.

Unit-III

PMOS versus NMOS, Compound semiconductors - material properties, MESFETs Compound semicocnductors MOSFETs in the context of channel quantization and strain , Hetero structure MOSFETs exploiting novel materials, strain, quantization.

Synthesis of Nanomaterials : CVD, Nucleation and Growth, ALD, Epitaxy, MBE. Compound semiconductor hetero-structure growth, emerging nano materials: Nanotubes, nanorods and other nano structures, LB technique, Soft lithography etc. Microwave assisted synthesis, Self assembly etc.

Unit-IV

Characterization : Quantum wells and Thickness measurement techniques: Contact - step height, Optical - reflectance and ellipsometry, AFM, Nanomaterials Characterization techniques: FTIR, XRD, AFM, SEM, TEM, EDAX and interpretation of results.

Books:

 Fundamentals of Modern VLSI Devices, Y. Taur and T. Ning, Cambridge University Press. Silicon VLSI Technology, Plummer, Deal, Griffin, Pearson Education India.
Encyclopedia of Materials Characterization, Edited by: Brundle, C.Richard; Evans, Charles A. Jr.; Wilson, Shaun; Elsevier.

ECE - 419N	OPTICAL COMMUNICATION										
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time					
3	0	0	75	25	100	3 Hr.					
Purpose	To familia	To familiarize the students with the concepts of Optical communication covering the contents of									
	optical fibers, losses in fibers, optical sources, detectors etc.										
Course Outcomes											
CO1	Students wi	ll be able to u	nderstand the st	ructure of fiber and	the mechani	sm of light travelling in the					
	fiber.										
	·										
CO2	Students wi	ll be able to a	nalyze various la	osses associated wit	h fibers.						
CO3	Students wi	ll learn about	the optical sour	ces and optical dete	ecters.						
			_	-							
CO4	Students wi	ll be able to u	nderstand the va	rious components n	ieeded in opt	ical networks					

Unit – I

INTRODUCTION : Optical Fibers: Structure, Propagation within the fiber, Numerical aperture of fiber, step index and graded index fiber, Modes of propagation in the fiber, Single mode and multi mode fibers. Splices and connectors. Optical Power Launching and Coupling. Fiber-to-fiber joints.

Unit-II

LOSSES IN OPTICAL FIBER : Rayleigh Scattering Losses, Absorption Losses, Leaky modes, Mode coupling losses, Bending Losses, Combined Losses in the fiber.

DISPERSION EFFECT: Effect of dispersion on the pulse transmission Intermodal dispersion, Material dispersion, Wave guide dispersion, Polarization Mode Dispersion Total dispersion, Transmission rate. Dispersion Shifted Fibers, Dispersion Compensating Fibers.

Unit – III

LIGHT SOURCES : LEDS, Laser Action in semiconductor Lasers, Semiconductor Lasers for optical communication – Laser modes, Spectral Characteristics, Power Voltage Characteristics, Frequency response.

DETECTORS : P-I-N Photodiode, APD, Noise Analysis in detectors, Coherent and non-coherent detection, Infrared sensors. Bit error rate.

Unit– IV

THE FIBER-OPTIC COMMUNICATION SYSTEM: Design considerations of fiber optic systems: Analog and digital modulation. Optical Devices: Optical coupler, space switches, linear dividercombiners, wavelength

division multiplexer and demultiplexer, optical amplifier

OPTICAL NETWORKS: Elements and Architecture of Fiber-Optic Network, Optical link networksingle hop, multihop, hybrid and photonic networks.

Suggested Books:

1. John Power, An Introduction to Fiber optic systems, McGraw Hill International.

2. John Gowar, Optical communication Systems.

3. R. Ramaswamy, Optical Networks, Narosa Publication

4. John M. Senior, Optical Fiber Communication

5. Gerd Keiser, Optical Fiber Communication

ECE -			ADAPTIV	E SIGNAL PROC	CESSING				
421N									
Lecture	Tutorial Practical Theory Sessionals Total Time								
3	0	0	75	25	100	3 Hr.			
Purpose	To familiarize the students with various stochastic processes and models, analysis of wiener								
	filters, steepest descent algorithms. Also, students will be able to understand LMS & RLS								
	algorithms and check the robustness and study the Finite-Precision effects on LMS and RLS								
	algorithms.								
Course Outcomes									
CO1	To underst	tand various s	stochastic proce	sses and models in	adaptive si	gnal processing.			
CO2	To underst	tand the anal	lysis of wiener j	filters, the concept	of the line	ear prediction and steepest			
	descent alg	gorithms.	•		U U	-			
CO3	To underst	tand the con	cept and use of	f Least-Mean-Squa	re (LMS) d	& Recursive Least-Squares			
	(RLS) algo	orithms with a	pplications to s	pecific engineering	problems.	-			
CO4	To apply	the concept	robustness and	analysis the Finit	e-Precision	i effects on LMS and RLS			
	algorithms	<i>.</i>		2					

Unit -I

Stochastic Processes and Models: Partial Characterization of a Discrete-Time Stochastic Process, Mean Ergodic Theorem, Correlation Matrix, Correlation Matrix of Sine Wave Plus Noise, Stochastic Models, Wold Decomposition, Asymptotic Stationarity of an Autoregressive Process, Yule—Walker Equations.

Wiener Filters: Linear Optimum Filtering: Statement of the Problem, Principle of Orthogonality, Minimum Mean-Square Error, Wiener-Hopf Equations, Error-Performance Surface, Multiple Linear Regression Model.

Unit -II

Linear Prediction: Forward Linear Prediction, Backward Linear Prediction, Levinson-Durbin Algorithm, Properties of Prediction-Error Filters, Schur-Cohn Test.

Method of Steepest Descent: Basic Idea of the Steepest-Descent Algorithm, The Steepest-Descent Algorithm Applied to the Wiener Filter, Stability of the Steepest-Descent Algorithm, Example, The Steepest-Descent Algorithm as a Deterministic Search Method, Virtue and Limitation of the Steepest-Descent Algorithm.

Unit -III

The Least-Mean-Square (LMS) Algorithm: Signal-Flow Graph, Optimality Considerations, Applications, Statistical Learning Theory, Transient Behavior and Convergence Considerations, Efficiency.

The Recursive Least-Squares (RLS) Algorithm: Some Preliminaries, The Matrix Inversion Lemma, The Exponentially Weighted RLS Algorithm, Selection of the Regularization Parameter, Update Recursion for the Sum of Weighted Error Squares, Example: Single-Weight Adaptive Noise Canceller.

Unit -IV

Robustness: Robustness, Adaptation, and Disturbances, Robustness: Preliminary Considerations Rooted in H^{∞} Optimization, Robustness of the LMS Algorithm, Robustness of the RLS Algorithm, Comparative Evaluations of the LMS and RLS Algorithms from the Perspective of Robustness.

Finite-Precision Effects: Quantization Errors, Least-Mean-Square (LMS) Algorithm, Recursive Least-Squares (RLS) Algorithm, Summary and Discussion.

TEXT BOOKS:

1. S. Haykin, Adaptive filter theory, Pearson

REFERENCE BOOKS:

- 1. T. Adali and S. Haykin, Adaptive Signal Processing, Wiley India
- 2. B. Widrow and S.D. Stearns, Adaptive signal processing, Prentice Hall.

ECE-	SATELLITE COMMUNICATION										
423N	Tutorial	Tutavial Duastical Theory Considerate Tatal Time									
Lecture	Tutoriai	Fractical	Theory	Sessionals	Total	1 lille					
3	0	0	75	25	100	3 Hr.					
Purpose	To familiarize the students with the concepts of Satellite communication and various terms,										
	laws and n	nultiple acces	s schemes used	in its working.							
Course Outcomes											
CO1	To understand the concept of basics of satellite communication and various basic laws and terms of satellite communication.										
CO2	To unders satellite co	tand the con mmunication	ncept and pro	cesses of various	communica	tion satellites used in					
CO3	To familiarize with the concept and design issues of satellite link design and satellite access.										
CO4	To famili communic	arize with ation.	the concepts	of Multiple a	ccess schem	es used in satellite					

Unit -I

SATELLITE ORBITS: Orbital Mechanics- Kepler's laws ,locating the satellite in the Orbit, locating the satellite with respect to the earth, Orbital elements, look angle determination, Sub satellite point, Azimuth and elevation angle calculation, Orbital perturbations, Longitudinal and Inclination changes; Launches and launch vehicles-ELV's, Placing the satellite into geostationary orbit, Doppler shift, range variations, solar eclipse, sun transit outage.

Unit -II

COMMUNICATION SATELLITES: Satellite Subsystems, Attitude and Orbit Control system(AOCS), Telemetry, Tracking, Command and Monitoring (TTC&M), Power System, Communication Subsystems-description, Transponders, satellite antennas-basic antenna types, basic antennas in practice.

Unit -III

Satellite link design and Satellite access: Basic transmission theory, system noise temperature and G/T ratio; Downlink design-link budget; Uplink design; design for specified C/N, uplink and downlink attenuation in rain, communication link design procedure; system design examples.

Unit –IV

Multiple access schemes: FDMA, TDMA, CDMA, DAMA; VSAT systems-basic techniques, VSAT earth station engineering, system design; DBS systems-C-band and Ku band home TV, digital DBS; satellite mobile systems; GPS

Text Books:

1. Timothy Pratt, Satellite Communications, Wiley India edition

Reference Books:

1. Anil K Maini, Satellite Communication, Wiley India edition

ECE-425N	Digital VLSI Design									
Lecture	Tutorial	Tutorial Practical Theory Sessionals Total Time								
3	-	-	75	25	100	3 Hr.				
Purpose	Analog CMOS circuits are used in amplifiers and various filters circuits. This course teaches design methods of CMOS IC circuits.									
			Course Out	comes						
CO1	To understan	nd MOS digi	tal circuits co	ncepts						
CO2	To understan	To understand the MOS inverter and its design								
CO3	To learn MC	S combinatio	onal and seque	ential circuit design						

Unit -I

Introduction: Introduction to MOSFETs : MOS Transistor Theory – Introduction MOS Device, Fabrication and Modeling , Body Effect, Noise Margin; Latch-up

Unit -II

MOS Inverter: MOS Inverter, MOS Transistors, MOS Transistor Switches, CMOS Logic, Circuit and System Representations, Design Equations, Static Load MOS Inverters, Transistor Sizing, Static and Switching Characteristics; MOS Capacitor.

Unit -III

MOS Combinational circuits: Combinational MOS Logic Circuits: Pass Transistors/Transmission Gates; Designing with transmission gates, Primitive Logic Gates; Complex Logic Circuits.

Unit -IV

MOS Sequential Circuits: Sequential MOS Logic Circuits: SR Latch, clocked Latch and flip flop circuits, CMOS D latch and edge triggered flip flop.

Books:

1. S. M. Kang and Y. Leblebici, CMOS Digital Integrated Circuits : Analysis and Design, Third Edition,

MH, 2002.

 N. Weste, K. Eshraghian and M. J. S. Smith, Principles of CMOS VLSI Design : A Systems Perspective, Second Edition (Expanded), AW/Pearson, 2001.
J. P. Uyemura, CMOS Logic Circuit Design, Kluwer, 1999.

ECE-427N	Analog CMOS IC Design									
Lecture	Tutorial	Tutorial Practical Theory Sessionals Total Time								
3	-	-	75	25	100	3 Hr.				
Purpose	Analog CMOS circuits are used in amplifiers and various filters circuits. This course teaches design methods of CMOS IC circuits.									
	Course Objectives									
CO1	To understan	nd CMOS d	igital circuits	concepts						
CO2	To design Ar	To design Analog circuits using CMOS.								
CO3	To learn mo	deling of Cl	MOS based an	nplifiers circuits						

Unit -I

Basic Analog CMOS Circuits: Introduction to analog design, Passive and active current mirrors, Switched Capacitor circuits - basic principles, sampling switches, switched capacitor integrator, switched capacitor amplifier.

Unit -II

CMOS single stage Amplifiers: Common-Source stage with resistive load and diode connected load, source follower, common-gate stage, cascode stage, folded cascode stage. Frequency responses of CS stage, CD stage, CG stage, cascode stage.

Unit -III

Differential Amplifier & Op-Amp: Single-ended and differential operation, basic differential pair – qualitative and quantitative analyses, common-mode response, differential pair with MOS loads, Performance parameters of op-amp, one stage op-amp, two-stage CMOS op-amp, slew rate, power supply rejection.

Unit -IV

Oscillators: General considerations, Ring oscillators, LC oscillators – cross-coupled oscillators, Colpitts oscillator, One-port oscillator, and voltage controlled oscillators.

Books:

1. Razavi, "Design of analog CMOS integrated circuits", McGraw Hill, Edition 2002.

2. Allen, Holberg, "CMOS analog circuit design", Oxford University Press, 2nd Edition, 2012.

ECE- 429N	CONSUMER ELECTRONICS								
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time			
3	0	0	75	25	100	3 Hr.			
Purpose	To familia various aa	To familiarize the students with the concepts of audio and video systems and also With various advanced electronic gadgets and home appliances							
	·		Course Out	comes					
CO1	To unders	tand the conce	ept of basic audi	o system and AM/FM	A tuners.				
CO2	To unders	tand the conce	ept of Video Syst	tems.					
CO3	To unders	tand the vario	us advanced elec	ctronic gadgets.					
CO4	To unders	tand the vario	us electronic ho	me appliances.					

Unit-I

Audio System: Wave motion, Microphones, Headphones and Headsets, Loudspeakers, Acoustics, Disc recording and Distortion in disc and tape, Optical recording and reproduction, Control circuits, Amplifying systems, Portable stereo, Theatre sound system and AM/FM tuners.

Unit-II

Video Systems: Monochrome TV standards and systems, Colour TV standards and systems, Monochrome and colour TV controls, Video Tape recording and reproduction, video disc recording and playback, Remote controls and Video systems.

Unit-III

Electronic Gadgets: Telecommunication Systems, Switching Systems, Modulation techniques, Fiber optics, Mobile Systems, Xerography and Fascimile fax, Automated Teller Machines and Top Boxes.

Unit-IV

Home Appliances: Digital clocks, In-Car Computers, Microwave ovens, Washing Machines, Air Conditioners and Refrigerators.

- 1. Consumer Electronics By S.P. Bali, Pearson Education, 1st edition.
- 2. Colour Television-principles & practice R.R Gulati by Wiley Eastern Limited, New Delhi.
- 3. Colour Television & Video Technology by A.K. Maini CSB Publisher
- 4. VCR-principles, maintenance & repair by S.P. Sharma, Tata Mc Graw Hill, New Delhi
- 5. Colour TV by A. Dhak.
| ECE-431N | 1 | ROBOTICS | | | | | | | | | |
|-----------|---|--|----------------|--------------------|------|--|--|--|--|--|--|
| Lecture | Tutorial Practical Theory Sessionals Total Tim | | | | | | | | | | |
| 3 | 0 0 75 25 100 3 Hr. | | | | | | | | | | |
| Course Ou | itcomes | | • | | | | | | | | |
| CO1 | The basic concep
familiar with the | The basic concepts related to robot, Parts of robots, End effectors and to make the student familiar with the various drive systems for robot. | | | | | | | | | |
| CO2 | Various sensors | and machine visi | on and their a | pplications in rob | ots. | | | | | | |
| CO3 | About various control system, robot programming, Artificial intelligence and safety standards of robots | | | | | | | | | | |
| CO4 | Industrial and Non-industrial Applications of robots. | | | | | | | | | | |

Unit–I

Fundamentals of Robot: Definition, History and Development in robot technology. Robot Technology: Characteristics, Basic Components, Robot Anatomy, Robot Generations, Robot selection, Present and Future Applications.

Robot Drive Systems and End Effectors: Robot Classification: Arm geometry, Degrees of freedom, Power sources, Types of motion, Path Control. Robot End Effectors: Mechanical grippers, Vacuum, Magnetic, Adhesive. Special purpose grippers, Process tooling, Compliance, Robot Drive systems: Hydraulic, Pneumatic and Electric system.

Unit-II

Sensor : Requirements of a sensor, Sensor classification, Principles and Applications of the following types of sensors : Position of sensors (Potentiometer, Encoder, LVDT, Resolvers, LMDT, Hall – effect sensors), Velocity sensors(Encoder, Tachometer, Differentiation of position signal), Acceleration sensors, Force and Pressure Sensors(Piezoelectric, Force sensing resistor, Strain Gauge, Antistatic foam), Torque Sensors, Micro switches, Visible light and Infrared Sensors, Touch and Tactile sensors, Proximity Sensors(Magnetic, optical, Ultrasonic, Inductive, Capacitive, Eddy Current), Range Finder (Ultrasonic, Light-based, GPS), Sniff Sensors, Taste Sensors, Vision Sensors, Voice recognition devices, Voice synthesizers, RCC.

Machine Vision: Visual sensing, Architecture of robotics vision system, Machine vision: Image acquisition (Vidicon tube, CCD), Digitization, Image processing, Image Analysis, Image interpretation. Machine vision application, other optical methods.

Unit-III

Control System, Programming and Artificial Intelligence: Control Systems: PLC, PID, CNC, MPU, URC. Robot programming: Programming methods, Languages, levels of robot programming, Program statements. Elements of Artificial Intelligence, System architecture, Application of fuzzy logic in robotics, Robot Safety, safety standards.

Unit-IV

Robot Applications: Industrial applications, Automation in manufacturing, Robot applications, Material handling, Processing application, Assembly application, Inspection application, evaluating the potential of a robot application, future applications, challenge for the future, Innovations, Non-industrial application.

Text Books:

- 1. James G. Keramas, "Robot technology fundamentals", Delmar Publishers.
- 2. Saeed B. Niku, "Introduction to robotics analysis, control and applications", 2nd ed., Wiley India.
- 3. R. K. Mittal, I.J. Nagrath, "Robotics and Control", TMH Education Pvt. Lmt.

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ECE 422N	NON CONVENTIONAL ENERCY DESOLIDCES									
ECE-455N			NON-CONVENI	IONAL ENERG	I KESUUKU	ES				
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time				
3	-	-	75	25	100	3 Hour				
Course Outcomes										
CO 1	To understan	nd the energy	demand of world,	nation and availa	ble resources t	o fulfill				
	the demand	the demand								
CO 2	To know about the conventional energy resources and their effective utilization									
CO 3	To acquire t	he knowledge	e of modern energy	conversion techno	ologies					
CO 4	To be able to understand and perform the various characterization techniques of fuels									
CO5	To be able to to utilize th) identify avai em effectively.	lable nonconventio	onal (renewable) e	nergy resource	es and techniques				

Unit-I

Introduction: Energy demand of world and country and gap analysis, Fossil fuel based systems, Impact of fossil fuel based systems, Non conventional energy – seasonal variations and availability, Renewable energy – sources and features, Hybrid energy systems. Distributed energy systems and dispersed generation (DG).

Unit-II

Solar thermal systems: Solar radiation spectrum, Radiation measurement, Technologies, Applications, Heating, Cooling, Drying, Distillation, Power generation; Costing : Life cycle costing (LCC), Solar thermal system

Solar Photovoltaic systems ,Operating principle, Photovoltaic cell concepts ,Cell, module, array, Series and parallel connections, Maximum power point tracking, Applications ,Battery charging, Pumping , Lighting,Peltier cooling , Costing: Life cycle costing ,Solar PV system

Unit-III

Microhydel: Operating principle, Components of a microhydel power plant, Types and characteristics of turbines, Selection and modification, Load balancing, Costing: Life cycle costing -Microhydel Wind ; Wind patterns and wind data, Site selection, Types of wind mills , Characteristics of wind generators, Load matching, Life cycle costing - Wind system LCC

Unit-IV

Biomass: Learning objectives, Operating principle, Combustion and fermentation, Anaerobic digester, Wood gassifier, Pyrolysis, Applications, Bio gas, Wood stoves, Bio diesel, Combustion engine, Life cycle costing - Biomass system LCC

Hybrid Systems, Need for Hybrid Systems, Range and type of Hybrid systems, Case studies of Diesel-PV, Wind-PV, Microhydel-PV, Biomass-Diesel systems, electric and hybrid electric vehicles

Suggested Books:

1. Ashok V Desai, Non-Conventional Energy, Wiley Eastern Ltd, New Delhi, 2003

2. Mittal K M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, New Delhi,2003 3.Ramesh R & Kumar K U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 2004

4. Wakil MM, Power Plant Technology, Mc Graw Hill Book Co, New Delhi, 2004.

ECE-435N	MICROSTRIP LINE ANALYSIS								
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time			
3	-	-	75	25	100	3 Hour			
Purpose	To create awareness about the basics of designing the modern tuned circuit based on microstrip circuit theory.								
			Course Obj	ectives					
CO 1	To understa	nd the need o	of microstrip line	analysis.					
CO 2	To be able to	acquire know	ledge about the di	spersion models an	d measuremen	ets.			
CO 3	To familiarize with quasi static analysis of microstrip line.								
CO 4	To acquire th	e knowledge o	f importance and a	pplications of slotline	type of microstr	ір			

Unit -I

Microstrip Lines I: Quasi- Static Analyses, Dispersion Models, and Measurements

Introduction, Quasi-Static Analyses of a Microstrip, Microstrip Dispersion Models, Microstrip Transitions, Microstrp Measurements.

Unit -II

Microstrip Lines II: Fullwave Analyses, Design Considerations, and Applications

Methods of Full Wave Analysis, Analysis of Open Microstrip, Analysis of Enclosed Microstrip, Design Considerations, Other Types of Microstrip Lines, Microstrip Applications.

Unit -III

Microstrip Discontinuities I: Quasi- Static Analysis and Characterization

Introduction, Discontinuity Capacitance Evaluation, Discontinuity Inductance Evaluation, Characterization of Various Discontinuities, Compensated Microstrip Discontinuities.

Unit -IV

Slotlines

Introduction, Slotline Analysis, Design Considerations, Slotline Discontinuities, Other Slotline Configurations, Slotline Transitions, Slotline Applications.

Text Book: K.C. Gupta, Ramesh Garg, Inder Bhal and Parkash Bhartia, *Microstrip lines & Slotlines*, Second ed., Artech House, London

ECE-437N		SOFTWARE DEFINED RADIOS									
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time					
3		-	75	25	100	3					
Purpose	To underst	To understand Modern Radio Communication System that can be reconfigured.									
			Course Out	comes							
CO 1	Conceptual	lize the SDR an	d implementation	details							
CO 2	Design SD	R for a specific	application								
CO 3	Identify the	Identify the challenges in the maintenance of SDR									
CO 4	Analyse the transmitter and receiver architectures										

Unit-I

Introduction – Software Defined Radio – A Traditional Hardware Radio Architecture – Signal Processing Hardware History – Software Defined Radio Project Complexity.

A Basic Software Defined Radio Architecture – Introduction – 2G Radio Architectures Hybrid Radio Architecture- Basic Software Defined Radio Block Diagram- System Level Functioning Partitioning-Digital Frequency Conversion Partitioning.

Unit-II

Analog-to-Digital and Digital-to-Analog Conversion- Introduction – Digital Conversion Fundamentals- Sample Rate- Bandpass Sampling- Oversampling- Antialias Filtering – Quantization – ADC Techniques-Successive Approximation- Figure of Merit-DACs- DAC Noise Budget- ADC Noise Budget.

Unit-III

Digital Frequency Up- and Down Converters- Introduction- Frequency Converter Fundamentals-Digital NCO- Digital Mixers- Digital Filters- Halfband Filters- CIC Filters Decimation, Interpolation, and Multirate Processing-DUCs - Cascading Digital Converters and Digital Frequency Converters. **Signal Processing Hardware Components**- Introduction- SDR Requirements for Processing Power-DSPs- DSP Devices- DSP Compilers- Reconfigurable Processors Adaptive Computing Machine-FPGAs

Unit-IV

Software Architecture and Components – Introduction- Major Software Architecture Choices – Hardware – Specific Software Architecture- Software Standards for Software Radio-Software Design Patterns- Component Choices- Real Time Operating Systems- High Level Software Languages-Hardware Languages.

Text Books

- 1. Paul Burns, Software Defined Radio for 3G, Artech House, 2002.
- 2. Tony J Rouphael, RF and DSP for SDR, Elsevier Newnes Press, 2008
- 3. Jouko Vanakka, Digital Synthesizers and Transmitter for Software Radio, Springer, 2005.
- 4. P Kenington, RF and Baseband Techniques for Software Defined Radio, Artech House, 2005.

ECE-414N		DSP PROCESSOR									
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time					
3	-	-	75	25	100	3 Hour					
Course	1. To study Programmable DSP Processors.										
Objectives	2. To provide an understanding of the fundamentals of DSP techniques.										
	3. To study implementation & applications of DSP techniques.										
	4. To understand architecture of DSP processor										
	5. To understand DSP system design using FPGA.										
	I		Course	Outcomes							
CO 1	To describe i	the detailed a	rchitecture, a	ldressing mode, in	struction sets	of TMS320C5X.					
CO 2	To write prog	gram of DSP	processor.								
CO 3	To describe the detailed architecture, addressing mode, instruction sets of TMS320C54X.										
CO 4	To know DSP system design using FPGA.										

Unit -I

INTRODUCTION: Digital Signal Processing, Advantages of DSP, Applications of DSP. *Fundamentals Of Programmable Dsps*: Multiplier and Multiplier accumulator, Modified Bus Structures and Memory access in P-DSPs, Multiple access memory, Multi-ported memory, VLIW architecture, Pipelining, Special Addressing modes in P-DSPs, On chip Peripherals.

Unit -II

ARCHITECTURE OF TMS320C5X: Architecture, Bus Structure & memory, CPU, addressing modes. Programming TMS320C5X: Assembly language syntax, Assembly language Instructions, Simple ALP – Pipeline structure, Operation Block Diagram of DSP starter kit, Application Programs for processing real time signals.

Unit -III

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Block diagrams of 54X internal Hardware, buses , internal memory organization, Data Addressing modes of S320C54XX Processors, Program Control, On-chip peripheral, Interrupts ofTMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

Unit -IV

ADVANCED PROCESSORS and FPGA: Code composer studio - Architecture of TMS320C6X, Introduction to FPGA, Design flow for an FPGA based system design, FPGA based DSP system design. Comparison of the performance of the system designed using FPGA and Digital signal processors, Application note on DSP systems.

Text- Books:

- 1. B. Venkataramani and M. Bhaskar, Digital Signal Processors -Architecture, Programming and Applications 2nd edition, Mc Graw Hills 2011.
- 2. Avtar Singh, S. Srinivasan DSP Implementation using DSP microprocessor with Examples from TMS32C54XX –Thamson.

Reference Books:

- 1. DSP Processor Fundamentals, Architectures & Features Lapsley et al., S. Chand & Co, 2000.
- 2. Digital signal processing-Jonathen Stein John Wiley 2005.
- 3. S.K. Mitra, Digital Signal Processing, Tata McGraw-Hill Publication, 2001.
- 4. B. Venkataramani, M. Bhaskar, Digital Signal Processors, McGraw Hil

ECE-416N		MOBILE COMMUNICATION NETWORK								
Lecture	Tutorial	Practical	Theory		Sessionals	Total	Time			
3		-	75		25	100	3			
Purpose	To expose	To expose the students to the most recent technological developments in Mobile								
-	communication systems.									
			Cour	se Out	comes					
CO 1	Fundamenta	al concepts in	wireless, ce	llular i	technology					
CO 2	Standards e	volved								
CO 3	Models of m	Models of mobile radio channels								
CO 4	Communica	tion technolo	gies adapted	l, Wire	less networks					

Unit-I

Introduction To Mobile Radio Systems Evolution of Mobile radio communications – Mobile radio systems in the U.S. and around the world – Examples of Mobile radio systems. **Standards and Cellular Concept Cellular concept** – Frequency reuse – Channel Assignment strategies – Handoff strategies – Interference and System capacity – Trunking and Grade of service – Improving capacity in cellular systems.

Unit-II

Mobile Radio Propagation Small-scale multipath propagation – Impulse response of a multipath channel – Parameters of mobile multipath channel – Types of small-scale fading – Rayleigh and Rician distributions – Statistical models for multipath fading channels.

Unit-III

Mobile System and Network Architectures GSM Services and Features – GSM system architecture – GSM radio subsystem – Frame structure for GSM – Signal processing in GSM – GPRS network architecture – GPRS services and features – 3G UMTS network architecture – UMTS services and features.

Unit-IV

Wireless Standards Multiple access techniques – FDMA, TDMA and CDMA – Wireless networking – Design issues in personal wireless systems – Cordless systems and Wireless Local Loop (WLL) – IEEE 802.16 Fixed Broadband Wireless Access standard – Mobile IP and Wireless Application Protocol.

Text Books

1. Rappaport, T.S., "Wireless Communications", Principles and Practice, Prentice Hall, NJ, 1996.

2. William Stallings, "Wireless Communication and Networking", Pearson Education, 2002.

3. Siegmund M. Redl, Mathias K. Weber, Malcolm W. Oliphant, "An Introduction to GSM", Artech House Publishers, 1995.

4. Kraus, J.D., "Antennas", II Edition, John Wiley and Sons, NY, 1977. 5. Collin, R.E. and Zucker, F., - "Antenna theory: Part I", Tata McGraw Hill, NY, 1969.

ECE-418N		MEMS									
Lecture	TutorialPracticalTheorySessionalsTotal										
3	-	-	75	25	100	3					
	Course Outcomes										
CO 1	Students will be using knowledge of mathematics, science, and engineering to understand various MEMS devices.										
CO 2	Students be fabrication d	able to unders and packaging	stand various _l g of MEMS de	processes used such a vices.	us oxidation, meta	llization,					
CO 3	Understand	ing basic prin	ciples of bulk i	micromachining and	clean rooms prac	tices					
CO 4	Understand	materials and	MEMS packa	iging techniques.							
CO 5	Students can write an engineering report on the one of potential MEMS devices and give an effective oral presentation.										

Unit-I

Introduction to Microsystems: Overview of microelectronics manufacture and Microsystems technology. Definition - MEMS materials. Laws of scaling. The multi disciplinary nature of MEMS. Survey of materials central to micro engineering. Applications of MEMS in various industries.

Unit-II

Micro Sensors and Actuators: Working principle of Microsystems - micro actuation techniques, micro sensors – types, Microactuators and types, micropump, micromotors, micro – valves, microgrippers – micro- accelerometers.

Unit-III

Fabrication Process Substrates - single crystal silicon wafer formation, Clean room practices, Photolithography, Ion implantation, Diffusion, Oxidation, CVD - Physical vapor deposition, epitaxy - etching process.

Unit-IV

Micro System Manufacturing Bulk Micro manufacturing - surface micro machining – LIGA Micro system packaging materials - die level - device level - system level - packaging techniques – die preparation – surface bonding wire bonding - sealing. Introduction to assembly, Introduction to Micro-system design.

Text Books

1. MEMS and Microsystems Design and Manufacture" by Tai-Ran Hsu. Tata McGraw-Hill Publishing Company Ltd.

2. Foundation of MEMS" by Chang Liu. Pearson Education.

3. MEMS Handbook", Mohamed Gad – el – Hak, CRC Press, 2002.

4. Rai - Choudhury P. MEMS and MOEMS Technology and Applications", PHI Learning Private Limited, 2009.

5. Sabrie Solomon, "Sensors Handbook," Mc Graw Hill, 1998.

References

1. Francis E.H. Tay and Choong .W.O, "Micro fluidics and Bio mems application", IEEE Press New York, 1997.

2. Trimmer William S., Ed., "Micromechanics and MEMS", IEEE Press New York, 1997.

 Maluf, Nadim, "An introduction to Micro electro mechanical Systems Engineering", AR Tech house, Boston 2000.

4. Julian W.Gardner, Vijay K.Varadan, Osama O. Awadel Karim, "Micro sensors MEMS and Smart Devices", John Wiby & sons Ltd., 2001.

ECE-420N		TRANSDUCERS & ITS APPLICATIONS									
Lecture	Tutorial	Futorial Practical		Sessionals	Total	Time					
3		-	75	25	100	3					
Purpose	Understanding the structural and functional principles of sensors and transducers used for various physical and nonelectric quantities and how to use them to measure these quantities.										
			Course Ou	tcomes							
CO 1	Explain the	principles of	operation of the s	ensor parameters an	d generators						
CO 2	Interpretatio	on of the meas	surement results l	by using transducers.							
CO 3	Developmen	Development of measurement schemes for different non electrical quantities									
CO 4	Assimilating	Assimilating knowledge about the implementation of sensors and transducers.									

Unit-I

Definition of transducer. Advantages of an electrical signal as out-put. Basic requirements of transducers, Primary and Secondary Transducer, Analog or digital types of transducers. Resistive, inductive, capacitive, piezoelectric, photoelectric and Hall Effect tranducers.

Unit-II

Measurement of Pressure – Manometers, Force summing devices and electrical transducers **Measurement of Temperature** – Metallic resistance thermometers, semi conductor resistance sensors (Thermistors), thermo-electric sensors, pyrometers.

Unit-III

Measurement of Displacement – Potentiometric resistance type transducers, inductive type transducers, differential transformer (L.V.D.T), capacitive transducers, Hall effect devices, strain gage transducers.

Measurement of Velocity – variable reluctance pick up, electromagnetic tachometers, photoelectric tachometer, toothed rotor tachometer generator.

Unit-IV

Measurement of Force – Strain-gage load cells, pneumatic load cell, LVDT type force transducer. **Measurement of Torque** – Torque meter, torsion meter, absorption dynamometers, inductive torque transducer, digital methods.

Suggested Books:

- 1. B.C. Nakra, K.K. Chaudhry, "Instrumentation Measurement and Analysis," Tata McGraw-Hill Publishing Company Limited, New Delhi.
- 2. Thomas G. Beckwith etc. all, "Mechanical Measurements (International Student Edition), Addison-Wesley Longman, Inc. England.
- 3. A.K. Sawhney, "A Course in Electrical and Electronic Measurements and Instrumentation," Dhanpat Rai & Sons, Delhi-6.

ECE 422N	RADAR ENGINEERING									
Lecture	Tutorial	Tutorial Practical Credit Theory Sessionals Total Time								
3	0	0	3	75	25	100	3 Hr.			
Purpose	To familiarize the students with the concepts of radar, various types of radar, radar mixers and various other technologies.									
			Cours	e Outcomes						
CO1	To unders radar.	tand the con	cept of basic	s of radar, its	equation and	signals asso	ciated with			
CO2	To unders	tand the cond	cept of CW a	nd MTI rada	<i>r</i> .					
CO3	To familia	rize with the	concept of tr	acking radar	•					
CO4	To familia	rize with the	concept of re	adar receiver,	, mixers and di	uplexers.				

Unit- I

Radar BASICS:

Radar Block Diagram & operation, Applications of Radar.

Radar Equation:

Simple form of Radar Equation, Detection of signals in noise, Signal to Noise ratio, Transmitter Power. Pulse repetition frequenc)' & range ambiguities, System losses, Propagation effects.

Unit- II

CW & Frequency Modulated Radar:

The Doppler effect, CW Radar, FM- CW Radar, Multiple Frequency CW Radar.

MTI & Pulse Doppler Radar:

Introduction, Delay Line Cancellors. Multiple or staggered Pulse repetition frequencies.range-Gated Doppler Filters, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler radar, MTI from a moving platform.

Unit-III

Tracking Radar: Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition, Low angle tracking.

Unit-IV

Receivers, Displays & Duplexers:

Radar Receivers, Noise Figure, MixerLow-noise Front ends. Displays, Duplexer, Receiver protectors.

Text Book: I. Introduction to Radar Systems: Merrill!. Skolnik,; MGH **Reference Book:** Electronic Communication Systems: Kennedy; TMH.

ECE- 424N		HIGH FREQUENCY CIRCUITS AND SYSTEMS								
Lecture	TutorialPracticalTheorySessionalsTotalTime									
3	0	0	75	25	100	3 Hr.				
Purpose	This cour for transm	This course aims to introduce the design of high frequency CMOS circuits suitable for transmitter and receiver of modern communication devices								
			Course	Outcomes						
CO1	To explore the various performance measures of high frequency circuits.									
CO2	To learn the design of high frequency filters, amplifiers and oscillators.									

Unit-I

PARAMETERS OF HIGH FREQUENCY CIRCUITS

Gain Parameters, Non-linearity parameters, Noise figure, Phase Noise, Dynamic range, RF front end performance parameters, performance trade offs in an RF circuit.

Unit-II

HIGH FREQUENCY FILTER DESIGN

Modern filter design, Frequency and impedance scaling, High Pass filter design, Band pass filter design, Band reject filter design, the effects of finite Q.

Unit- III

HIGH FREQUENCY AMPLIFIER DESIGN

Zero as bandwidth enhances, Shunt-series amplifier, Bandwidth enhancement with frequency Doublers, Tuned amplifiers, Neutralization and unilateralization, cascaded Amplifiers.

Unit -IV

MIXERS AND OSCILLATORS

Mixer fundamentals, Non linear systems as Linear mixers, multiplier based mixers, Subsampling mixers. Problems with purely linear oscillators, Tuned oscillator, Negative Resistance oscillators, frequency synthesis.

BOOKS

- 1. Aleksandar Tasic, Wouter.A.Serdijn, John.R.Long, "Adaptive Low Power Circuits for Wireless Communication (Analog Circuits and Signal Processing)", Springer, 1st Edition, 2006.
- Chris Bowick, "RF Circuit design", Newnes (An imprint of Elesvier Science), 1st Edition, 1997. Thomas.H. Lee, "The design of CMOS Radio-Frequency Integrated Circuits", Cambridge University Press, 2nd Edition, 2004.

ECE-426N	BIO-MEDICAL SIGNAL PROCESSING									
Lecture	TutorialPracticalTheorySessionalsTotalT									
3		-	75	25	100	3				
Purpose	Purpose To understand the concept of Bio-Medical Signal Processing.									
			Course O	outcomes						
CO 1	Introduction	to signal and	information.							
CO 2	Introduction	to Biomedica	ıl Signals and E	CG.						
	Introduction to Adaptive filtering and EEG.									
CO 4	Introduction	to Event dete	ection and wavef	orm analysis.						

Unit – I

Signals and Information: Definitions and properties of Laplace transform, Basic of DFT and FFT, z-transform, Sampling theorem.

Linear Time-Invariant (LTI) Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, frequency response, group delay, phase delay, Applications of Digital Signal Processing.

Unit – II

Introduction to Biomedical Signal: General measurement and diagnostic system, classification of signals, introduction to biomedical signals, Biomedical signal acquisition and processing.

ECG: ECG signal origin, ECG parameters-QRS detection different techniques, ST segment analysis, Arrhythmia, Arrhythmia analysis, Arrhythmia monitoring system.

Unit – III

Adaptive Filtering: Introduction, General structure of adaptive filters, LMS adaptive filter, adaptive noise cancellation, cancellation of ECG from EMG signal, Cancellation of maternal ECG in fetal ECG. **EEG**: EEG signal characteristics, Sleep EEG classification and epilepsy.

Unit – IV

Event Detection and waveform analysis: Need for event detection, Detection of events & waves, Correlation analysis of EEG signals, Identification of heart sounds, Morphological analysis of ECG waves. **Frequency Domain Analysis:** Introduction, Spectral analysis, linear filtering, Removal of high frequency noise (power line interference), motion artifacts (low frequency) and power line interference in ECG.

Text Book:

1. Biomedical Signal Analysis" A case study approach, Rangaraj M Rangayyan, John Wiley publications.

Reference Books:

1. "Biomedical Signal Processing Time and Frequency Domains Analysis (Volume I)", Arnon Cohen, CRC press.

2. "Biomedical Signal Processing Principles and Techniques" D.C.Reddy, Tata Mc Graw-Hill

3. "Biomedical Digital Signal Processing", Willis J. Tompkins, PHI

ECE-428N		MULTIMEDIA COMMUNICATIONS								
Lecture	e Tutoria	I Practical	Theory	Sessionals	Total	Time				
3	0	0	75	25	100	3 Hr.				
Purpose	Purpose To familiarize the students with the concepts of basic multimedia communication systems and various compression algorithms of text, audio, image and video.									
			Course Out	comes						
C01	To under networks	stand the conce and application	ept of basic mult s.	imedia comm. Syste	em and variou	is types of				
CO2	To under	stand the concep	pt text and image	e compression.						
CO3	To under	To understand the concept of audio and video compression.								
CO4	To understand the concept of multimedia synchronization and video indexing.									

Unit - I

Multimedia Communication: Introduction, Multimedia networks: Telephone networks, Data networks, ISDN, B-ISDN. Multimedia Applications: Interactive applications over the internet and entertainment applications.

Digitization Principles, Representation of Text, Images, Audio and Video.

Unit - II

Text Compression: Compression principles, Text Compression techniques: Static Huffman Coding, Dynamic Huffman Coding, Arithmetic Coding, Lempel Ziv and Lempel Ziv welsh coding.

Image Compression: Graphics interchange format, Tagged image file format, JPEG in detail.

Unit - III

Audio Compression: Differential Pulse Code Modulation, Adaptive Differential PCM, Adaptive Predictive coding, Linear predictive coding and MPEG audio coders,

Video Compression: Video Compression principles, Frame types, Motion estimation and compensation, H.261, H.263

Unit - IV

Multimedia Synchronization: Basic definitions and requirements, Time stamping and Pack architecture.

Video Indexing: Basics of content based image retrieval and video content representation.

Reference Books:

- 1. Multimedia communications: Fred Halsall; Pearson Education Asia.
- 2. Multimedia Systems" by Ralf Steinmetz and Klara Nahrstedt
- 3. Multimedia Systems, Standards, and Networks" by A. Puri and T. Chen

ECE-430N	MIXED VLSI DESIGN									
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time				
3	0	0	75	25	100	3 Hr.				
Purpose	This cours implement	se teaches h ed for vario	ow in real li ous system de	fe applications both sign.	analog and digita	l circuits can				
	-		Course	Outcomes						
CO1	To kno	w mixed sig	gnal circuits	like DAC, ADC, PLI	L etc.					
CO2	To gain	To gain knowledge on filter design in mixed signal mode.								
CO3	To acq	To acquire knowledge on design of different architectures in mixed signal								

PHASE LOCKED LOOP

Characterization of a comparator, basic CMOS comparator design, analog multiplier design, PLL simple PLL, charge-pump PLL, applications of PLL.

Unit- II

Unit-I

SAMPLING CIRCUITS

Basic sampling circuits for analog signal sampling, performance metrics of sampling circuits, different types of sampling switches. Sample-and-Hold circuit with miller capacitance.

Unit-III

D/A CONVERTER

Input/output characteristics of an ideal D/A converter, performance metrics of D/A converter, D/A converter in terms of voltage, current, and charge division or multiplication, switching functions to generate an analog output corresponding to a digital input.

Unit- IV

A/D CONVERTER

Input/output characteristics and quantization error of an A/D converter, performance metrics of pipelined architectures, Successive approximation architecture.

BOOKS:

- S. M. Kang and Y. Leblebici, CMOS Digital Integrated Circuits : Analysis and Design, Third 1. Edition, TMH, 2002.
- Razavi, "Design of analog CMOS integrated circuits", McGraw Hill, 2. Edition 2002.
- Jacob Baker, "CMOS Mixed-Signal circuit design", IEEE Press, 2009. 3.
- 4. Gregorian, Temes, "Analog MOS Integrated Circuit for signal processing", John Wiley & Sons, 1986.

ECE-432N	MICROSTRIP ANTENNA										
Lecture	Tutorial	TutorialPracticalTheorySessionalsTotalTir									
3	0	0	75	25	100	3 Hr.					
Purpose	To familia	To familiarize the students with the concepts of basic Antenna.									
	•		Course Ou	itcomes							
C01	To underst application	tand the con is.	cept of basi	ic Antenna. System	n and various	s types of					
CO2	To underst	and the con	cept of micr	ostrip antenna an	d its analytica	al modeling					
CO3	To underst	tand the diff	erent design	s of microstrip and	tenna						
CO4	To underst	tand the app	lications of	different designs o	of microstrip a	intenna					

Unit-1

Micro Strip Radiator

Introduction, Microstrip Antenna Configurations, Feeding Techniques and Modeling of Microstrip Antenna, Radiation field, Surface wave and Photonic Bandgap Structures and Applications

Unit-2

Analytical Modeling and Full Wave Analysis

Introduction, Transmission Line Model, Cavity model, Radiation Fields, Aperture and Mutual admittance, conductance. **Full wave analysis:** Input Impedance and Radiation efficiency, Radiation pattern, Mixed Potential Integral Equation Analysis, Greens function, Finite Difference Time-Domain Analysis.

Unit-3

Rectangular and Circular Microstrip Antenna

Introduction, Models for Rectangular Patch Antennas, Design Consideration for Rectangular Patch antennas, Tolerance Analysis, Mechanical Tuning, Quarter-wave Rectangular Patch Antenna, **Circular Microstrip Antenna:** Analysis of Circular disk, Cavity and Transmission line modeling of circular antennas.

Unit-4

Circularly Polarized and Broadband Microstrip Antenna Design

Circular Polarization, Rectangular and Circular Circularly polarized Antennas, Power divider : T Junction and Wilkinson.

Effect of Substrate Parameter on Bandwidth, Selection of suitable Patch Shape, Feeding Techniques, Multimoding Techniques, Impedance Matching, Resistive Loading.

Text book: Ramesh Garg, Prakash Bhartiya, Inder Bahl, Apisak Ittipboon, "Microstrip Antenna Design Handbook", Artech House Boston, London.

KURUKSHETRA UNIVERSITY, KURUKSHETRA										
ECE-434N			STRATEG	IC ELECTRONI	CS					
Lecture	Tutorial	Practical	Theory	Sessionals	Total	Time				
					100	2.11				
3	0	0	75	25	100	3 Hr.				
Course Outcomes										
CO1	Students wi	ll be aware o	f state-of the	? art in flexible elec	tronics					
CO2	Students be	e able to unde	erstand the fi	undamentals of Sm	art Structure and	Materials				
СОЗ	Understand of futuristic	Understanding basic principles of fabrication techniques used for the fabrication of futuristic flexible electronic devices, structure, sensors and transducers.								
CO4	Understand smart mater	l the characte rials, struct	erization tecl ures, etc.	iniques used in fut	uristic electronic d	levices,				

Unit-I

Emerging flexible electronics technology, involving new materials and processing techniques such as amorphous and nanocrystalline silicon, organic and polymeric semiconductors, solution cast films of carbon nanotubes, and graphene. Real device are discussed including high speed transistors, photovoltaics, flexible flat-panel displays, etc.

Unit – II

Strain Measuring Techniques using Electrical strain gauges, Types – Resistance – Capacitance Inductance – Wheatstone bridges – Pressure transducers – Load cells – Temperature Compensation – Strain Rosettes. Sensing Technology – Types of Sensors – Physical Measurement using Piezo Electric Strain measurement – Inductively Read Transducers – The LVOT – Fiber optic Techniques. Chemical and Bio-Chemical sensing in structural Assessment – Absorptive chemical sensors – Spectroscopes – Fibre Optic Chemical Sensing Systems and Distributed measurement.

Unit - III

Clean room practices, Photolithography, Ion implantation, Diffusion, Oxidation, CVD - Physical vapor deposition, epitaxy - etching process.

Bulk Micro manufacturing - surface micro machining – LIGA ,Micro system packaging materials - die level- device level - system level - packaging techniques – die preparation – surface bonding - wire bonding - sealing. Introduction to assembly, Introduction to Micro-system design

Unit - IV

Characterization Techniques: Quantum wells and Thickness measurement techniques: Contact - step height, Optical - reflectance and ellipsometry, AFM, Nanomaterials Characterization techniques: IV-CV Electrochemical Impedance, FTIR, XRD, AFM, SEM, TEM, EDAX and interpretation of results.

Books:

 Flexible Electronics: Materials and Applications, Editors: Wong, William S., Salleo, Alberto (Eds.) 2.Brain Culshaw – Smart Structure and Materials Artech House – Borton. London-1996.
MEMS and Microsystems Design and Manufacture" by Tai-Ran Hsu. Tata McGraw-Hill Publishing Company Ltd

4. Marc F Madou, "Fundamentals of Micro Fabrication", CRC Press, 2nd Edition, 2002.

5. Semiconductor Material and Device Characterization By Dieter K. Schroder, Willey Publications

ECE-436N		COGNITIVE RADIOS									
Lecture	Tutorial	itorial Practical Theory Sessiona		Sessionals	Total	Time					
3		- 75 25 100 3									
Purpose	To understand the concept of Cognitive Radio and Spectrum sharing										
			Course Ou	itcomes							
CO 1	Conceptuali	ze the CR a	nd implemen	tation details							
CO 2	Design CR f	or a specific	c application								
CO 3	Identify the challenges in the maintenance of CR										
CO 4	Analyse the	transmitter	and receiver	architectures							

Unit-I

RF System Design – Introduction- Noise and Channel Capacity- Link Budget- Receiver Requirements- Multicarrier Power Amplifiers- Signal Processing Capacity Tradeoff.

Unit-II

CR Architecture- Cognitive Radio Architecture, Dynamic Access Spectrum, Spectrum Efficiency, Spectrum Efficiency gain in SDR and CR ,Spectrum Usage, SDR as a platform for CR, OFDM as PHY layer ,OFDM Modulator, OFDM Demodulator, OFDM Bandwidth, Benefits of OFDM in CR, Spectrum Sensing in CR, CR Network

Unit-III

Smart Antennas Using Software Radio- Introduction- 3G smart Antenna Requirements Phased Antenna Array Theory- Applying Software Radio Principles to Antenna Systems Smart Antenna Architectures- Optimum Combining/ Adaptive Arrays- DOA Arrays-Beam Forming for CDMA- Downlink Beam Forming.

Unit-IV

Application of SDR -Application of SDR in Advance Communication System-Case Study, Challenges and Issues, Implementation, Parameter Estimation –Environment, Location, other factors, Vertical Handoff, Network Interoperability.

Text Books:

1. Jeffrey.H.Reed ,Software Radio : A Modern Approach to Radio Engineering , Pearson , Reference Books: 1. Markus Dillinger , KambizMadani ,Nancy Alonistioti, Software Defined Radio : Architectures , Systems and Functions ,Wiley

2. Tony .J. Rouphael, RF and DSP for SDR, Elsevier Newness Press ,2008

3. Dr. TajStruman , Evaluation of SDR – Main Document

4. SDR –Handbook , 8th Edition , PENTEK 5. Bruce a. Fette , Cognitive Radio Technology, Newness, Elsevier.

Bachelor of Technology (Biotechnology Engineering)

SCHEME OF STUDIES/EXAMINATIONS

S.	Course No.	Course Title	Те	eachin	g Sch	edule		Allotment	of Marks		Duration
No.			L	Т	Р	Hours/	Theory	Sessional	Practical	Total	of Exam
						Week					(Hrs.)
1	BT-401N	Bioinformatics	3	1	0	4	75	25	0	100	3
2	BT-403N	Pharmaceutical Biotechnology	3	1	0	4	75	25	0	100	3
3		DEC -I*	3	1	0	4	75	25	0	100	3
4		DEC -II*	3	1	0	4	75	25	0	100	3
5	HS-401N	Entrepreneurship	3	0	0	3	75	25	0	100	3
6	BT-405N	Bioinformatics Lab	0	0	4	4	0	40	60	100	3
7	BT-407N	Seminar	0	0	2	2	0	100	0	100	
8	BT-409N	Project-I**	0	0	8	8	0	100	100	200	3
9	BT-411N	Industrial Training (Viva-	0	0	2	2		40	60	100	
		Voce)***									
		Total	15	4	16	35	375	405	220	1000	

Semester – VII

* The students should select two Departmental Elective Courses (DEC) from the following list.

Course No.	DEC-I	Course No.	DEC-II
BT-413N	Biosensor and Bioinstrumentation	BT-421N	Advanced Management Information System and
			Information Technology
BT-415N	Biochips and Microarray Technology	BT-423N	Behavioural Neuroscience
BT-417N	Nano-Biotechnology	BT-425N	Herbal Drug Technology
BT-419N	Stem Cell Technology	BT-427N	Human Genetics and Human Genome

**The project should be initiated by the students in the beginning of VIIth semester and will be evaluated at the end of the semester on the basis of a presentation and report.

***The performance of the student will be evaluated after the presentation delivered and the report submitted by the student related to Industrial training undertaken after VIth semester.

Bachelor of Technology (Biotechnology Engineering)

SCHEME OF STUDIES/EXAMINATIONS

		Semes	ter –	VIII		
le	Т	eachin	g Sch	edule		Al
	I.	Т	Р	Hours/	Theory	Se

S.	Course No.	Course Title	Т	eachin	g Sch	edule		Allotment of	of Marks		Duration
No.			L	Т	Р	Hours/	Theory	Sessional	Practical	Total	of Exam
						Week					(Hrs.)
1	BT-402N	Biocatalysis &	3	1	0	4	75	25	0	100	3
		Biotransformation									
2		DEC -III*	3	1	0	4	75	25	0	100	3
3		DEC -IV*	3	1	0	4	75	25	0	100	3
4	BT-404N	Bioethics, IPR and Biosafety	3	0	0	3	75	25	0	100	3
5	BT-406N	Professional Practice &	0	0	2	2	0	40	60	100	3
		Communication Skills Lab									
6	BT-408N	Advanced Techniques in	0	0	2	2	0	40	60	100	3
		Biotechnology Lab									
7	BT-410N	Project-II	0	0	16	16	0	100	100	200	3
		Total	12	3	20	35	300	280	220	800	
8	BT-412N	General Proficiency**						100	0	100	0

*The student should select two Departmental Elective Courses (DEC) from the following list.

Course No.	DEC-III	Course No.	DEC-IV
BT-414N	Virology	BT-422N	Developmental Biology
BT-416N	Molecular Modeling and Drug Design	BT-424N	Protein Engineering
BT-418N	Cancer Biology	BT-426N	Biomaterial Technology
BT-420N	Plant Physiology and Biotechnology	BT-428N	Food Process Engineering

**BT-412N is a mandatory course and student has to get passing marks in order to qualify for the award of degree but its marks will not be added in the grand total.

BT-401N	BIOINFORMATICS (B.Tech. Biotechnology Semester VII)										
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time					
3	1	-	75 25 100 3 H								
Purpose	To familiarize the students with the basics of Bioinformatics										
Course Outcomes											
CO1	Students will learn basic principles of various types of databases										
CO2	Students will con significance of all	ne to know abo ignment	out various tools	related to seque	ence alignmen	t and statistical					
CO3	This unit will enable the students to learn various software tools for sequence analysis and primer designing										
CO4	Students will be able to learn predictive methods for nucleotides and protein sequence analysis										

UNIT I

1. Databases

a. Sequence Databases: introduction of Databases, primary and secondary databases, nucleotide and protein sequence databases: Genbank, EMBL, DDBJ, Swissprot, pfam, Block, PRI

b. Structure Databases: Introduction to structures. PDB (Protein Data bank) Molecular Modeling database at NCBI. , visualizing structural information, database structure viewers.

c. Sequence and Structure File Formats, Format vs Content., the gene bank Flat file- a dissection.

2. The Entrez system: Integrated information axis, Information retrieval from biological database, retrieving database entries, integrated information retrieval, sequence database beyond NCBI. Medical databases.

UNIT II

3.Sequence Alignment AND Database Searches

Introduction, the evolutionary basis of sequence alignment, Type of Aligmnents, Pair-wise Alignment, Multiple Alignment, The modular nature of proteins,Optimal alignment methods, substitution scores and gap penalties, statistical significance of alignment, database similarity searching. FASTA, BLAST, low-complexity regions, repetitive elements, Tool of multiple sequence alignment: CLUSTAL W/X, progressive alignment method,motifs and patterns.

4. Phylogenetic Analysis:

Elements of phylogenetic models, phylogenetic data analysis: alignment, substitution model building, tree building and tree evaluation, building the data model (alignment), determining the substitution model, tree-building methods, searching for trees, rooting trees, evaluation trees and data, phylogenic software (PHYLIP). phylogenetics online tool.

UNIT III

5.Sequence Analysis Using Software Resources :

Introduction. The Wisconsin package, databases that accompany the Wisconsin package, the Seq Lab environment, analyzing sequences with operations and Wisconsin package programmes, viewing output, monitoring programme progress and troubleshooting problems, annotating sequences and graphically displaying annotations in the Seqlab Editor, saving sequences in the Seq Lab Editor, Example of analysis that can be undertaken in Seqlab, extending Seqlab by including programmes that are not part of the Wiscosin package.

6. Plasmid Mapping And Primer Design

Restriction mapping.DNA strider, Mac Vector and OMIGA.Gene construction kit.Vector NTI, primer design for PCR Sequencing, primer design programs and software.

UNIT IV

7.Predictive Methods using nucleotide sequences :Predictive methods using nucleotide sequences: Introduction, Gene prediction methods, Computational gene prediction in eukaryotes. Gene prediction programs: GRAIL, GeneID, GENSCAN, GENMARK, detecting functional sites in the DNA: Promoters, Intron Splice Sites, Translation Initition Site.

8.Predictive methods using protein sequences: protein identity based on composition, physical properties based on sequence, secondary structure and folding classes, specialized structures or features, tertiary structure.prediction of protein secondary and tertiary structures.Related software.

Text Books-

1. Bioinformatics by Andreas D.Boxevanis. Wiley Interscience, 1998.

2. Bioinformatics: Sequence and genome analysis by David W.Mount, Cold Spring Harbor, 2001.

3. Biocomputing Informatics And The Genome Projects by Smith D.W., Academic Press, 1993.

4. Bioinformatics: A Biologists Guide to Computing and the Internet. by Stuart M. Brown, NKU Medical Center, NY USA, 2000.

Reference Books-

 Molecular Evolution Computer Analysis of Protein And Nucleic Acid Sequences, Methods in Enzymology, Vol. 183, Academic Press, 1990.

- 2. Biological Sequence Analysis by Durbin, Eddy, Krogh, And Mitchison. Allied Publishers Ltd. 1998.
- 3. Computational Methods for Macromolecular Sequence Analysis by R F Doolittle. Academic Press, 1996.

4. Computational Methods in Molecular Biology. S.L. Salzberg, D B Searls, SK Kasif Eds, Elsevier, 1998.

5. Bioinformatics: The Machine Learning Approach by Baldi & Brunak II Edn (2003)

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

BT-403N	PHARMACEUTICAL BIOTECHNOLOGY (B.Tech. Biotechnology Semester VII)									
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time				
3	1	-	75	25	100	3 Hrs.				
Purpose	To familiarize the students with the basics of Pharmaceutical Biotechnology									
Course Outcomes										
CO1	Students will learn basic concepts of drug development and various chemical processes									
	involved in drug development									
CO2	Students will	come to know	about concepts	of drug metabol	ism and meta	bolomics				
CO3	This unit will	enable the stud	dents to learn ab	out drug manuf	acturing proce	esses and quality				
	control proce	sses								
CO4	Students will be able to know the basic concepts of nutraceuticals and recombinant									
	therapeutic proteins									

UNIT-I

1. Introduction:

Development of drugs and pharmaceutical industry, organic therapeutic agents and their uses, economics of drug development.

2. Important processes and their applications:

Chemical conversion processes: alkylation, carboxylation, condensation and cyclisation; dehydration. esterification (alcoholysis), halogenations, oxidation and sulphonation, Complex chemical conversions, Fermentation.

UNIT-II

3. Drug metabolism and Pharmacokinetics:

Drug metabolism, half-life of drugs, physico-chemical principles, radioactive labeled compounds, pharmacokinetics and action of drugs on human bodies.

4. Metabolomics:

Metabolomics, pharmacogenesis, single nucleotide polymorphism, inborn errors of metabolism, drug targets.

UNIT-III

5. Manufacturing principles:

GMP, GLP and clean room concept, compressed tables, wet granulation, dry granulation or slugging, direct compression, tablet formulation, coating, pills, capsules, sustained action dosage form, parental preparations, oral liquids, ointments.

6. Pharmaceutical products, analysis and control:

Vitamins, cold remedies, laxatives, analgesics, non steroidal contraceptives, external antiseptics, antacids and others, antibiotics, biological and hormones, Preservation of these products, Analytical methods and tests for various drugs and pharmaceuticals, packaging techniques and quality control.

UNIT-IV

7. Nutraceuticals:

Water and fat soluble vitamins, functions and nutritional importance of vitamins, deficiency diseases of vitamins. Estimation of vitamins from the sample, Evaluating the nutritional status of vitamins, Assay of vitamins.

8. **Recombinant proteins**: Therapeutic proteins regulatory aspects, analytical enzymes, brief account of applications of recombinant proteins, delivery and targeting of therapeutic proteins, first generation and second generation therapeutic proteins, Future prospects of recombinant proteins.

Reference Books

1. Enzymes Technology for Pharmaceutical & Bio-technological Applications by Herbert A. Kirst, Wu-Kuang Yeh, Milton J.

2. Essential Cell Biology, 3RD Edition, Brice Alberts, Dennis Bray, Julian Lewis, Martin Raff, Keith Roberts, James D. Watson, garland Publishing, Inc., 1997.

3. Basic Biotechnology by Colin Ratledge and B. Kristiansen, Cambridge.

4. Physiological Chemistry by Harper, 22nd edition, 2003.

5. Basic Biotechnology by S.Ignacimuthu, Tata McGraw-Hill Publishing Company Ltd., 2003.

6. Essentials of Molecular Biology by George M.malacinski, Jones and Bartlett Publishers, 2002.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

HS-401N	ENTREPRENURESHIP (B.Tech. Biotechnology. Semester VII)								
Lecture	Tutorial	Tutorial Practical Theory Sessional Total Time							
3	-	-	75	25	100	3 Hrs.			
Purpose	To familiarize	the students v	vith the basics o	f Entreprenuresh	nip				
Course Outcomes									
CO1	Students will be able understand who the entrepreneurs are and what competences needed								
CO2	Students will be able to understand insights into the management, opportunity search, identification of a product, market flexibility studies, project finalization etc. required for small business enterprise.								
CO3	Students will be able to write a report and do oral presentation on the topics such as product identification, business ideas, export marketing etc.								
CO4	Students will be able to know the different financial and other assistance available for								
	establishing small industrial units.								

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Entrepreneurship : Concept and Definitions; Entrepreneurship and Economic Development; Classification and Types of Entrepreneurs; Entrepreneurial Competencies; Factor Affecting Entrepreneurial Growth – Economic, Non-Economic Factors; EDP Programmes; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs; Manager Vs. Entrepreneur, Women Entrepreneurs; Social entrepreneurship; Intrapreneurship, Entrepreneurial challenges.

Unit-II

Opportunity / **Identification and Product Selection:** Entrepreneurial Opportunity Search &Identification; Criteria to Select a Product; Conducting Feasibility Studies; Project ; Sources of business ideas, launching a new product; export marketing, Methods of Project Appraisal, Project Report Preparation; Specimen of Project Report; Project Planning and Scheduling using Networking Techniques of PERT / CPM.

Unit -III

Small Enterprises and Enterprise Launching Formalities : Definition of Small Scale; Rationale; Objective; Scope; SSI; Registration; NOC from Pollution Board; Machinery and Equipment Selection, Role of SSI in Economic Development of India; major problem faced by SSI,MSMEs – Definition and Significance in Indian Economy; MSME Schemes, Challenges and Difficulties in availing MSME Schemes,start ups/incubators(Basic Introduction and concept)

Unit -IV

Role of Support Institutions and Management of Small Business: Role of financial and other supporting institutions-NABARD, Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISBUD; State Financial Corporation SIC; Venture Capital : Concept, venture capital financing schemes offered by various financial institutions in India, Legal issues – Forming business entity, considerations and criteria, requirements for formation of a Private/Public Limited Company,

Note:

• Exercises / activities should be conducted on 'generating business ideas' and identifying problems and opportunities.

• Interactive sessions with Entrepreneurs, authorities of financial institutions, Government officials should be organized

Suggested Readings:

- 1. Poornima M Charantimath (2013), "Entrepreneurship development small business enterprises", Pearson.
- 2. Roy Rajiv, 2011, "Entrepreneurship", Oxford University Press.
- 3. Drucker.F, Peter, 2006"Innovation and Entrepreneurship", Harper business.
- 4. Robert D. Hisrich, Mathew J. Manimala, Michael P Peters and Dean A. Shepherd, 2012, 8th Edition "Entrepreneurship", Tata Mc-graw Hill Publishing Co.ltd new Delhi.
- 5. S.S.Khanka (1999), Enterpreneurship Development- S.Chand & Co., Delhi.
- 6. Vasant Desai (2003) Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi.
- 7. Cynthia, Kaulgud, Aruna (2003), Entrepreneurship Management -, Vikas Publishing House, Delhi.
- 8. L. Greene(2004), Entrepreneurship Ideas in Action-, Thomson Asia Pvt. Ltd., Singapore.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

BT-405N	BIOINFORMATICS LAB (B.Tech. Biotechnology Semester VII)								
Lecture	TutorialPracticalPractical/Viva-voceSessionalTotalTir								
-	-	3	60	40	100	3 Hrs.			
Purpose	To familiarize the students with applied aspects of Bioinformatics								
			Course Outcomes						
CO1	To familiarize with computer basics and searching of biological databases								
CO2	Students will come to know about data mining techniques								
CO3	To learn the concepts of phylogenetic analysis using bioinformatics software								
CO4	Students will	be able to kno	w the basic concepts of pro	otein structure	prediction				

List of Experiments:

- 1. Computer basics
- 2. Searching biological database for relevant information
- 3. Data mining techniques in Bioinformatics.
- 4. Searching, retrieval and similarity analysis of biological database.
- 5. Sequence retrieval from nucleic acid and protein database.
- 6 Restriction mapping
- 7. Sequence (FASTA & BLAST) searches.
- 8. Pair wise comparison of sequences.
- 9. Evolutionary studies/ Phylogenic analysis.
- 10. Identification of genes in genomes.
- 11. Protein databank retrieval and visualization.
- 12. Superposition of structures.
- 13. Secondary structure prediction of proteins.
- 14. Pattern searching in nucleic acids.
- 15. Validation of 3D structures.

Text Books-

- 1. Bioinformatics- A Practical Guide to the Analysis of Genes and Proteins by Andreas D. Baxevanis and
- B.F.Francis Ouellette, 2nd Edition, A John Wiley and Sons, Inc. Publications, 1998.
- 2. Bioinformatics: Sequence and Genome Analysis by David W. Mount, Cold Spring Harbor, 2001.
- 3. Biocomputing Informatics and the Genome Projects by Smith D.W., Academic Press, 1993.

4. Bioinformatics: A Biological Guide to Computing and the Internet, by Stuart M. Brown, NYU Medical Center, NY USA.2000.

BT-413N	DEC-I * BIOSENSOR AND BIOINSTRUMENTATION (B.Tech. Biotechnology Semester VII)							
Lecture	TutorialPracticalTheorySessionalTotalTime							
3	1	-	75	25	100	3 Hrs.		
Purpose	To familiarize the students with basic and applied aspects of Bioinstrumentation							
	Course Outcomes							
CO1	To familiarize with basic concepts of general properties of transducers and other analytical							
	instruments							
CO2	Students will come to know about bioassay design and implementation and basic concepts of							
	automation and robotics							
CO3	This unit will enable the students to learn about data retrieval, handling and integration of							
	databases and ba	asics of human	cardiac and vasc	ular system				
CO4	Students will be a	able to know th	ne basic concepts	s and applicatior	ns of various ty	ypes of biosensors		

UNIT – I

1. Introduction: Electrical quantities and units, functional elements of an instrumentation system, static and dynamic characteristics, principle of analog and digital meters, CRO, energy meters, time and frequency meters, multimeters.

2. Transducers: Classification, resistive strain gauges, RTD, LVDT, Piezoelectric transducers, Electromagnetic transducers, Optical transducers, Transducers for biomedical science and their applications.

3. Analytical Instruments: pH meters, radiometric devices, fluorescence spectrophotometers, chromatology (chromatographic techniques- GC and HPLC), electrophoresis, lab on a chip – related instrumentation, Validation, commissioning and maintenance of the above equipments.

$\mathbf{UNIT}-\mathbf{II}$

4. **Assay Technologies and Detection methods:** Introduction, bioassay design and implementation, radiometric assay, scintillation proximity assay, fluorescence methodology to cover all types of fluorescence measurements and instrumentation, Reporter gene assay applications. Bio-analytical applications.

5. Automation and Robotics: Introduction: management and services issues of a centralized robotics HTS (high throughput screening) core, flexible use of people and machines, Bar-code technology and a centralized database, factors for the successful integration of assays, equipment, robotics and software. Perspectives on scheduling.

UNIT – III

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6. Data retrival, handling and integration: Database systems, systems integration, data management and tracking

7.**Cardiac and Vascular system:** Overview of cardiovascular system, types of blood pressure sensors, Lumped parameters modeling of a catheter- sensor/system, heart sounds, cardiac catheterization, indirect measurement of blood pressure, measuring blood flow rate, measuring blood volume, pacemakers, defibrillators, cardiac-assist devices and heart valves- related instrumentation of equipments and involved sensors.

8. Respiratory system: Modeling the respiratory system, measuring gas flow rate and lung volume, tests of respiratory mechanics, measuring gas concentration, tests of gas transport, ventilators, anesthesia machines-related instrumentation of equipments and involved sensors.

UNIT-IV

9. **Biosensors:** Introduction to biosensors: concepts and applications, biosensors for personal diabetes management, micro fabricated sensors and the commercial development of biosensors, electrochemical sensors, chemical fibrosensors, Ion-selective FETs, noninvasive blood-gas monitoring, blood-glucose sensors. Noninvasive biosensors in clinical analysis, Applications of biosensors based instruments to the bioprocess industry. Applications of biosensors to the environmental samples, Introduction to biochips and their application to genomics, BIA core- an optical biosensors

Text Books:

1. Introduction to Bio-analytical Sensors by Alice J Cunningham New York, John Wiley, 1998.

2. Applied Biosensors by Doland L.Wise, 1989

3. Advances in Laboratory Automation – Robotics, Eds. J.R.Strimataitis and J.N. Little, Zymark Corporation, Hopkinton, MA 1991.

Reference Books-

1. Instrument methods of analysis by H W Willard, L L Merrit, J A Dean and F A Sttle. VI edition, East-West publishers. 1992.

2. Biosensors and their applications by C Yang Victor & TNgo That, Plenum Press NY, 2000.

3. Biosensors- An Introduction by R.Eggins Brain.

4. Automation technologies for genome characterization, edited by Tony J Beugelsdijk, John Wiley & Sons, Inc.2002.

5. Transducers and instrumentation by D V S Murthy, Prentice Hall, 1995.

- 6. Commercial sensors by Graham Ramasay, John Wiley & Son, INC, 1998.
- 7. Biosensors by Jon Cooper and Tony Cass, Oxford university Press, 2004.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-I)

BT-415N	DEC-I * BIOCHIPS AND MICROARRAY TECHNOLOGY (B.Tech. Biotechnology Semester VII)								
Lecture	Tutorial	torial Practical Theory Sessional Total Time							
3	1	-	75	25	100	3 Hrs.			
Purpose	To familiarize the students with basic knowledge of biochips and microarrays								
Course Outcomes									
CO1	To familiarize with basic concepts of biochips and microarray technology								
CO2	Students will come to know about RNA and Protein Chips and electrical detection methods								
	for microarrays								
CO3	This unit will enable the students to learn about applications of biochip technology in								
	various fields								
CO4	Students will be able to know the commercial aspects of biochip technology and DNA								
	computing								

UNIT – I

1. Introduction: Basics of biochips and microarray technology, historical development of biochip technology

2. Biochip and Microarray construction: DNA microarrays, oligonuleotide, cDNA and genomics microarrays, microchip production technologies, megaclone technology for fluid microarray labels, microarray scanners./headers, microarray robotics. Microfluidics systems, chips and mass spectrometry.

UNIT-II

3. Biochip and Microarray construction (Continued): Biochips, microarrays, Chromosome on a chip, tissue chip, RNA chip, Protein chip technology, glycochips, biochips assays, combination of microarray and biosensor technology, biochip versus gel-based methods, process flow for production and analysis of a chip, standardization of microarray analysis, bioinformatics and microarrays, integrated biochip system, evaluation of conventional microarray technology. Electrical detection methods for microarrays, SERS (Surface-Enhanced Raman spectroscopy)-based microarrays.

UNIT-III

4. Applications of Biochip Technology: Molecular diagnostics and pharmacogenomics, Application of microarray technology in drug discovery and development, Gene expression studies, use of DNA chip technology for drug safety, use of microchips for drug delivery, biochips as neural prostheses, use of biochips in health care, use of microarrays in population genetics and epidemiology, use of microarray in forensics. DNA chip technology for water quality management, Bioagent chip, Application of microarray in the agro-industry, use of microarray in genetic disease monitoring, point of care (POC) applications, Limitations of biochip technology.

UNIT-IV

5. **Commercial aspects of Biochip technology:**Markets for biochip technologies, commercial support for the development of biochips, government support for biochip development, business strategies and patent issues

6. **DNA Computing:**Introduction, junctions, other shapes, biochips and large-scale structures. Discussion of Robinson and Kallenbach's methods for designing DNA shapes, DNA cube. Computing with DNA, Electrical analogies for biological circuits.Challenges and future trends.

Reference Books-

- 1. Biochips and Microarrays-technology & Commercial Potential, Published byUrck Publishing, 2000.
- 2. DNA Arrays: Technology and Experimetal strategies, Grigorenko(ed), CRC Press, 2002.
- 3. Microarray Analysis Mark Schena; J. Wiley & Sons (ed., New York), 2002.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-I)

BT-417N	DEC-I * NANOBIOTECHNOLOGY (B.Tech. Biotechnology Semester VII)									
Lecture	Tutorial	utorialPracticalTheorySessionalTotalTime								
3	1	-	75	25	100	3 Hrs.				
Purpose	To familiarize the students with basic knowledge of Nanobiotechnology									
Course Outcomes										
CO1	To familiarize with basic concepts of Nanotechnology									
CO2	Students will come to know about the basic concepts of BioMEMS									
CO3	This unit will enable the students to learn about applications of Nanotechnlogy in Life									
	Sciences									
CO4	Students will be able to know the basic concepts of nanotherapeutics									

UNIT-I

1. Introduction to Nanotechnology

Definition of nanobiotechnology, A brief history of the Super small, Bottom-up versus top-down, discussion on nanofabrication, nanolithography, nanobiotechnology, nanotubes and buckyballs, Structure-property relations in materials, materials characterization techniques, microelectronic fabrication, scanning tunneling and atomic force microscopy, Biomolecule-suface interactions, DNA microarrays, Quantum dots and hybrid biological/ inorganic devices.

UNIT-II

2. BioMEMS

Introduction and overview, biosignal transduction mechanisms. Electromagnetic transducers: basic sensing mechanisms, basic actuating mechanisms. Case studies in biomagnetic sensors. Mechanical transducers: basic sensing mechanisms, basic actuating mechanisms. Case studies in microfluidic devices. Chemical transducers: basic sensing mechanism, basic actuating mechanism, ultimate limits of fabrication and measurement.Recent developments in BioMEMS.

UNIT-III

3. Applications of Nanotechnology in the Life Sciences

Nanobiotechnology overview, Buckyballs and buckytubes, fluidics, manufacturing, diagnostics and sensors, drug delivery, valuing nanobiotechnology, drug delivery revenues, biosensors revenues, nanobiosensors, health risks and challenges, Fullerenes, Carriers, Dendrimers, nanoparticles, membrane/matrices, nanoshells, quantum dot nanocrystals, nanotubes, targeting and functionlization, leading segments of biotechnology.

UNIT-IV

4. Applications of nanotechnology in the life sciences (continued):

Leading applications of nanobiotechnology: drug delivery. bioavailability, sustained and targeted release, nanorobots. Benefits of nano drug delivery. Drug delivery using nanocrystals, drug discovery using Resonance Light Scattering (RLS) technology, rapid ex-vivo diagnostics, benefits of nano-imaging agents, nanoscale biosensors, nanosensors as diagnostics, nanotherapeutics

Reference Books-

- 1. Unbounding the future by K Eric Drexler, C.Pelerson, G.Pergamit Willaim Marrow and Company, 1993
- 2. Biological molecules in Nanotechnology By Stephen Lee and Lynn M Savage, 2004
- 3. Nanotechnology By mark Ratner and Dan Ratner, Prentice Hall, 2005

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-I)

BT-419N	DEC-I * STEM CELL TECHNOLOGY (B.Tech. Biotechnology Semester VII)						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time	
3	1	-	75	25	100	3 Hrs.	
Purpose	To familiarize the students with basic and applied aspects of Stem Cell Technology						
Course Outcomes							
CO1	To familiarize with basic concepts of Cell Developmental Biology						
CO2	Students will come to know about the basic concepts of renewal of epidermal cells by stem cells and genesis modulation and regeneration of skeletal muscles						
CO3	This unit will enable the students to learn about fibroblasts and their transformation						
CO4	Students will be able to know the basic concepts of hemopoeitic stem cells and the related						
	disorders						

UNIT – I

Cell Diversification in Early Animal Embryo: Initial difference among various blastomers arising from spatial segregation, new types of cell from inductive interactions, complex pattern of cell responses from a simple morphogenic gradient, different reactions of the cells to a signal based upon the time of its reception, the role of intracellular clock, an unusual style of early development in mammals from protected uterine environment, same developmental potential of all the cells of every mammalian embryo, effect of environment on the pace and the pathways of mammalian embryonic stem cell development.

UNIT –II

Renewal by Stem Cells: Epidermis: unlimited divisions of stem cells and production of differentiated progeny, epidermal stem cells in the basal layer: synthesis of a sequence of different Keratins from epidermal cells during maturity, epidermal stem cells as a subset of basal cells, regulation of basal cells proliferation according to thickness of epidermis, seclusion of secretory cells in the epidermis of the glands having their own population kinetics.

Genesis Modulation and Regeneration of Skeletal Muscle: Formation of new skeletal muscle cells from fusion of myoblasts, change in the properties of muscle cells with change in their protein isoforms, persistence of myoblasts as quiescent stem cells in the adult.

UNIT-III

Fibroblasts and their Transformations: The connective tissue cell family: change of character by fibroblast in response to the signals in the extra cellular matrix, the influence of extra cellular matrix on the connective tissue cell differentiation by affecting cell shape and attachment, regulation of the production of cells by sequential action of signaling molecules, continuous remodeling of bone by cells within it, secretion of bone matrix by osteoclasts and erosion of bone matrix by osteoclasts. Erosion of cartilage by osteoclasts during

development leading to bone formation, stabilization of the body structure by connective tissues framework and selective cohesion of cells

UNIT-IV

The Concept of Hemopoietic Stem Cells:Hemopoietic stem cell disorders: classification and manifestation of hemopoietic stem cell disorders, plastic hemopoietic stem cell disorders, myelo dysplastic, myelo proliplastic, clinical applications of colony stems, complications of gene therapy, replacement therapy and marrow transplantations, Immunological principles, Preservation and clinical use of blood and blood components, hemapheresis procedures and oxiplantations.

Text Book-

1. Stem Cell Biology by Marshak, Cold Spring Harbar Symposium Publication, 2001.

Reference Books-

1. Developemental Biology by R.M.Twyman, Viva Books Pvt. Ltd., 2001

2. Hematology, William J. Willams, Ernest Beutler, Allan JU.Erslev, Marshall A. Lichman.

3. Essential Cell Biology, Bruce Alberts, Dennis Bray, Julian Lewis, Martin Raff, Kieth Roberts and Jamnes D. Watson, Garland Science, Taylor and Francis Group, 2nd Edition, 2003.

4. Molecular Biology of the Cell, Bruce Alberts, Dennis Bray, Alexander Johnson, Julian Lewis, Martin Raff, Kieth Roberts and Peter Walter, Garland Science, Taylor and Francis Group, 4th Edition, 2003.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-I)

BT-421N	DEC-II * ADVANCED MANAGEMENT INFORMATION SYSTEM AND INFORMATION

	TECHNOLOGY (B.Tech. Biotechnology Semester VII)							
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time		
3	1	-	75	25	100	3 Hrs.		
Purpose	To familiariz	To familiarize the students with various aspects of Management Information Systems						
Course Outcomes								
CO1	To familiarize with basic concepts of Office Functions and Record Management							
CO2	Students wil and tools for	Students will come to know about the basic concepts of Management Information Systems and tools for implementation						
CO3	This unit will	This unit will enable the students to learn about internet and intranet fundamentals						
CO4	Students wil	Students will be able to know the basic concepts of online services and broadband						
	connection							

UNIT – I

1. Elements of O & M:

Office functions, office organization, office equipments, records management and classification of filing systems: manual-filing equipment. Forms design and control. Filing through electronic equipment– microfilms, MS punched cards, magnetic or punched tape formats, Development of office procedures, application of work study principles to office procedure and methods, weeding out of records.

3.Information planning:

Format of presentation, selection of scales and techniques of charting, time series analysis

UNIT-II

4. Management Information Systems :

The meaning and the role of MIS for managing, objectives of an information system, difference between data/statistics and information, data life cycle. Characterization of information, amount of information requirements of a good information system, Volition of an information system, basic industrial information systems, MIS techniques for making programmed decisions. Manual information systems: storing, retrieval and wedding out of data forms of original documents. Techniques of information presenting-System approach to organization information flow, inductive approach. Computer based information system: electronic data processing- definition of

objectives, adoption of record forms, preparation of data, microfilms, punched card and magnetic tapes for storing information. Flow charting, coding of data, development of database, detailing of information, establishing information output formats for management variety of useful reports, analysis and interpretation of information.

UNIT-III

3.Introduction to Internet

Internet protocol model an overview, internet addresses, internet protocol, basics for internet and intranets, transport layer, upper layer protocols, internet access and applications. Future of internet and related applications, Router technology, network fundamentals (OSI layers), internet routing and router market.

4. Internet and Intranet technology:

Overview of HTML (hyper text markup language) and HTTP (hyper text transfer protocol); web access, security, www (world wide web) proxies, HTML technologies and applications with examples related to biotechnology, Browsing systems for the web, the internet and intranet, browsing features and capabilities, netscape, building a web site, getting connected, elements of web services, security issues, management issues, Novell's www service, applications of the web, search engines on topics of biotechnological relevance, legal and ethical issues.

UNIT-IV

6. Services and applications:

Line services: technology, applications, vendors overview. Definition of On-line services, history of On line services and of its market, On line services industry make up, technology trends, broad band communication, need for broad band, network architecture supporting broad band and their carrier services for intranets and internets, WEB TV, virtual reality technology. Opportunities for corporate education, training, marketing and business applications (all oriented towards developments in biotechnology).

Reference Books-

- 1. Internet: the complete reference by Margaret Levine Young, Tata McGraw Hill. 1999.
- 2. Information system for modern managemnet by Mudrick, G.R., Prentice Hall, 2002
- 3. The Information System for management planning and control by Prentice T.R.
- 4. The corporate Internet by Berard RyanL: John Wiley, 1997.
- 5. Intranet business strategies, by Mellanie Hills, John Wiley, 1997.

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6. Applications of O & M by G.E. Milwird.

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- 7. System analysis for effective administration by Barish.
- 8. Development of Information System By Donald (Ronald Press)

9. Using Information Technology by Brian K.Willams and Stacey C.Sawyer. Tata McGraw-Hill Publishing Company Ltd. 5th Edition.

10. Information Technology by Dev Prakash, Cyber Tech Publications, 2002.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-II)

BT-423N	DEC-II * BEHAVIOURAL NEUROSCIENCE (B.Tech. Biotechnology Semester VII)					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
3	1	-	75	25	100	3 Hrs.
Purpose	To familiarize the students with basic and applied aspects of behavioural neuroscience					
Course Outcomes						
CO1	To familiarize with basic knowledge of tools and techniques used in the study of behavioural					
	neuroscience					
CO2	Students will	come to know	about the basic	concepts of syna	aptic transmiss	sion
CO3	This unit will	enable the stud	dents to learn ab	out Central Ner	vous System o	rganization and
	development					
CO4	Students will	be able to kno	w the basic conc	epts of neurolog	jical disorders	and mechanisms
	of informatio	n storage				

UNIT-I

1. Introduction:

Historical Highlights; Tools & Methods in Behavioural Neuroscience.Cellular Elements (Neurons & Glia); Cellular organization of CNS. Excitable Cell Neurobiology: Membranes, Potentials, Channels, Pumps. Action Potentials; Currents; Voltage-Gated Ion Channels; Action Potential Conduction

UNIT-II

2. SynapticTransmission

Basic Properties & Principles--Synaptic Potentials, Transmitters, Synthesis & Release; Receptors.Cholinergic & Monoaminergic Systems (Localization, Neurochemistry, Receptors, Neuropharmacology).Glutatmate & GABA Systems; Peptides; Others (Localization, Neurochemistry, Receptors, Neuropharmacology).Ligand-Gated & G-Protein-Coupled Receptors.Receptors and Intracellular Signaling Mechanisms of Neuronal Communication and Neuroplasticity. Signaling Mechanisms of Neurons; Chemical Senses as a Model System

UNIT III

3.CNS Organization & Development

Overview of CNS Organization & Development: Sensory, Motor Limbic, Cortical, Autonomic & Neuroendocrine System; *Comp Tutorial*.Sensory Transduction.Vision (cellular function and organization; cortical representation; visual experience and critical periods of development). Audition; Somesthesis and Pain. Motor Systems: Structural & Functional Organization; Motor Disorders. Sleep and Biological Rhythms.

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Regulatory Systems and Motivated Behavior (feeding; drinking) Sex and Brain: Hormones, Development, Dimorphic Brain & Behavior. Brain Mechanisms of Emotional Experience, Expression & Learning; anxiety, fear & aggression. Brain Mechanisms of Emotions: Hedonic Experience.

UNIT IV

4 Neurological Disorders & Mechanisms of Information Storage

Mental Illness: Neurobiological theories and treatment. Memory and Memory Disorders: Brain Systems of Declarative and Working Memory. Neural Systems and Molecular Mechanisms of Learning & Memory.Synaptic Plasticity & Mechanisms of Information Storage.Drugs of Abuse and Addiction.

Text Books-

1. Neuroscience, Exploring the Brain, second edition.2001. Mark F. Bear, Barry W. Connors, and Michael A. Paradiso Lippincott Williams & Wilkins

2. Principles of neural science.2000.Kandel.Schwartz.Jessel. McGraw hill/Appleton & Lange

3. From Neuron to Brain, 4ed by John G. Nicholls, John G. Nicholls, Bruce G. Wallace, Paul A. Fuchs,

A. Robert Martin, (2001), Sinauer

- 4. Fundamental Neuroscienceby Zigmond et al.; Academic Press, 1998 or 2003.
- 5. Biological Psychologyby Rosenzweig, Leiman and Breedlove; Sinauer Assoc., 1999.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-II)

BT-425N	DEC-II * HERBAL DRUG TECHNOLOGY (B.Tech. Biotechnology Semester VII)							
Lecture	Tutorial	TutorialPracticalTheorySessionalTotalTime						
3	1	-	75	25	100	3 Hrs.		
Purpose	To familiarize the students with basic and applied aspects of Herbal Drug Technology							
Course Outcomes								
CO1	To familiarize with basic knowledge of use of plants in the management of health and							
	disease							
CO2	Students will	come to know	about the basic	concepts of vari	ous systems o	f medicine		
CO3	This unit will	enable the stud	dents to learn ab	out various trad	itional therap	ies prevalent in		
	the Country							
CO4	Students will	be able to know	w the basic conc	epts of neurolog	jical disorders	and mechanisms		
	of informatio	n storage						

UNIT-I

1.Introduction

Evolution of conscious use of plants in the management of health and disease –The Alma – Ata Declaration – The World Health Organization (WHO) – The need for the study of herbals and herbal medicine : Rescue and Preservation of traditional medicinal knowledge and herbals, Understanding the potential and option values of hitherto unknown/ yet to be evaluated herbals, Understanding mode of action, synthesis and designing of herbal drugs - Pharmacodynamics - Improvement of drugs.

UNIT-II

2. Systems of Medicine – Evolution of systems of medicine – Allopathy –Alternative and complementary medicinal stems – Ayurveda : dimensions, encyclopaedic source texts, eight chikitsas, philosophical and theoretical bases, The Ayurvedic Pharmacopoeia and Materia Medica, Principles and strategies of ayurvedic treatment, types of therapies and treatment methods, current research trends. Concept of Homeopathy.

UNIT-III

3. Traditional Therapies

Naturopathy, Aromotherapy, Bach's flower remedies, Tribal medicine, Faith healing, Religious beliefs, Ethnotherapeutics and Ethnopharmacology – Concept of Holistic medicine – Common herbals and herbal medicines of India.

UNIT-IV

4. Economic Aspects of Herbal Drugs

Economic value of herbals and herbal drugs, wealth of Indian and World herbals, standardization and preservation of herbal drugs.Drug adultreration, identification and substitutions, Identification, cultivation and micropropagation of herbals, biotechnological exploitation, Databases on herbals and herbal drugs.

Reference Books-

1. A lexicon of medicinal plants in India. D.N.Guhabakshi, P.Sensarma and D.C.Pal, 1999.Naya prokash - publications.

2. Glossary of Indian medicinal plants. R.N.Chopra, S.L.Nayar and I.C.Chopra, 1956. C.S.I.R, New Delhi.

3. Ethnobotany The Renaissance of Traditional Herbal Medicine. Rajiv K.Sinha, 1996.INA SHREE publishers.

4. The indigenous drugs of India. Kanny, Lall, Dey and Raj Bahadur, 1984.International Book Distributors.

5. Herbal plants and Drugs Agnes Arber, 1999. Mangal Deep Publications.

- 6. New Natural products and Plant drugs with Pharmacological, Biological (or) Therapeutical activity.
- H.Wagner and P.Wolff, 1979. Springer, New Delhi.

7. Ayurvedic drugs and their plant source. V.V.Sivarajan and Balachandran Indra, 1994. Oxford IBH publishing Co.

8. Ayurveda and Aromatherapy. Miller, Light and Miller, Bryan, 1988. Banarsidass, Delhi.

9. Principles of Ayurveda. Anne Green, 2000. Thorsons, London.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-II)

BT-427N	DEC-II * HUMAN GENETICS AND HUMAN GENOME (B.Tech. Biotechnology Semester VII)							
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time		
3	1	-	75	25	100	3 Hrs.		
Purpose	To familiarize the students with Concepts of Human Genetics and Human Genome							
Course Outcomes								
CO1	To familiarize	with basic kno	wledge of organ	nization of the hu	man genome			
CO2	Students will	come to know	about the basic	knowledge of me	ethods for gen	etic studies		
CO3	This unit will enable the students to learn about methods for human gene mapping							
CO4	Students will be able to know the genetic disorders and applications of gene therapy							

UNIT – I

1. Introduction

History and development of human genetics; organization of the human genome.Genes and chromosomestructure, function and inheritance. Repetitive DNA in human genome-Alu and SINE repeats. Functional organization of centromeres and telomeres, telomerases and centrosomes.

$\mathbf{UNIT} - \mathbf{II}$

2. Methods for Genetic Study :

Methods for genetic study in man – pedigree analysis, chromosomal analysis, biochemical analysis.Somatic cell genetics (somatic cell hybrids, radiation hybrids, monochromosome hybrid panels, gene mapping, hybridoma technology, polyclonal and monoclonal antibodies), molecular genetic analysis.Tissue culture techniques, long-term and shorts-term cultures, lymphoblastoid cell lines.

UNIT - III

3. Human Genome Mapping :

Human genome mapping – genetic mapping, physical mapping-restriction fragment length polymorphism, pulse field gel electrophoresis, yeast artificial chromosomes, bacterial artificial chromosomes, P1 derived artificial chromosomes, expressed sequence tags, sequence-tagged sites, microsatellites and single nucleotide polymorphisms.

UNIT - IV

4. Genetic Disorders and Gene Therapy :

Congenital abnormalities; clinical aspects of autosomal and sex chromosomal disorders; inborn errors of metabolism, haemoglobinopathies.Inherited human diseases-single gene diseases, complex traits.Identification and isolation of disease genes – positional cloning, functional cloning, DNA and cDNA microarrays. Yeast two-

hybrid system. Statistical methods for genetic analysis of complex traits.Cancer genetics.Immunogenetics; prenatal diagnosis-chorionic villus sampling, amniocentesis Pre-implantation diagnosis.Genetic counselling.Gene therapy-concept, vectors, gene targeting and tissue-specific expression Ethics and human genetics.Introduction to pharmacogenomics and toxicogenomics.

Reference Books-

1. Human Heredity, Principles and Issues. Michael R. Cummings. Brooks / Cole Publishing 6th Ed. (2003).

2. Human Molecular Genetics Peter Sudbery Pearson (2002).

3. Human Molecular Genetics Tom Strachan and Andrew Read Garland Science Publishing 3rd ed. (2003).

4. Modern Genetic Analysis Anthony J.F. Griffiths, William M. Gelbart, Richard C. Lewontin and Jaffrey H. Miller. W.H. Freeman and Co. 2nd edition (2002)

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-II)

BT-402N	BIOCATALYSIS AND BIOTRANSFORMATION (B.Tech. Biotechnology Semester VIII)						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time	
3	1	-	75	25	100	3 Hrs.	
Purpose	To familiarize the students with Concepts of Biocatalysis and Biotransformation						
Course Outcomes							
CO1	To familiarize with basic knowledge of fermentation and biotransformation reactions						
CO2	Students will con	ne to know abo	out the basic kno	wledge of transf	ormation of n	on-steroidal	
	compounds and antibiotics						
CO3	This unit will enable the students to learn about transformation of pesticides and nitrile groups						
CO4	Students will be a	able to know al	bout biotransfor	mation by lipase	s and alkaloid	transformations	

UNIT-I

1. Introduction

General usage of biocatalyst, fermentation and applied biocatalysis

2. Biotransformation reactions:

Types of bioconversion reactions, Procedure for biotransformation, Use of cells and enzymes for biotransformation, Genetic manipulations of organism for biotransformation, applications of bioconversions.

3. Transformation of steroids or sterols:

Reaction types of microbial transformation from steroids, microbial breakdown of sterols side chain

UNIT-II

1. Transformation of non-steroidal compounds:

L-ascorbic acid, dihydroxy acetone from glycerol, prostaglandins, hydantoinases, carbamylases, catalytic antibodies.

5. Transformation of antibiotics:

Acylases and peptidases, reaction of penicillin and cephalosporin substrates, protection of amino groups.

UNIT-III

6. Transformation of pesticides:

Accumulation of pesticides, pesticides as carbon source, conjugate formation

7. Biotransformation of nitrile group:

Nitrile Hydratase and Nitrilases, biotechnology of Nitrile transformation, Regio and stereo selective biotransformation of Nitriles, commercial processes, search for Novel Nitrile biotransforming activities, redesign of existing enzymes by protein engineering, metabolic engineering by multistep biotransformation, cyanide biotransformation.

UNIT-IV

8. Biotransformation by lipases:

Commercial lipases, properties and application of lipases, lipid or surfactant coated lipases, inter-esterification of fats and oils, enantioselective esterification by lipases, Commercial application (food ingredients and enantiomerically pure chemical and pharmaceutical intermediates)

9. Alkaloid biotransformation:

Propane Alkaloid biosynthesis, microbial metabolism of propane alkaloids, morphine alkaloid biosynthesis, transformation of morphine alkaloid by *Pseudomonas putida* M10, microbial transformation of heroin.

Text Books-

1. A Textbook of Industrial Microbiology-by W. Crueger and A. Crueger, Panima Publishing corporation, 2nd Edition, 2003.

Reference Books-

1. Biotechnology by H. J. Rehm and G. Reed, Vol. 8a. Willey-Veh, Weinhein, 1999.

2. 3. Microbial Biotechnology- by A.N.Glazer and H.Nikaido, W.H.Freman and Company, NY, 1995.

4. Behavior of Enzyme Systems by John M. Reiner, Van Nostrand Reinhold Company, 2nd Edition, 1969.

5. Enzymes- Biochemistry, Biotechnology and Clinical Chemistry by Trevor Palmer, East West Press Pvt. Ltd.2004.

6. Methods in Enzymology by Sidney Pestka, Academic Press, Vol.79, 1981.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

BT-404N	BIOSAFETY, IPR AND BIOETHICS (B.Tech. Biotechnology Semester VIII)							
Lecture	Tutorial	TutorialPracticalTheorySessionalTotalTime						
3	1	-	75	25	100	3 Hrs.		
Purpose	To familiarize the	students with	Concepts of bio	safety, IPR and I	bioethics			
Course Outcomes								
CO1	To familiarize with concept of biosafety and risk assessment issues							
CO2	Students will come to know about the basic knowledge of general principles for the laboratory							
	and environment	al biosafety						
CO3	This unit will ena	ble the studen	ts to learn about	ecological aspec	cts of genetica	ally modified		
	microorganisms a	and their impac	t on biodiversity	1				
CO4	Students will be able to know about Intellectual Property Rights and their implications on							
	commercialization of biotechnology products							

UNIT I

Biosafety and risk assessment issues; Regulatory framework; National biosafety policies and law, The Cartagena protocol on biosafety, WTO and other international agreements related to biosafety, Cross border movement of germplasm; Risk management issues - containment.

UNIT II

General principles for the laboratory and environmental biosafety; Health aspects; toxicology, allergenicity, antibiotic resistance, etc; Impact on environment: gene flow in natural and artificial ecologies; Sources of gene escape, tolerance of target organisms, creation of superweeds/ superviruses, etc.

UNIT III

Ecological aspects of GMOs and impact on biodiversity; Monitoring strategies and methods for detecting transgenics; Radiation safety and nonradio isotopic procedure; Benefits of transgenics to human health, society and the environment.

UNIT IV

The WTO and other international agreements; Intellectual properties, copyrights, trademarks, trade secrets, patents, geographical indications, etc; Protection of plant variety and farmers right act; Indian patent act and amendments, patent filing; Convention on biological diversity; Implications of intellectual property rights on the commercialization of biotechnology products.

Text Books-

1. Singh BD. 2007. Biotechnology: Expanding Horizon. Kalyani.

Webpages

http://patentoffice.nic.in www.wipo.org Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

BT-406N	PROFESSIONAL PRACTICE & COMMUNICATION SKILLS LAB (B. TECH. BIOTECHNOLOGY SEMESTER VIII)								
Lecture	Tutorial Practical Practical/Viva-voce Sessional Total Time								
-	-	2	60	40	100	3 Hrs.			
Purpose	To familiarize the students with various aspects of Communication Skills and its impact on								
	Professional Behaviour								
			Course Outcomes						
CO1	To familiarize	with importa	nce of effective communica	tion					
CO2	Students will	come to know	/ about non-verbal commur	nication					
CO3	To learn the o	concepts of sei	minars and employment int	erviews					
CO4	Students will	be able to kno	ow the basic concepts of pro	ofessional ethic	s				

List of Lectures:

- 1. Importance of effective communication.
- 2. Production of speech and characteristics of voice.
- 3. Non verbal communication
- 4. Modes of delivery
- 5. Organisation of speech
- 6. Seminars and employment interviews.
- 7. Meetings and Group Discussion
- 8. Professional ethics
- 9. Notice, Agenda and Minutes
- 10. Technical Reports- Type, Structure & Style.
- 11. Technical proposals
- 12. Research Papers
- 13. Handbooks and Manuals
- 14. Editing and Proofreading

Text Books-

- 1. Developing Communication Skills. Krishna Mohan & Meera Banerji. Macmillan India Limited, 1998..
- 2. Speaking English Effectively. Krishna Mohan & N.P.Singh. Macmillan India Limited, Delhi, 1997

3. Business Communication Today. Bovee, Courtland, L. and John, V. Thill. 1995. 4th Ed. New York. McGraw Hill Inc..

4. Communicating for future business professionals. Greene Michael and Jonathen G Ripley. Prentice Hall Inc.

BT-408N	Advanced Techniques in Biotechnology Lab (B. Tech. Biotechnology Semester VIII)								
Lecture	Tutorial	Practical	Practical/Viva-voce	Sessional	Total	Time			
-	- 2 60 40 100 3 Hrs.								
Purpose	To familiarize	To familiarize the students with various advanced techniques in Biotechnology							
Course Outcomes									
CO1	To familiarize	with importar	nce and functioning of biore	eactor					
CO2	Students will	come to know	about optical density meas	surement of m	icrobes				
CO3	To learn the o	concept of mea	surement of dissolved oxy	jen					
CO4	Students will	be able to kno	w the basic concepts of tra	nsducers					

List of Experiments:

- 1. Basic structure and functioning of bioreactor.
- 2. Control of temperature and pH in bioreactor.
- 3. Control of flow rate in bioreactor.
- 4. Optical density measurement of bacterial cultures.
- 5. Measurement of dissolved oxygen in growth media.
- 6. Measurement of CO in a given sample.
- 7. Characteristics of Transducer (Temp, pressure, flow).

Reference Books

- 1. Bioprocess engineering by Shule and Kargil Hall, 1992.
- 2. Bioprocess engineering Principles by Pauline M. Doran, 1995.
- 3. Unit Operations in Chemical Engineering, by McCabe W.L. and Smith J.C., McGraw Hill. 5th edition, 1987
- 4. Biochemical Engineering Fundamentals by Bailey and Ollis, McGraw Hill, 2nd Edition, 1986.
- 5. Bioprocess Engineering- Kinetics, Mass transport, Reactors and gene expression by Wolf R. Vieth,
- A.Wiley, Interscience Publishers, 1992.

6. New Trends and Developemnet in Biochemical Engineering by T.Scheper, springer-Verlag Berlin Heidelberg, 2004.

BT-414N	DEC-III* VIROLOGY (B.Tech. Biotechnology Semester VIII)						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time	
3	1	-	75	25	100	3 Hrs.	
Purpose	To familiarize the students with basic and applied aspects of virology						
Course Outcomes							
CO1	To familiariz	To familiarize with basic concepts of general properties of viruses and their multiplication					
CO2	Students wil	I come to know	about prokaryo	otic viral diversity			
CO3	This unit wil	l enable the stu	dents to learn al	bout eukaryotic v	iral diversity		
CO4	Students wil	l be able to kno	w the basic cond	cepts of experime	ental virology	and applications	
	of virology						

UNIT-I

1. Introduction:

Virus and Virion: General properties of viruses, nature of the virion. Nomenclature and Classification of viruses.Subviral particles- Viroids and Prions.

2. Viral Replication & Multiplication

Growth & Quantification: The virus host, Quantification of virus. Virus replication: General features of viral replication, virus multiplication- attachment and penetration, production of viral nucleic acid and protein.

UNIT-II

3. Viral Diversity: Viruses of Prokaryotes

Overview of bacterial viruses, Virulent Bacteriophage & T4, Temperate Bacteriophages, Bacteriophage lambda. RNA Bacteriophages; Icosohedral single stranded DNA Bacteriophages, Filamentous single stranded DNA Bacteriophages- T7, Mu: Double Stranded transposable DNA Bacteriophage.

UNIT-III

4. Viral diversity- Viruses of Eukaryotes:

Plant viruses.Positive strand RNA Viruses of animals- Poliovirus and Coronavirus.Negative strand RNA Viruses of animals- Rabies & Influenza. Double stranded RNA Viruses- Reoviruses. Replication of double stranded DNA Viruses of animals. Double stranded DNA Viruses-Herpesvirus, Pox Virus and Adenovirus. Viruses with reverse transcriptase- Retroviruses and Hepadnaviruses.

UNIT-IV

5. Experimental Virology

Cultivation of viruses in embryonated eggs.Production of viruses on large scale.Serological methods in virology. Haemagglutination, Compliment fixation, Neutralization test, Plaque method, Assays of viruses (Microscopic, Molecular and Immunological)

6. Applications of Virology

Viruses and transgenic plants and animals.Overview of Tumor Viruses. Viral Vaccines: Conventional Vaccines. New Generation Vaccines including DNA Vaccines with examples. Interferons-Production and mode of action.Antiviral drugs.

Text Books-

1. Microbiology. Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. Tata McGraw Hill, New Delhi.

2. Introduction to Modern Virology. Dimmock, N.J. and Primrose, S.B.4th Ed. Blackwell Science Publications, Oxford.

Reference Books-

1. Brock: Biology of Microorganisms. By Madigan and Martinko. 11th Ed. 2005. Prentice Hall- Pearson Publications. New Jersey, US..

- 2. Medical Virology. Morag, C & Tinbury, M.C. Churchil Livingstone, London.
- 3. Functionals of Plant virology. Mathew, R.E. Academic Press. San Diego, US.
- 4. The genetics of bacteria and their viruses. William Hayes. Blackwell Scientific Publishers, Oxford

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-III)

BT-416N	DEC-III * MOLECULAR MODELING AND DRUG DESIGN (B.Tech. Biotechnology Semester VIII)						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time	
3	1	-	75	25	100	3 Hrs.	
Purpose	The course w	ill focus on the	Molecular Mode	eling in context (of drug design	ing	
Course Outcomes							
CO1	To understand the critical relationship among biomolecular structure, function and force						
	field models.						
CO2	To be able to utilize basic modeling techniques to explore biological phenomena at the molecular level.						
CO3	To emphasize Modelling drug/receptor interactions in detail by molecular mechanics, molecular dynamics simulations and homology modeling.						
CO4	An awareness	s of rational dru	ug design, based	on understandi	ng the three-c	limensional	
	structures and	d physicochem	ical properties o	f drugs and rece	ptors will be c	reated.	

UNIT I

 Introduction to Molecular Modelling: Introduction - Useful Concepts in Molecular Modelling : Coordinate Systems. Potential Energy Surfaces. Molecular Graphics. Surfaces. Computer Hardware and Software. The Molecular Modelling Literature.

UNIT II

 Force Fields: Fields. Bond Stretching. Angle Bending. Introduction to Non-bonded Interactions. Electrostatic Interactions. Van der Waals Interactions. Hydrogen Bonding in Molecular Mechanics. Force Field Models for the Simulation of Liquid Water.

UNIT III

3. Energy Minimisation and Computer Simulation: Minimisation and Related Methods for Exploring the Energy Surface. Non-Derivative method, 1st and 2nd order minimisation methods. Computer Simulation Methods. Simple Thermodynamic Properties and Phase Space. Boundaries. Analyzing the Results of a Simulation and Estimating Errors. GROMACS and CNS.

UNIT IV

 Molecular Dynamics & Monte Carlo Simulation: Molecular Dynamics Simulation Methods. Molecular Dynamics Using Simple Models. Molecular Dynamics with Continuous Potentials. Molecular Dynamics at Constant Temperature and Pressure. Metropolis Method. Monte Carlo Simulation of Molecules. Models Used in Monte Carlo Simulations of Polymers. Molecular Modeling software: BIOSUITE

5. Structure Prediction and Drug Design: Structure Prediction - Introduction to Comparative Modeling. Sequence Alignment. Constructing and Evaluating a Comparative Model. Predicting Protein Structures by 'Threading', Molecular Docking, AUTODOCK and HEX. Structure based De Novo Ligand design, Drug Discovery – Chemoinformatics – QSAR. Reference Books: 1. A.R.Leach, Molecular Modelling Principles and Application, Longman, 2001. 2. J.M.Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997. 3. Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008.

Reference Books:

- 1. A.R.Leach, Molecular Modelling Principles and Application, Longman, 2001.
- 2. J.M.Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.
- 3. Satya Prakash Gupta, QSAR and Molecular Modeling, Springer Anamaya Publishers, 2008.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-III)

BT-418N	DEC-III * CANCER BIOLOGY (B.Tech. Biotechnology Semester VIII)					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
3	1	-	75	25	100	3 Hrs.
Purpose	To give complete overview of cancer as a disease detailed analysis of biological changes of the tumor cells. Analyze the impact of the cell cycle (proliferation), gene mutations and apoptosis in cancer. Discuss the impact of applied/translational research in cancer diagnosis as well as the design of novel targeted therapeutic agents in the treatment of cancer.					
			Course Outcor	nes		
CO1	To familiarize	about carcino	genesis and facto	ors that can caus	se cancer	
CO2	To study cand	er at molecula	r level			
CO3	To study the process of metastasis					
CO4	To study diag	nosis and treat	tment of cancer			

UNIT I

1. Fundamentals of Cancer Biology and Principles of Carcinogenesis

Regulation of Cell cycle, mutations that cause changes in signal molecules, effects on receptor, signal switches, Chemical Carcinogenesis, Metabolism of Carcinogenesis, Natural History of Carcinogenesis, Targets of Chemical Carcinogenesis. Principles of Physical Carcinogenesis, X - Ray radiation - mechanism of radiation Carcinogenesis.

UNIT II

2. Molecular Cell Biology Of Cancer

Oncogenes, Identification of Oncogenes, Retroviruses and Oncogenes, detection of Oncogenes, Growth Factor and Growth Factor receptors that are Oncogenes. Oncogenes / Proto Oncogene activity. Growth factors related to transformations.

Tumor suppressor genes, modulation of cell cycle in cancer. Different forms of cancers, Diet and cancer.

UNIT III

3. Principles of Cancer Metastasis

Clinical significances of invasion, heterogeneity of metastatic phenotype, Metastatic cascade, Basement Membrane disruption, Three-step theory of Invasion, Proteinases and tumour cell, The biology of angiogenesis.

UNIT IV

4. Detection of Cancer and Cancer Therapy

Detection of Cancers, Prediction of aggressiveness of Cancer, Advances in Cancer detection.Different forms of therapy, Chemotherapy, radiation Therapy, and Immuno therapy: advantages and limitations.

Text Books

1. Maly B.W.J. Virology a practical approach, IRL Press, Oxford, 1987.

2. Dunmock N.J and Primrose.S.B., Introduction to modern Virology, Blackwell Scientific Publications. Oxford, 1988.

Reference Book

1. An Introduction to Cellular and Molecular Biology of Cancer, Oxford Medical Publications, 1991.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-III)

BT-420N	DEC-III * PLANT PHYSIOLOGY AND BIOTECHNOLOGY (B.Tech. Biotechnology Semester VIII)					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
3	1	-	75	25	100	3 Hrs.
Purpose	To create aw	areness with	concepts of Pla	nt Physiology a	nd Biotechno	logy of secondary
	metabolite production					
Course Outcomes						
CO1	To familiarize	about basic co	ncepts of Bioen	ergetics		
CO2	To study cond	cepts of plant p	hotosynethetic ı	netabolism		
CO3	To study the	Biochemistry o	f nitrogen metak	olism in plants		
CO4	To study biotechnological techniques for production of secondary metabolites from plants					
	for industrial applications					

UNIT I

1. **Bioenergetics** – Concept of free energy, standard free energy, determination of ΔG for a reaction. Relationship between equilibrium constant and standard free energy change, biological standard state & standard free energy change in coupled reactions. Biological oxidation-reduction reactions, redox potentials, relation between standard reduction potentials and free energy change (derivations and numerical included). High energy phosphate compounds – introduction, phosphate group transfer, free energy of hydrolysis of ATP and sugar phosphates along with reasons for high ΔG . Energy charge.

UNIT II

2. Introduction to Plant Photosynthesis. Photosynthesis: Chloroplast structure and function; Photosynthetic pigments and light harvesting complexes, Photo inhibition of photosynthesis, Photosynthetic carbon reduction (PCR) cycle, C4 syndrome and Crassulacean acid metabolism. Oxidative respiration, Alternate electron pathways and Respiration rate. Photomorphogenesis : Phytochromes, Crypto Chromes, photo-morphogenesis

UNIT III

3. **Nitrogen metabolism** Physical and biological nitrogen fixation, Ammonification, Nitrification, Denitrification, Biochemistry and Genetics of nitrogen fixation and Ammonium assimilation. Plant Hormones: Biosynthesis, Physiological effects and mechanism of action of Auxins, Gibberellic acids, Cytokinins, Abscisic acid, Ethylene, Brassinosteroids, Polyamines and Strigolactones.

UNIT IV

- 4. **Plant Stress physiology**. Plant stress, Plant responses to abiotic and biotic stresses, Water deficit and drought resistance, Flooding, Temperature stress, Salt stress, Ion toxicity, Pollution stress and potential biotic stress.
- 5. Biotechnology for Plant Secondary Metabolite Production. Plant secondary products of industrial importance-alkaloids, No Protein amino acids, Amines, Cyanogenic glucosides, glucosinolates, Terpenoids, Phenolics, ; Biochemistry of major secondary metabolic pathways. In vitro production of secondary metabolites: Plant growth regulators and elicitors; Cell suspension culture development: methodology, kinetics of growth and production formation, optimization of culture; Hairy root cultures and their cultivation; Biotransformation

Reference Books

- Mukherji, S and Gosh A. K. Plant Physiology. 2nd ed. New Central Book Agency, Kolkata, 2005.
- Slater A, NW Scott, MR Fowler. Plant bio technology, 2nd ed. Oxford University Press, 2008.
- Hopkins, W. G and Huner, N. P. A. Introduction to Plant Physiology. 3rd ed. John Wiley & Sons Inc. New York, 2004

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-III)

BT-422N	DEC-IV * DEVELOPMENTAL BIOLOGY (B.Tech. Biotechnology Semester VIII)							
Lecture	Tutorial	utorial Practical Theory Sessional Total Time						
3	1	-	75	25	100	3 Hrs.		
Purpose	To create awareness with concepts of Developmental Biology							
Course Outcomes								
CO1	To familiarize	about basic co	ncepts of anima	l developmental	Biology			
CO2	To study diffe	erent stages of	morphogenesis i	n animals				
CO3	To familiarize with basic concepts of plant developmental biology							
CO4	To study gametophyte development and fertilization in plants							

UNIT-I

- Animal Development Introduction to animal developmental biology. Model organisms. Approaches to animal developmental biology Origins of developmental biology (early theories) Anatomical approaches Experimental approaches Genetic approaches. Germ cells, gametogenesis and fertilization Specification of germ cells Oogenesis and spermatogenesis Structure of gametes Fertilization Prevention of polyspermy Parthenogenesis
- 2. The stages of early animal development Overview of early developmental processes in echinoderms (sea urchin). Overview and comparison of early development in vertebrates (Xenopus, chick and mouse). Cleavage: mechanisms, patterns and consequences Cleavage cycle Plane of cleavage Patterns and type of cleavage Formation of the blastula.

UNIT-II

3. Morphogenesis Cell shape, adhesion and movements Morphogenic processes in gastrulation and neurulation Epithelial to mescynchymal transition Molecular basis for gastrulation and neurulation. Cell specification and determination Progressive determination of cell fate Cell-cell communication Acquisition of commitment Cell differentiation Differential gene expression Maintaining patterns of gene expression Models of cell differentiation Plasticity of gene expression. Neural tube development Neural tube induction Anterior-posterior patterning of the neural tube Dorsal-ventral patterning of the neural tube Neural crest cells

UNIT-III

 Plant Development. Overview of plant development. Model plant species (*Arabidopsis thaliana*) Life cycle: alternation of generations Differences between plant and animal development. Embryogenesis, seed development and germination Stages in embryo development Seed structure Endosperm development Dormancy Germination. Introduction to phytohormones Auxin Cytokinins Gibberellins Ethylene and Abscisic Acid.

5. Meristems Types of meristems Shoot apical meristems Organization of the shoot apical meristem. Structure of the root apical meristem Comparison of root and shoot apical meristems Development of lateral organs Auxillary meristems and shoot branching Positioning of lateral organs on the shoot apical meristem Initiation and development of lateral roots. Initiation of leaf development.

UNIT-IV

6. Gametophyte development and fertilization Alternation of generations – haploid phase Pollen grain structure and development Ovule and embryo sac structure and development Cell fate specification in the embryo sac. Flower development Floral meristems How to make a flower Establishing floral meristem identity and determinacy Determining floral organ identity: The ABC model

Reference Books-

- 1. Gibert SF 2000. Developmental Biology Sinauer Associates USA
- 2. Arias AM, Stewart A. 2002. Molecular Principles of Animal Development. Oxford University Press.
- 3. Pua EC, Davey MR. 2010. Plant Developmental Biology-Biotechnological Perspectives. Springer.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-IV)

BT-424N	DEC-IV * Protein Engineering (B.Tech. Biotechnology Semester VIII)											
Lecture	Tutorial	Practical	Time									
3	1	-	75 25 100 3 Hrs.									
Purpose	To create awareness with concepts of Protein Engineering											
			Course Outco	mes								
CO1	To familiariz	e about basic c	oncepts of prote	in structure dyna	mics							
CO2	To study asp	ects of protein	structure and th	eir functions rela	ted to signal ti	ransduction						
CO3	To familiariz	e with basic co	ncepts of proteir	n designing								
CO4	To study the	e concept of pro	teomics and its	applications								

UNIT I

1. Structure Function Dynamics Correlation. Basic structural concepts – Primary, secondary, tertiary and quaternary structures. Ramachandran plot, super secondary structures – motif and domain. Protein folding and mechanisms.

UNIT II

2. Structure Function Engineering. The correlation of structure and function in – transcription factors, serine proteinases, membrane proteins, signal transduction proteins and recognition in immune system.

UNIT III

3. Prediction and Design of Proteins. Examples of designed proteins (enzymes) with enhanced stability and efficiency, playing a significant role in industries. A case study for – introduction of disulfide bonds (T4 lysozyme), reduction of free sulfhydryl groups, removal of metal requirements in certain proteins, streptokinase, introduction of complementary determining region in antibodies and to increase enzyme activity.

UNIT IV

- Protein Structure Characterization. Proteomes Protein digestion and separation techniques. Role of Mass spectrometry in protein identification - MALDI TOF - Tandem MS and SALSA peptide mass fingerprinting.
- Proteomics Application. Mining proteomes, protein expression profiling, identifying protein protein Interactions and protein complexes, mapping- protein identification, new directions in proteomics.

References

1. Carl Brandon & John Tooze, "Introduction to Protein Structure," "2nd Edition" Garland Publishing, 1999

2. Paul R. Carey, "Protein Engineering and Design," Academic Press, 1996.

3. Daniel C. Liebler, "Introduction to Proteomics - Tools for the New Biology," Humana Press, 2001

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-IV)

BT-426N	DEC-IV * BIOMATERIAL TECHNOLOGY (B.Tech. Biotechnology Semester VIII)													
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time								
3	1	-	75	3 Hrs.										
Purpose	To create awareness with concepts of Biomaterials													
	Course Outcomes													
CO1	To familiariz	e about basic co	oncepts of vario	us types of bioma	iterials									
CO2	To study diff	erent kinds of p	olymers and the	eir biocompatibil	ity									
CO3	To familiariz	e with various n	netallic alloys ar	nd ceramics as bio	omaterials									
CO4	To study bio	compatibility of	biomaterials ar	nd response of hu	ıman body tow	ards such								
	biomaterials	i			biomaterials									

UNIT I

 Biomaterial: Introduction, Types, Properties Synthetic, Metals and non-metallic alloys, Ceramics, Inorganics and glasses. Bio-resorbable and biologically derived materials, Bioderived macromolecules, Standard and assessments of biomaterials, Surface properties of biomaterials and their testing.

UNIT II

2. **Polymers**: Polymerization, Polyethylene, Clinical study of soft polymers, Bioerodible polymers, Blood compatible polymers, Bioactive polymers, Hydrogels; Hard Methacrylats, Drug incorporation polymer gels, Biocompatibility of polymers, blood compatibility improvement, processing techniques for the polymers, assembling medical disposable.

UNIT III

- 3. **Metals and Metallic Alloys**. Stainless steel, Titanium and Titanium alloys, Cobalt based alloy Nitinol, Dental metals, Dental amalgam, Gold, Nickel, and Corrosion of the metals.
- 4. Ceramics and Composite Biomaterials. Ceramics- Introduction to biomedical usagebonding natural tissues, Bio-active glass, High density alumina; Calcium phosphate ceramics. Porous materials, Biological interactions, Dental ceramics. Drug delivery from ceramics, Wet chemical synthesis, Particulate and Fibrous composites, Soft composites, Nano-biomaterials: properties, preparation, characterization and applications.

UNIT IV

- 5. Biocompatibility. Methods for testing and evaluating biocompatibility: In Vitro and In Vivo Testing; Hemocompatibility, Osteocompatibility, Odontocompatibility, Cytotoxicity Testing, Hypersensitivity/ Allergic Responses, Genotoxicity, Tissue reaction to external materials, Blood/biomaterial interaction, Corrosion and wear of biomaterials, Treatment of materials for biocompatibility, Biodegradable materials and their applications, Rheological properties of biological solids- bone, tendons, blood vessels, biological liquids, mucus
- 6. **Response of biomaterials to human body**: Biological effects of the implants on the human body: Inflammatory response, coagulation and haemolysis, adaption, systematic distribution and excretion, allergic foreign body response, chemical and foreign body carcinogenesis.

Reference Books

- 1. Temenoff, I.S. and Mikos, A.G. Biomaterials: The Intersection of Biology and Material Science. Pearson Education, India. 2009 Indian ed.
- 2. Ratledge C and Kristiansen B, Basic Biotechnology, Cambridge University Press, 2nd Edition, 2001.
- 3. J B Park, Biomaterials Science and Engineering, Plenum Press, 1984.
- 4. Sujata V. Bhat, Biomaterials, Narosa Publishing House, 2002.
- 5. C.P.Sharma & M.Szycher, *Blood compatible materials and devices*, Technomic Publishing Co. Ltd., 1991.
- 6. Piskin and A S Hoffmann, *Polymeric Biomaterials* (Eds), Martinus Nijhoff Publishers. (Dordrecht. 1986)
- 7. Eugene D. Goldbera, Biomedical Ploymers.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-IV)

BT-428N	DEC-IV * Food Process Engineering (B.Tech. Biotechnology Semester VIII)												
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time							
3	1	-	75	3 Hrs.									
Purpose	To create a	To create awareness with concepts of Food Process Engineering											
			Course Outco	mes									
CO1	To familiar	ize about scope a	and importance	of food processin	g								
CO2	To study th	e concept of foo	d drying techniq	ues in food indus	stry								
CO3	To familiar	ize with the conc	ept of food conv	version operation	S								
CO4	To study the concept of food preservation												

UNIT-I

- 1. **Introduction** Scope and importance of food processing- Properties of food- Physical, thermal, mechanical, sensory. Raw material preparation- Cleaning, sorting, grading, peeling.
- Processing Methods Heating- Blanching and Pasteurization. Freezing- Dehydration- canningadditives- fermentation- extrusion cooking- hydrostatic pressure cooking- dielectric heatingmicro wave processing and aseptic processing – Infra red radiation processing- Concepts and equipment used.

UNIT-II

 Drying Moisture content- definition, methods of determination- direct and indirect methods. Equilibrium moisture content- Hysterises effect- Psychrometry- properties of air, water- vapour mixer, problems in psychrometry. Drying-mechanisms-constant rate period and falling rate period- methods and equipment used- factors affecting rate of drying.

UNIT-III

4. **Food Conversion Operation** Size reduction- Fibrous foods, dry foods and liquid foods- Theory and equipments- membrane separation filtration- equipment and application.

UNIT-IV

5. **Food Preservation By Cooling** Refrigeration, Freezing-Theory, freezing time calculation, methods of freezing, freezing equipments, freeze drying, freeze concentration, thawing, effect of low temperature on food. Water activity, methods to control water activity.

Text Books

- 1. Introduction to food engineering. R. Paul Singh. 2000. Academic Press. B.
- 2. P.Fellows.1988. Food Processing Technology. Principles and practice. Ellis Horwood International publishers, Chichester, England.

Reference Books-

- 1. Food Process Engineering by Dennis, R.H.
- 2. Engineering properties of foods by Rao, M.A. and Rizvi, S.S.H.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting atleast one from each unit.

* The students should select two Departmental Elective Courses (DEC-IV)

		SCHEME	OF	STUD	IES/I	EXAMINATION Somostor VI	/S(<i>w.e.f.</i> 2 IT	2015-16 on	wards)		
S.	Course	Course Title		Teac	hing	Schedule	Allotment of Marks				Duration
No.	No.		L	Т	P	Hours/ Week	Theory	Sessional	Practical	Total	of Exam (Hrs.)
1	ME-401N	Measurement and Control	4	0	0	4	75	25	0	100	3
2	ME-403N	Mechatronics	4	0	0	4	75	25	0	100	3
3	HS-401N	Entrepreneurship	3	0	0	3	75	25	0	100	3
4		<u>DEC – I</u> *	4	0	0	4	75	25	0	100	3
5		<u>DEC –II</u> *	3	0	0	3	75	25	0	100	3
6	ME-405N	Measurement and Control Lab	0	0	2	2	0	40	60	100	3
7	ME-407N	Mechatronics Lab	0	0	2	2	0	40	60	100	3
8	ME-409N	Project-I**	0	0	8	8	0	100	100	200	3
9	ME-411N	Industrial Training (Viva-Voce)***	2	0	0	2	0	40	60	100	3
10	ME-413N	Seminar-I	0	2	0	2		100	0	100	
		Total	20	02	12	34	4 375 445 280 1100				
* Th	e students s	hould select two Departmental Elect	ive (Course	es (D	EC) from the fo	llowing li	st.			
Cou	irse No.	DEC-I				Course No.			DEC-II		
ME	E-415N	Non-Conventional Machining				ME-427N	Finite Element Methods in Engineering				
ME	ME-417N Soft Computing Techniques				ME-429N	Advanced Manufacturing Technology					
ME	1E-419N Non-Destructive Evaluation & Testing				ME-431N	Robotics	: Mechanics	and Contro	<u>l</u>		
ME	E-421N	21N Design and Optimization				ME-433N	Simulation of Mechanical Systems				
ME	E-423N	Computational Fluid Dynamics				ME-435N	Control Engineering				
ME	E-425N	Fundamentals of Gas Dynamics				ME-437N	Environmental Pollution and Abatement				

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**The project should be initiated by the students in the beginning of VII^h semester and will be evaluated at the end of the semester on the basis of a presentation and report.

***The performance of the student will be evaluated after the presentation delivered and the report submitted by the student related to Industrial training undertaken after VIth semester.

						Sen	nester – V	III		·		
S.	Course	No. Co	T	each	ing S	chedule	Allotment of Marks				Duration	
No.				L	Т	Р	Hours/ Week	Theory	Sessional	Practical	Total	(Hrs.)
1	ME-402	N <u>Automobile Er</u>	ngineering	4	0	0	4	75	25	0	100	3
2		DEC-III*		4	0	0	4	75	25	0	100	3
3		DEC-IV*		4	0	0	4	75	25	0	100	3
4	ME-404	N Power Plant En	ngineering	4	0	0	4	75	25	0	100	3
5	ME-406	N Quality Assura	nce & Reliability	4	0	0	4	75	25	0	100	3
6	ME-408	N <u>Automobile Er</u>	ngineering Lab	0	0	2	2	0	40	60	100	3
7	ME-410	N <u>Project-II</u> **		0	0	10	10	0	100	100	200	3
8	ME-412	N <u>Seminar-II</u>		0	2	0	2	0	100	0	100	
		Total		20	2	12	34	375	365	160	900	
*Th	e student s	hould select two De	partmental Elective C	Courses	(DE	C(fr)	om the foll	owing list.				
Cou	rse No.		DEC-III			Co	urse No.			DEC-IV		
ME	-414N	Smart Materials Str	uctures & Devices			Μ	E-426N	Manufact	uring Manag	gement		
ME	-416N	Lubrication Techno	logy			Μ	E-428N	Design of	Pressure Ve	essels and P	<u>iping</u>	
ME	ME-418N Energy Management			Μ	E-430N	Concurrent Engineering						
ME	-420N	Waste Heat Recove	ry System			Μ	E-432N	Industrial Combustion				
ME	-422N	Foundry Engineerin	<u> </u>			Μ	E-434N	Metal For	ming and Fi	nishing		
ME	-424N	Ergonomics in Desi	gn			Μ	E-436N	Air Craft and Rocket Propulsion				

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**The project should be initiated by the students in the beginning of VIIIth semester and will be evaluated at the end of the semester on the basis of a presentation and report. Note: Project-II should not be related to Project-I unless it involves large amount of work, time and effort.

	B. Tech. 7th Semester Mechanical Engineering											
Course No.	Course Title	Teaching Schedule		Allotr	rks	Duration of Exam						
		L	Т	Р	Theory	Sessional	Total	(Hrs.)				
ME-401N	MEASUREMENT AND CONTROL	4	0	0	75	25	100	3				
Purpose	To understand the fundam for solving the problems re	enta elate	als of ed trai	mecha 1sfer fu	nical instru	iments and ontrol syste	enable t ms	he students				
	(Cou	rse O	utcom	ies							
CO1	To study the fundamenta performance characteristic	als s of	of m meas	easure ureme	ment system nt systems.	ms and un	derstand	the static				
CO2	To enable the students to u study the measurements of	inde stra	erstan ain an	d the r d vibra	notion, forc ation.	e and torqu	e measu	rement and				
CO3	To study the instruments re	elate	ed to p	pressu	e, flow and	temperatur	e measu	rements.				
CO4	Learn about various conce	pts 1	elate	d to co	ntrol system	ns.						

UNIT-I

Fundamentals of Measurements: Definition, application of measurement instrumentation, functional elements of a generalized measuring system, measuring standards, types of measurement, types of input to measuring instruments and instrument system, classification of measuring instruments, merits and demerits of mechanical measuring systems, comparison of mechanical measuring system with electrical measuring systems, calibration.

Generalized Measurement System: Introduction, types of error, types of uncertainties, propagation of uncertainties in compound quantity, Static performance parameters: accuracy, precision, resolution, static sensitivity, linearity, hysteresis, dead band, backlash, and drift, sources of error, selection of measuring instruments, mechanical and electrical loading.

UNIT-II

Motion, Force and Torque Measurement: Introduction, relative motion, measuring devices, electromechanical, optical, photo electric, Moore-Fringe, pneumatic, absolute motion devices, seismic devices, spring mass & force balance type, calibration, hydraulic load cell, pneumatic load cell, elastic force devices, separation of force components, electro mechanical methods, torque transducer, torque meter.

Measurement of Strain and Vibrations: Type of strain gauges and their working, strain gauge circuits, Mcleod gauge, Pirani gauge, temperature compensation, strain rosettes, analysis of strains.

Vibration and noise measurement: Seismic instruments, vibration pick-ups and decibel meters.

UNIT-III

Pressure and Flow Measurement: Moderate pressure measurement, monometers, elastic transducer, dynamic effects of connecting tubing, high pressure transducer, low pressure measurement, calibration and testing, quantity meters, positive displacement meters, flow rate meters, variable head Meters, variable area meters, rotameters, pitot-static tube meter, drag force flow meter, turbine flow meter, electronic flow meter, electro-magnetic flow meter, hot-wire anemometer.

Temperature Measurement: Introduction, measurement of temperature, non-electrical methods – solid rod thermometer, bimetallic thermometer, liquid in- glass thermometer, pressure thermometer, electrical methods – electrical resistance thermometers, semiconductor resistance

sensors (thermistors), thermo-electric sensors, thermocouple materials, radiation methods (pyrometry), total radiation pyrometer, selective radiation pyrometer

UNIT-IV

Control Analysis: Introduction, classification of control systems, control system terminology, servomechanism, process control and regulators, manual and automatic control systems, physical systems and mathematical models, linear control systems, Laplace transform, transfer function, block diagram, signal flow graphs.

Reference and Text Books:

1. Mechanical measurements & control- By D.S. Kumar, Metropolitan book

- 2. Instrumentation and Mechanical measurements- By A.K. Tayal, Galgotia Publ.
- 3. Measurements systems application and design-By Ernest Doebelin, McGraw-Hill

4. Automatic Control Systems- By S. Hasan Saeed

NOTE: In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

B. Tech. 7 th Semester Mechanical Engineering											
Course No.	Course Title	Teaching Schedule		Allotr	Allotment of Marks						
		L	Т	Р	Theory	Sessional	Total	(Hrs.)			
ME-403N	MECHATRONICS	4	0	0	75	25	100	3			
Purpose	The Objective of this course is to make the students aware about Mechanical and Electronic instruments together for different applications. This course will help students to build the fundamental concepts of inter disciplinary problems										
	(Cou	rse O	utcom	es						
CO 1	To understand Mechatron algebra and able to convert	nics t nur	syste mber	m and system	l study of as from one	number sy system to a	vstem an another.	d Boolean			
CO 2	Students will be able to understand different sensors and transducers as well as recognize various Pneumatic and Hydraulic system components along with their symbols										
CO 3	Able to explain mechanica	l act	tuatio	n syste	ems and arc	hitecture of	micropr	ocessors.			
CO 4	Able to understand basic Robotics.	stru	ucture	of P	LC and its	application	ns and c	oncepts of			

UNIT- I

Introduction to Mechatronics and its Systems: Evolution, Scope, Measurement Systems, Control Systems, open and close loop systems, sequential controllers and microprocessor based controllers, mechatronics approach.

Basics of Digital Technology: Number System, Boolean algebra, Logic Functions, Karnaugh Maps, Timing Diagrams, Flip-Flops, Applications.

UNIT - II

Sensors and transducers: Introduction, performance terminology-Displacement, Position and Proximity, Velocity and motion, force, Fluid Pressure-Temperature Sensors-Light Sensors-Selection of Sensors-Signal Processing.

Pneumatic and Hydraulic actuation systems: actuation systems, Pneumatic and hydraulic systems, directional control valves, pressure control valves, cylinders, process control valves, rotary actuators.

UNIT - III

Mechanical actuation systems: Mechanical systems, types of motion, kinematics chains, cams, gear trains, ratchet and pawl, belt and chain drives, bearings, mechanical aspects of motor selection.

Microprocessor: Introduction, Architecture, Pin Configuration, Instruction set, Programming of Microprocessors using 8085 instructions-Interfacing input and output devices-Interfacing D/A converters and A/D converters, Applications, Temperature control, Stepper motor control, Traffic light controller.

UNIT - IV

Programmable Logic Controller: Introduction, Basic structure, Input/output Processing, Programming, Mnemonics, Timers, Internal relays and counters, Data handling, Analog Input/Output, Selection of a PLC.

Robotics: Introduction, types of robots, Robotic control, Robot drive systems Robot end effectors, selection parameters of a robot, applications.

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Text Books:

1. R. K Rajput, "A Textbook of Mechatronics", Edition 2010.

Reference Books:

- 1. Bolton W., "Mechatronics", Longman, Second Edition, 2004.
- 2. Histand Michael B. and Alciatore David G., "Introduction to Mechatronics and Measurement Systems", McGraw Hill International Editions, 2003.
- 3. HMT Ltd., "Mechatronics", Tata McGraw Hill Publishing Co. Ltd., 1998.
- 4. Nitaigour Premchand Mahalik, "Mechatronics Principles, Concepts and Applications", Tata McGraw-Hill publishing company Ltd, 2003.

NOTE: In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

B. Tech. 7 th Semester Mechanical Engineering											
Course No.	Course Title	Teaching Schedule		Allotr	nent of Ma	rks	Duration of Exam				
		L	Τ	Р	Theory	Sessional	Total	(Hrs.)			
HS-401N	ENTREPRENEURESHIP	3	0	0	75	25	100	3			
Purpose	To familiarize the students with the basics of Entrepreneurship										
	Co	ourse	e Ou	tcom	es						
CO 1	Students will be able unders needed	stand	l who	o the	entreprene	urs are and	what co	ompetences			
CO 2	Students will be able to u search, identification of a pr required for small business e	inder oduc enterj	rstand et, ma prise	d ins arket	ights into flexibility s	the manage studies, proj	ement, d ect final	opportunity ization etc.			
CO 3	Students will be able to writ product identification, busine	e a r ess i	epor deas,	t and expc	do oral pre ort marketin	esentation of or getc.	n the top	bics such as			
CO 4	Students will be able to known for establishing small indust	ow th rial u	ne di inits.	fferer	nt financial	and other a	assistanc	e available			

UNIT –I

Entrepreneurship : Concept and Definitions; Entrepreneurship and Economic Development; Types of Entrepreneurs; Factor Affecting Entrepreneurial Growth – Economic, Non-Economic Factors; EDP Programmes; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs; Manager Vs. Entrepreneur, types of entrepreneurships, Entrepreneurial myths.

UNIT-II

Opportunity Identification and Product Selection: Entrepreneurial Opportunity Search &Identification; Criteria to Select a Product; Conducting Feasibility Studies; Sources of business ideas, launching a new product; export marketing, Methods of Project Appraisal, Project Report Preparation; Project Planning and Scheduling. Sources of finance for entrepreneurs.

UNIT –III

Small Enterprises and Enterprise Launching Formalities : Definition of Small Scale; Rationale; Objective; Scope; SSI; Registration; NOC from Pollution Board; Machinery and Equipment Selection, Role of SSI in Economic Development of India; major problem faced by SSI,MSMEs – Definition and Significance in Indian Economy; MSME Schemes, Challenges and Difficulties in availing MSME Schemes.

UNIT -IV

Role of Support Institutions and Management of Small Business : Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISBUD; State Financial Corporation SIC; Venture Capital : Concept, venture capital financing schemes offered by various financial institutions in India, Legal issues – Forming business entity, considerations and criteria, requirements for formation of a Private/Public Limited Company,

Note:

• Exercises / activities should be conducted on 'generating business ideas' and identifying problems and opportunities.
• Interactive sessions with Entrepreneurs, authorities of financial institutions, Government officials should be organized.

Suggested Readings:

- 1. "Entrepreneurship development small business enterprises", Pearson, Poornima M Charantimath,2013.
- 2. Roy Rajiv, "Entrepreneurship", Oxford University Press, 2011.
- 3. "Innovation and Entrepreneurship", Harper business- Drucker.F, Peter, 2006.
- 4. "Entrepreneurship", Tata Mc-graw Hill Publishing Co.ltd new Delhi- Robert D. Hisrich, Mathew J. Manimala, Michael P Peters and Dean A. Shepherd, 8th Edition, 2012
- 5. Enterpreneurship Development- S.Chand & Co., Delhi- S.S.Khanka 1999
- 6. Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi Vasant Desai 2003.
- 7. Entrepreneurship Management -Cynthia, Kaulgud, Aruna, Vikas Publishing House, Delhi, 2003.
- 8. Entrepreneurship Ideas in Action- L. Greene, Thomson Asia Pvt. Ltd., Singapore, 2004.

Note: Question Paper will consist of four units. Eight questions will be set in the question paper by selecting two from each unit. The students will be required to attempt five questions, selecting at least one from each unit.

	B. Tech. 7th Semest	er M	lech	ani	<u>cal Engin</u>	eering		
Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam	
		L	Т	P	Sessional	Practical	Total	(Hrs.)
ME-405N	MEASUREMENT AND CONTROL LAB	0	0	2	40	60	100	3
Purpose	To enable the students to understand about the applications of measurement systems.							
		Co	urs	e O	utcomes			
CO1	To understand about the bas temperature and flow measu	sics a	und v ent.	wor	king princi	iple of pres	ssure,	
CO 2	Identify the different variati conditions	Identify the different variation of measurement parameter with various input conditions						
CO 3	To analyze the primary, secondary and tertiary measurements.							
CO 4	To learn about the various c	ontr	ol de	evic	es and par	ts of meas	uremer	nt systems

LIST OF EXPERIMENTS:

- 1. Study of a strain gage based cantilever beam and measurement of strain on the beam
- 2. Study of a LVDT and measurement of linear displacement
- 3. Study of an inductive pick up and measurement of linear displacement
- 4. Study of a LDR and measurement of linear displacement
- 5. Study of capacitive pick up and measurement of angular displacement
- 6. Study of temperature transducers and measurement of temperature of fluid
- 7. Study of a LVDT (strain gage based) and measurement of linear displacement.
- 8. Study of a torque pick up and measurement of torque.
- 9. Study of a pressure pick up and measurement of pressure of fluid.
- 10. Study of load cell and measurement of load with load cell
- 11. Study of non-contact type speed pick up and measurement of rotational speed
- 12. Comparison of sensitivity of thermocouple, thermister and RTD

Note: At least eight experiments should be performed from the above list.

Course No.	No. Course Title Teaching Schedule		Allotm	Duration of Exam				
		L	Т	P	Sessional	Practical	Total	(Hrs.)
ME-407N	MECHATRONICS LAB	B 0 0 2 40 60 100						3
Purpose	modeling & analysis of basic electrical, hydraulic & pneumatic Systems which enable the students to understand the concept of mechatronics.							the design, c Systems cs.
		Co	ours	e O	utcomes			
CO 1	Able to perform operations	on A	ssei	nbl	y language	programn	ning of	8085
CO 2	Able to understand distinguing	ish h	ydra	aulio	c and pneu	matic cont	rol sys	tem
CO 3	Able To demonstrate experiments on DC motor, traffic light and stepper motor interface							
CO 4	Able to demonstrate workin	g of	sens	sors	and transc	lucer.		

LIST OF EXPERIMENTS:

- To perform various operation on Assembly language programming of 8085 Addition Subtraction Multiplication – Division – Sorting – Code Conversion.
- 2. To Study Stepper motor interface.
- 3. To study the Traffic light interface using a PLC kit.
- 4. To Perform Speed control of DC motor kit.
- 5. To Study various types of Sensors and transducers.
- 6. To Study hydraulic System.
- 7. To study Pneumatic and electro-pneumatic circuits.
- 8. To study PLC and its applications.
- 9. To Study image processing technique.

Note: Any 8 experiments from the above list and other 2 from others (developed by institute) are required to be performed by students in the laboratory.

	B. Tech. 7 th Semes	ter N	lech	ani	cal Engine	ering		
Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam	
		L	Т	Р	Sessional	Practical	Total	
ME-409N	PROJECT-1 0 0 8 100 100 200							
Purpose	To know the method of programming the microprocessor and also the design, modeling & analysis of basic electrical, hydraulic & pneumatic Systems which enable the students to understand the concept of mechatronics.							
		Co	ours	e O	utcomes			
CO 1	Able to perform operations	on As	ssem	bly	language p	programmi	ng of 8	085
CO 2	Able to understand distingu	ish hy	ydra	ılic	and pneum	natic contro	ol syste	m
CO 3	Able To demonstrate experiments on DC motor, traffic light and stepper motor interface							
CO 4	Able to demonstrate workin	g of s	sense	ors a	and transdu	icer.		

The students expected to take up a project under the guidance of teacher from the college. The project must be based on mechanical engineering problems, which can be extended up to the full semester. The students may be asked to work individually or in a group not more than four students in a group. Viva- voce must be based on the preliminary report submitted by students related to the project.

	<u>B.</u> ′	Tech. 7 th Semest	er Mechanical H	Ingineering								
ME-411N		INDUSTRIAL TRAINING (VIVA-VOCE)										
Lecture	Tutorial	Practical	Sessional	Practical	Total	Duration of Exam. (Hrs.)						
2	0	0	40	60	100	3						

The training report will be submitted by the students along with the certificate indicating the duration of training and the nature of Project-done.

The students will have to appear for viva-voce examination based on training performed at the end of previous semester in industries.

		B. Tech. 7 th Semester Mechanical Engineering									
ME-413N		SEMINAR- I									
Lecture	Tutorial	Practical	Sessional	Practical	Total	Duration of Exam. (Hrs.)					
0	2	2 0 100 0 100									

The students are required to deliver a seminar on some emerging areas of Mechanical Engineering, given as follows:

- CAD/CAM/CAE/FEA
- Robotics
- Machine Vision
- Automation
- Tribology
- CFD
- Energy Conservation
- Alternate Energy Sources
- Hybrid Fuels
- Advances in IC Engines
- Vehicle Dynamics

- Aerodynamics
- Advanced Manufacturing Techniques
- Advanced Engineering Materials
- Supply Chain Management
- Business Process Re-engineering
- Six-Sigma Technique
- Lean Manufacturing Technique
- Just-in-Time Technique
- Agile Manufacturing
- Value Engineering
- Reliability Engineering
- Any other topic related to Design/Thermal/Industrial/Production Engineering

The student will deliver a power point presentation for about 30 minutes in the seminar on any of the above topics. This will be followed by question answering session for about 10 minutes. The questions on the seminar topic will be asked by the teacher concerned and class students. The students will also prepare a detailed report in MS word and after spiral binding will submit it to the teacher concerned. The report is to be submitted at least one week prior to the presentation. The grades/awards will be given according to the student's presentation, report submitted, and answering of questions asked after the presentation.

ELECTIVE -I

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	B. Tech. 7 th Semester	· M	ech	anica	al Enginee	ering		
Course No.	Course Title	Te Sc	Teaching Schedule		Allotr	nent of Ma	rks	Duration of Exam
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME-415N	NON-CONVENTIONAL	4	0	0	75	25	100	3
	MACHINING							
Purpose	This course provides the knowle	edge	e ab	out t	he advanc	ed technolo	ogies an	d different
	processes of Non-conventional n	nacl	hini	ıg.				
	COURSE OUTCOMES							
CO1	To impart the basic knowledge of various Non-conventional machining processes,							
	rapid prototyping processes and	pro	oces	s par	ameters a	nd metal re	moval 1	nechanism
	of Ultra-Sonic machining proces	s.						
CO2	To acquaint the student with dee	ep k	nov	how	about the	e Electroche	emical a	and Electro
	Discharge machining processes.							
CO3	To acquaint the students to cla	ssif	y th	e va	rious kind	of Jet ma	chining	processes,
	process parameters and metal	ren	nova	l me	echanism,	limitations	and a	pplications
	associated with these processes.							
CO4	To make the students to understand the process mechanism of Rapid Prototyping							
	processes and rapid tools used in industries.							

Introduction: Introduction, need of Non-conventional machining processes, Rapid prototyping processes, their classification, consideration in process selection.

Ultrasonic Machining: Element of process, design of cutting tool, metal removal mechanism, effect of parameters, economic consideration, limitation and applications, surface finish.

UNIT II

Electrochemical Machining: Element of process, process chemistry, metal removal mechanism, tool design, accuracy, surface finish and work material characteristics, economic consideration, advantage, limitation and application, Electrochemical grinding, debarring and honing, chemical machining.

EDM: Principal and metal removal mechanism, generators, electrode feed control, electrode material, tool electrode tool design, EDM wire cutting, surface finish, accuracy and application.

UNIT III

Jet Machining: Principal and metal removal mechanism of abrasive and water jet machining, process variables, design of nozzle, advantage, limitation and application.

Plasma arc machining, Electron beam machining, Laser beam machining, their principal of metal removal mechanism, process parameter, advantage and limitations.

UNIT IV

Rapid Prototyping: Fundamentals, process chain, physics of processes, principal and process mechanism of SLA, SGA, LOM, FDM, and SLS processes, their advantage and limitations, application of RP process, RP data format, STL file format, STL file problems, STL file repair, others translators and formats.

Rapid Tooling Process: Introduction, fundamentals, classifications, indirect RT processes, principal of Silicon Rubber Molding, Epoxy Tooling, Spray Metal Tooling, Pattern for investment casting, Vacuum casting and vacuum forming processes, direct RT processes, Shape Deposition manufacturing, their advantage, limitations and applications.

Reference and Text Books:

- 1. Modern machining processes By P.C. Pandey and M.S. Shan.
- 2. Machining Science By Gosh and Malik, Affiliated East west
- 3. Nontraditional Manufacturing Processes By G.F. Benedict, Maicel Dekker.
- 4. Advanced Method Of Machining By J.A. Mcgeongh, Chapman And Hall.
- 5. Electrochemical Machining Of Metals By Ruryantsev & Davydov, Mir Pub.
- 6. Rapid Prototyping: Principal And Application by CK Chua, World Scientific Publishing.

	B. Tech. 7th Semeste	r M	lech	anic	al Engine	ering		
Course No.	Course Title	Teaching Schedule		Allotr	nent of Ma	rks	Duration of Exam	
		L	L T P		Theory	Sessional	Total	(Hrs.)
ME-417N	SOFT COMPUTING TECHNIQUES	4	0	3				
Purpose	This course is designed to give an insight into the latest developments regarding smart materials and their use in structures.							
	Cours	e O	utco	mes	1			
CO 1	To expose the concepts of feed f	orw	vard	neur	al network	s.		
CO 2	To provide adequate knowledge	abo	out f	eedb	ack neural	networks.		
CO 3	To teach about the concept of fu	To teach about the concept of fuzziness involved in various systems.						
CO 4	To expose the ideas about gene about of FLC and NN toolbox.	etic	alg	orith	m and to	provide ad	equate	knowledge

Introduction and Artificial Neural Networks

Introduction of soft computing – soft computing vs. hard computing various types of soft computing techniques applications of soft computing Neuron Nerve structure and synapse Artificial

Neuron and its model activation Functions Neural network architecture single layer and multilayer feed forward networks McCulloch Pitts neuron model, perceptron model Adaline and Madaline multilayer perception model back propagation learning methods effect of learning rule coefficient back propagation algorithm factors affecting back propagation training applications.

UNIT II

Artificial Neural Networks

Counter propagation network architecture functioning & characteristics of counter Propagation Network Hopfield/ Recurrent network configuration stability Constraints Associative Memory and Characteristics limitations and applications Hopfield v/s Boltzman machine Adaptive Resonance Theory Architecture Classifications Implementation and training Associative Memory.

UNIT III

Fuzzy Logic System

Introduction to crisp sets and fuzzy sets basic fuzzy set operation and approximate reasoning. Introduction to fuzzy logic modeling and control Fuzzification inferencing and defuzzification Fuzzy knowledge and rule bases Fuzzy modeling and control schemes for nonlinear systems. Self-organizing fuzzy logic control Fuzzy logic control for nonlinear time delay system.

UNIT IV

Genetic Algorithm

Basic concept of Genetic algorithm and detail algorithmic steps adjustment of free Parameters Solution of typical control problems using genetic algorithm Concept on some other search techniques like tabu search and ant colony search techniques for solving optimization problems. **Applications**

GA application to power system optimization problem Case studies: Identification and control of linear and nonlinear dynamic systems using Matlab Neural Network toolbox. Stability analysis

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of Neural Network Interconnection Systems, Implementation of fuzzy logic controller using Matlab fuzzy logic toolbox Stability analysis of fuzzy control systems.

REFERENCES:

- 1. Laurene V. Fausett, Fundamentals of Neural Networks: Architectures, Algorithms and Applications, Pearson Education,
- 2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India.
- 3. Zimmermann H.J. "Fuzzy set theory and its Applications" Springer international edition, 2011.
- 4. David E. Goldberg, "Genetic Algorithms in Search, Optimization, and Machine Learning", Pearson Education, 2009.
- 5. W.T.Miller, R.S.Sutton and P.J.Webrose, "Neural Networks for Control", MIT Press, 1996.
- 6. <u>http://www.myreaders.info/html/soft_computing.html</u>

Course No.	Course Title	Teaching Schedule			Allotr	Duration of Exam				
		L	Т	Р	Theory	Sessional	Total	(Hrs.)		
ME-419N	NON-DESTRUCTIVE	4	0	0	75	25	100	3		
	EVALUATION AND TESTING									
Purpose	To give the basic idea of NON-D	DES	TR	JCT	IVE EVAI	LUATION	AND T	ESTING		
	Cours			se Outcomes						
CO1	To make student able to acquire	kno	wle	dge o	of differen	t types of N	DT tecl	nniques.		
CO2	To make student able to under techniques.	rsta	nd	the b	oasic prine	ciples unde	erlying	each NDT		
CO3	To make student able to acquir basic familiarity of emerging ND	To make student able to acquire knowledge of established NDE techniques and basic familiarity of emerging NDET Techniques								
CO4	To make student able to become different types of manufactured evaluate them.	e fa l pi	mil: odu	ar w	ith comm and the N	on types of DT method	defects l(s) bes	arising in transference to the suited to		

Introduction to NDET and Surface NDT Techniques: Introduction to non-destructive testing and evaluation, visual examination, liquid penetrant testing and magnetic particle testing. Advantages and limitations of each of these techniques.

UNIT II

Radiographic Testing: Radiography principle, electromagnetic radiation sources, X-ray films, exposure, penetrometer, radiographic imaging, inspection standards and techniques, neutron radiography. Radiography applications, limitations and safety.

UNIT III

Eddy Current Testing and Ultrasonic Testing: Eddy current principle, depth of penetration, eddy current response, eddy current instrumentation, probe configuration, applications and limitations. Properties of sound beam, ultrasonic transducers, inspection methods, flaw characterization technique, immersion testing. Special/Emerging Techniques Leak testing, Acoustic Emission testing, Holography, Thermography, Magnetic Resonance Imaging, Magnetic Barkhausen Effect. In-situ metallography

UNIT IV

Defects in materials / products and Selection of NDET Methods: Study of defects in castings, weldments, forgings, rolled products etc. and defects arising during service. Selection of NDET methods to evaluate them. Standards and codes.

Reference and Text books:

1. Baldevraj, Jayakumar T., Thavasimuthu M., (2008) "Practical Non-Destructive Testing", 3rd edition, Narosa Publishers.

Reference Books

- 1. American Society for Metals, "Non-Destructive Evaluation and Quality Control": Metals Hand Book: 1992, Vol. 17, 9th Ed, Metals Park, OH.
- 2. Paul E Mix, "Introduction to nondestructive testing: a training guide", Wiley, 2nd edition

New Jersey, 2005.

3. Ravi Prakash, "Nondestructive Testing Techniques", New Age International Publishers, 1st rev. edition, 2010.

	B. Tech. 7th Semester	·M	lech	anica	l Enginee	ring		
Course No.	Course Title	Teaching Schedule		Allotn	nent of Ma	rks	Duration of Exam	
	-	L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME - 421N	DESIGN AND	4	0	0	75	25	100	3
	OPTIMIZATION							
Purpose	To provide the concepts of various classical and modern methods of for constrained and unconstrained problems in both single and multivariable and Introduction to system design.							
	COURSE	0	U T (COM	ES			
CO1	Students will be able to formulate	e oj	otim	izatio	n problem	s.		
CO2	The student will be able to unde	erst	and	and a	pply the c	concept of o	optimal	lity criteria
	for various type of optimization p	prol	olen	ıs.				
CO3	The students will be able to solve various constrained and unconstrained problems							
	in single variable as well as mult	iva	riab	e.				
CO4	The students will be to understan	d a	dva	nced	optimizatio	on techniqu	es.	

Introduction to Classical Methods & Linear Programming Problems: Terminology, Design Variables, Constraints, Objective Function, Problem Formulation. Calculus method, Kuhn Tucker conditions, Method of Multipliers. Linear Programming Problem, Simplex method, Concept of Duality. Gradient Based Methods: Newton-Raphson Method, Bisection Method, Secant Method. Application to Root finding.

UNIT II

Multivariable Optimization Algorithms: Optimality Criteria, Unidirectional Search. Direct Search Methods: Hooke-Jeeves pattern search method, Powell's Conjugate Direction Method. Gradient Based Methods: Cauchy's Steepest Descent Method, Newton's method, Marquardt's Method

UNIT III

Nonlinear programming with constraints: Lagrange multipliers, Kuhn-Tucker conditions, quadratic programming. Wolfe's and Beale's method, sequential linear programming approach, penalty methods. Interior and exterior penalty function method.

UNIT IV

Advanced optimization techniques: Concepts of multi-objective optimization, genetic algorithms and simulated annealing.

Text Books:

1. S.S.Rao, Optimization-Theory and Applications, , Wiley Eastern, New Delhi, 1978

2. J.C.Pant, Introduction to Optimization, Jain Brothers, New Delhi, 1983

3. Kanthi Swaroop, et.at., Operations Research, S. Chand & Co., New Delhi

4. Kalyanmoy Deb, Optimization for Engineering Design Algorithms and Examples, Prentice Hall of India, New Delhi, 1995

NOTE: In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

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	B. Tech. 7th Semester	r M	[ech	anica	l Enginee	ring		
Course No.	Course Title	Teaching Schedule		Allotn	nent of Ma	rks	Duration of Exam	
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME – 423N	COMPUTATIONAL FLUID DYNAMICS	4	0	0	75	25	100	3
Purpose	To familiarize the students with the basic concepts of Computational Fluid Dynamics.							
	Course	e O	utco	mes				
CO1	Understand the basic equations phenomena.	5 W	hich	n gov	vern the f	uid flow a	and he	at transfer
CO2	Classify the different types of di behavior.	Classify the different types of differential equations and analyze their mathematical behavior.						
CO3	Understand the basic concepts of	Understand the basic concepts of discretization and error analysis.						
CO4	Analyze the steady and unsteady problems.	/ he	at c	onduc	ction & co	mbined cor	nductio	n diffusion

Methods of prediction: comparison of experimental investigation vs theoretical calculation; Mathematical description of physical phenomena; governing differential equations; the general form of governing differential equation; nature of co-ordinates; one way and two-way coordinates; proper choice of co-ordinates.

Mathematical behavior of partial differential equations: Classification of partial differential equations, general behavior of different classes of equations: Elliptic, parabolic and hyperbolic partial differential equations.

UNIT II

Discretization: The concept of discretization; Finite differences; Taylor series formulation; Finite difference discretization of ordinary and partial derivatives; Truncation error, round-off error, discretization error; Consistency and stability of numerical schemes; Variationally formulation; Method of weighted Residuals, control volume formulation.

UNIT III

Heat Conduction: Steady one-dimensional conduction, Inter-face conductivity, Non-linearity, Source-term linearization, Boundary conditions. Unsteady one-dimensional conduction: Explicit, Crank-Nicolson and Fully Implicit Schemes Discretization of two and three dimensional problems, over relaxation and under relaxation.

UNIT IV

Convection and Diffusion: Steady one dimensional convection and diffusion, Upwind scheme, Exponential scheme, Hybrid scheme, Power law scheme, Generalized formulation, Discretization equation for two and three dimensional problems, Outflow boundary condition, false diffusion.

Calculation of the flow field: Need for a special procedure, Vorticity based methods, Representation of pressure-gradient term, Representation of the continuity equation, Staggered grid, Momentum equations, Pressure velocity corrections, Pressure correction equation, SIMPLE algorithm.

Reference and Text books:

- 1. Numerical Heat Transfer and Fluid Flow Suhas V. Patankar, Ane Books.
- 2. Computational Fluid Dynamics: The Basics with Applications John D. Anderson Jr., McGraw Hill.
- 3. An Introduction to CFD: Development, Applications and Analysis Atul Sharma, Ane Books.
- 4. An Introduction to Computational Fluid Dynamics: The Finite Volume Method H. Versteeg and W. Malalasekra, Pearson Education.

	B. Tech. 7th Semester	r M	ech	<u>anica</u>	l Enginee	ring		
Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam	
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME – 425N	FUNDAMENTALS OF GAS4007525100DYNAMICS							
Purpose	To aware the students for basic concepts of gas dynamics and study flow through nozzles and diffusers. Also, to understand the concepts of flame and combustion along with propulsion.							
	Course	e O	utco	mes				
CO1	To study the fundamentals of gather fundamental equations of steady the fundamental equations of steady ste	as d ady	yna flov	mics <i>w</i> .	and its pro	operties. Al	lso, to	understand
CO2	To enable the students to unders and variable area flow.	To enable the students to understand isentropic flow, adiabatic flow, frictional flow and variable area flow.						
CO3	To study the flow through nozzle	To study the flow through nozzles and diffusers.						
CO4	Learn about various concepts rela	atec	l to	flame	, combusti	ion and pro	pulsion	l.

Basic concepts of Gas Dynamics and Gas Properties: Units and dimensions, The concepts of a continuum, properties of the continuum. Methods of describing fluid motion, Lagrangian method. Eulerian Method. The integral form of the equations of Conservations of Mass, momentum and energy as applied to control volumes, applications to the steady flow of inviscid compressible fluids

Fundamental equations of Steady Flow: Continuity and momentum equations, The thrust function, The dynamic equation and Euler's Equation, Bernoulli's Equation. Steady flow energy equations

UNIT II

Isentropic Flow: Introduction, Acoustic velocity, Mach number, Mach line and mach angle. Classification of flows, Kerman's rules of supersonic flow, flow parameter, critical condition stagnation values.

Adiabatic Flow: Stagnation temperature change, Rayleigh line, Pressure ratio and temperature ratio, Entropy considerations, maximum heat transfer.

Frictional Flow: The fanning equation, Friction factor and friction parameter, Fanno line, Fanno equations.

Variable Area Flow: Velocity variation with Isentropic flow, Criteria for acceleration and deceleration, Effect of pressure ratio on Nozzle operation, Convergent nozzle and convergent divergent nozzle, Effect of back pressure on nozzle flow, Isothermal flow functions, Comparison of flow in nozzle, Generalized one dimensional flow.

UNIT III

Flow Through Nozzle: Under and over expansion in nozzle flow, frictional effects on nozzle flow, operation of nozzles, analysis of shock phenomena, shocks in nozzles- normal shock waves, oblique shock waves; thermodynamic directions of a normal shock, Rankins-Hugoniat relation, strength of shock, operation of nozzles, Governing relation of the Normal shock, Pressure, Temperature, Density, Mack number across the shock, Reyleigh and Fanno lines, problems.

Flow through Diffusers: Classification of diffusers, internal compression subsonic diffusers, velocity gradient, effect of friction and area change, the conical internal-compression Subsonic

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diffusers, external compression subsonic diffusers, supersonic diffusers, Normal shock supersonic diffusers, the converging diverging supersonic diffusers.

UNIT IV

Introduction to Flames and Combustion: Flame propagation, diffusion flames, premixed flames, flame velocity, theories of flame propagation, ignition for combustible mixture, flame stabilization.

Propulsion: Introduction, Brayton cycle, propulsion engines. thrust power and efficiency, thrust consideration power consideration, power conskloiftlion and efficiency consideration, open Brayton cycle for propulsion systems, turbojet, turbo propulsion, ram jet, pulse jet, numericals.

Text Books:

1. Fundamentals of Gas Dynamics- YAHA, S.M. TMI-I, India.

2. Fluid Mechanics-A.K. Mohanty, Prentice Hall of India.

Reference Books:

1. Fundamentals of Fluid Mechanics- YUAN, S.W. Prentice Hall of India.

- 2. Fundamentals of Gas Dynamics Robert D. Zucker, Met tire Publication.
- 3. Gas Dynamics -E-., Radha Krishnan, prentice Hall of India.

4. Gas Dynamics Vol. -I Zucrotuf, Wiley.

5. Gas Dynamics - Shapiro Wiley.

ELECTIVE-II

	B. Tech. 7th Semes	ter N	Mech	anica	l Enginee	<u>ring</u>			
Course No.	Course Title	Teaching Schedule		Allotn	nent of Ma	rks	Duration of Exam		
		L	Т	Р	Theory	Sessional	Total	(Hrs.)	
ME – 427N	FINITE ELEMENT	3	0	0	75	25	100	3	
	METHODS IN								
	ENGINEERING								
Purpose	Students will be able to solve	the	vario	ous pr	oblems re	lated to stru	uctures	, machines	
	etc. through finite element m	etho	ds. A	Also,	enable the	students f	for pre	dicting the	
	solutions of compressible and incompressible fluid friction film problems								
	Cou	rse (Dutco	omes					
CO1	To study the fundamentals of	fini	ite el	emen	t methods	and under	stand t	he various	
	methods for solving engineering	ng pr	oble	ns.					
CO2	To enable the students to und	ersta	nd h	igher	order para	ametric eler	ments a	and also to	
	study element shapes, sizes an	d no	de lo	cation	IS.				
CO3	Enable the students for solving	g pla	ne sti	ess a	nd strain p	roblems, ax	kis-sym	metric and	
	three-dimensional stress-strain	prol	blem	5.	_		-		
CO4	Learn about velocity-pressure	and	l stre	am fi	unction-vo	rticity forn	nulatio	n. Also, to	
	understand in viscid incompressible flow, potential function and stream function								
	formulation.								

Introduction: Basic Concept, Historical background, Engineering applications, general description, Comparison with other methods.

Integral Formulations and Variational Methods: Introduction, Variational Principles and Methods, Need for weighted-integral forms, relevant mathematical concepts and formulae, weak formulation of boundary value problems, Variational Methods, Rayleigh-Ritz method, and the Method of weighted residuals.

UNIT II

Second Order Differential Equations in One Dimensions: Finite Element models: Model boundary value problem, finite element discretization, element shapes, sizes and node locations, interpolation functions, derivation of element equations, connectivity, boundary conditions, FEM solution, post-processing, compatibility and completeness requirements, convergence criteria, higher order and isoperimetric elements, natural coordinates, Lagrange and Hermite polynomials.

UNIT III

Plane Elasticity Analysis: External and internal equilibrium equations, one-dimensional stressstrain relations, plane stress and strain problems, axis-symmetric and three-dimensional stressstrain problems, strain displacement relations, boundary conditions, compatibility equations, computer programs.

UNIT IV

FEM Application to Scalar Problems: Variational approach, Galerkin approach, onedimensional and two-dimensional steady-state problems for conduction, convection and radiation, transient problems. In viscid incompressible flow, potential function and stream function formulation, incompressible viscous flow, stream function, velocity-pressure and stream function-vorticity formulation, Solution of incompressible and compressible fluid film lubrication problems.

Reference and Text Books:

- The Finite Element Method By Zienkiewicz, Tata McGraw.
 The Finite Element Method for Engineers -By Huebner, John Wiley.
- 3. An Introduction to the Finite Element Method -By J.N. Reddy, McGraw Hill.
- 4. Finite Element Methods By R. Dhanaraj and K. Prabhakaran Nair, Oxford university press.

B. Tech. 7th Semester Mechanical Engineering										
Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam			
		L	Т	Р	Theory	Sessional	Total	(Hrs.)		
ME – 429N	ADVANCED	3	0	0	75	25	100	3		
	MANUFACTURING									
	TECHNOLOGY									
Purpose	The course covers the details of the advanced machining theory and practices							practices,		
	advanced machining processes	s, a	dva	nced	metal fo	rming pro	cesses,	advanced		
	welding processes and advanced	fou	ındr	y pro	cesses					
	Course	e O	utco	mes						
CO1	Students will be able to compreh	ienc	ling	the su	urface clea	ning, treatr	nents p	rocess and		
	vacuum mould processes.		-			-	_			
CO2	Students will be able analyze the	ad	vanc	ed ca	sting proc	esses				
CO3	Students will be able to Synt	hes	ize	the e	effect of v	variables o	n meta	al forming		
	processes.							e		
CO4	Students will be able to design estimating.	vac	cuur	n die	and evalu	ate the chi	ef fact	ors in cost		

Hot machining, Machining of Plastics, Unit heads, Plastics cooling, electro forming, Surface Cleaning and Surface Treatments, Surface Coatings, Paint Coating and Slushing, Adhesive Bonds, Adhesive Bond Joints, Adhesives, Surface Coating for Tooling, Graphite Mould Coating, **Vacuum Mould Process.** Introduction, Types of Composites materials, Agglomerated Materials, Reinforced materials, Laminates, Surface Coated Materials, Production of Composite Structures, Fabrication of particulate composite Structures, Fabrication of reinforced Composite, Fabrication of Laminates, Machining, Cutting and Joining of Composites.

UNIT II

Polymers: Introduction, Polymerization, Addition of Polymers, Plastics, Types of plastics, Properties of Plastics, Processing of Thermoplastic Plastics, Injection Moulding, Casting of Plastics, Machining of plastics, other processing methods of plastics Introduction, casting, thread chasing, Thread Rolling, Die Threading and Tapping, Thread Milling, Thread Measurement and Inspection.

UNIT III

Metal Forming: Theoretical basis of metal forming, classification of metal forming processes, cold forming, hot working, Warm working, Effect of variables on metal forming processes, Methods of analysis of manufacturing processes, Open Die forging, Rolling Power Rolling, Drawing, Extrusion.

UNIT IV

Die Casting: Introduction, Product Application, Limitation of Die Casting, Die Casting Machines, Molten metal Injection systems, lot chamber machines, Cold chamber machines, Die casting Design, Design of Die casting Dies, Types of Die casting Dies, Die design, Die material, Die Manufacture, Die Lubrication and Coating, Preheating of Dies, Vacuum Die Casting, Recent trends In Die Casting Process. Definition, Cost accounting or costing, Elements of costing, cost structures, Estimation of cost elements, Methods of estimating, Data requirements of cost

estimating, Steps in making cost estimate, Chief factors in cost estimating, Numerical examples, calculation of machining times, Estimation of total unit time

Reference and Text Books:

- 1. Principles of Manufacturing- By J.S.Campbell, Tata McGraw-Hill
- 2. Production Engineering Sciences- By Pandey and Sinh Standard Pub.
- 3. A text book of Production Technology- By P.C. Sharma S.Chand & Company.
- 4. Manufacturing Materials and Processes- By Lindberg Prentice Hall
- 5. A text book of Production Engineering- By P.C. Sharma S.Chand & Company.

B. Tech. 7 Semester Mechanical Engineering										
Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam			
		L	Т	Р	Theory	Sessional	Total	(Hrs.)		
ME – 431N	ROBOTICS: MECHANICS AND CONTROL	3	0	0	75	25	100	3		
Purpose	To acquaint the students about the mechanics and controls of robotic systems and its application in industries.									
	Cours	e O	utco	mes						
CO1	To make students to aware abou used in robot.	t the	e bas	sic of	robot and	the various	drive 1	nechanism		
CO2	To acquaint the students about the	ne e	nd e	ffecto	ors and rob	ot controls.				
CO3	To impart the students to unde used in robot.	rsta	nd a	bout	the robot	transforma	tions a	nd sensors		
CO4	To make students understand ab robot.	out	the	robo	t cell desig	gn and area	of app	olication of		

Robot anatomy: Definition, law of robotics, History and Terminology of Robotics, Accuracy and repeatability of Robotics, Simple problems.

Robot drive mechanism: Objectives, motivation, Types of drive systems, Functions of drive system, Lead Screws, Ball Screws, Chain & linkage drives, Belt drives, Gear drives, Harmonic drives.

UNIT II

Mechanical grippers: Slider crank mechanism, Screw type, Rotary actuators, cam type, Magnetic grippers, Vacuum grippers, Air operated grippers, Gripper force analysis, Gripper design-Simple problems

Robot controls: Point to point control, Continuous path control, intelligent robot control system for robot joint, Control actions, Feedback devices: Encoder, Resolver, LVDT-Motion Interpolations-Adaptive control.

UNIT III

Robot kinematics: Types- 2D, 3D Transformation-Scaling, Rotation, Translation-Homogeneous coordinates, multiple transformation-Simple problems.

Sensors in robot: Touch Sensors-Tactile sensor – Proximity and range sensors – Robotic vision sensor-Force Sensor-Light sensors, Pressure sensors.

UNIT IV

Robot cell design: Robot work cell design and control-Sequence control, Operator interface, Safety monitoring devices in Robot-Mobile robot working principle, actuation using MATLAB, NXT Software

Robot applications: Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting and undersea robot.

REFERENCE BOOKS:

- 1. S.R. Deb, Robotics Technology and flexible automation, Tata McGraw-Hill Education., 2009
- 2. Mikell P Groover& Nicholas G Odrey, Mitchel Weiss, RogerN Nagel, AshishDutta, Industrial Robotics, Technologyprogramming and Applications, McGraw Hill, 2012
- 3. Richard D. Klafter, Thomas .A, ChriElewski, Michael Negin, Robotics Engineering an Integrated Approach, Phi Learning., 2009.
- 4. Francis N. Nagy, AndrasSiegler, Engineering foundation of Robotics, Prentice Hall Inc., 1987.
- 5. P.A. Janaki Raman, Robotics and Image Processing: An Introduction, Tata McGraw Hill Publishing company Ltd.,1995.
- 6. Fu. K. S., Gonzalez. R. C. & Lee C.S.G., "Robotics control, sensing, vision and intelligence", McGraw Hill Book co, 1987
- 7. Craig. J. J. "Introduction to Robotics mechanics and control", Addison- Wesley, 1999.
- 8. Ray Asfahl. C., "Robots and Manufacturing Automation", JohnWiley & Sons Inc., 1985.

	B. Tech. 7 th Semester Mechanical Engineering										
Course No.	Course Title	Teaching Schedule		Allotn	Allotment of Marks						
		L	Т	Р	Theory	Sessional	Total	(Hrs.)			
ME – 433N	SIMULATION OF	3	0	0	75	25	100	3			
	MECHANICAL SYSTEMS										
Purpose	To make students aware of System and environment concepts of Simulation										
	statistics in simulation, Modelli	ng	elen	nents	in manufa	cturing sys	stems,	Simulation			
	of manufacturing systems, Mod	elli	ng (of ma	nufacturin	g supply cl	hains,	Design of			
	simulation experiments.										
	Course	e O	utco	mes							
CO1	Students will attain the know	led	ge	of S	ystem and	l environn	nent co	oncepts of			
	Simulation & statistics in simula	tior	1.								
CO2	Students will attain the knowled	ge o	of M	lodell	ing elemer	nts in manu	facturi	ng systems			
	& Simulation of manufacturing s	- syst	ems		-						
CO3	Students will attain the knowledge	ge c	of m	odelli	ing of man	ufacturing s	supply	chains.			
CO4	Students will attain the knowled	ge c	of D	esign	of simulat	ion experin	nents.				

Introduction: Concept of System and environment, Continuous and discrete systems, Linear and non-linear systems, Stochastic processes, Static and Dynamic models, Principles of modeling, Basic Simulation modeling, Role of simulation in model evaluation and studies, Steps in a simulation study, Verification, validation and credibility of simulation models, Advantages, disadvantages and pitfalls of simulation,

Statistics in Simulation: Review of basic probability and statistics, random variables and their properties, Statistical analysis for terminating simulation and steady state parameters

UNIT II

Modelling Elements In Manufacturing Systems: Definition, Classifications and characteristics of production systems; measures of manufacturing systems performance, modelling elements in manufacturing systems: processes, resources, single and multi-server queues, arrival processes, service times, downtime, manufacturing costs, resources selection rules, different manufacturing flexibilities.

Simulation of Manufacturing Systems: Simulation of Job shop, batch and Flexible manufacturing systems, Case studies for above systems.

UNIT III

Modelling of Manufacturing Supply Chains (SC): Introduction of SC, Modelling elements in SC, Measures of SC performance, brief review of bear game, SC initiatives and effect on SC performance Modelling of Supply Chain Processes at different Supply chain nodes like: Retailer, assembler, distributor, and manufacturer; Modelling of different SC processes, inventory control policies like (s, S), (s, Q) systems, production control issues like Manufacturing-to-order, Manufacturing-to-stock, Assemble-to-order, Assemble-to-stock; Modelling of material transport system in SC, Development of Simple SC models

Design of Simulation Experiments: Consideration For Selecting Length of Simulation run, no of replication and warm-up period, elimination of initial bias, Finance Considerations of a simulation study, Variance reduction techniques, 2^k factorial design, fractional factorial design, factor screening, response surface, Meta-models and sensitivity, optimization procedures.

Suggested Reading:

- 1. Simulation Modeling and Analysis, 3e, Law A.M. and Kelton W.D., TMH, New Delhi.
- 2. Simulation with Arena Kelton and Sadowski, 2003, (McGraw-Hill).
- 3. Analysis and Control of Production Systems, Printice Hall Publn, E.A. Elsayed and T.O. Boucher, 1994.
- 4. Modelling and Analysis of Dynamic Systems, C.M. Close and Dean K.F., Houghton Mifflin.
- 5. Simulation of Manufacturing, Allan Carrie, John Wiley & Sons.
- 6. System Simulation, Geoffrey Gordon, Prentice Hall, 1998.
- 7. Modern Production /Operations Management, 8e, Buffa E.S. and Sarin R.K., John Wiley.
- Designing and Managing the Supply Chain, 3/e, Simchi-Levi D., Kaminsky P., Simchi-Levi E., Shankar R., TMH, New Delhi.

	B. Tech. 7th Semester Mechanical Engineering									
Course No.	Course Title	Teaching Schedule		Teaching Allotment of Marl Schedule		rks	Duration of Exam			
		L	Т	Р	Theory	Sessional	Total	(Hrs.)		
ME – 435N	CONTROL ENGINEERING	3	0	0	75	25	100	3		
Purpose	Modeling, performance analysis and control with potential application to engineering systems.									
	Course Outcomes									
CO1	Students will be able to understa	nd l	oasis	s of di	ifferent typ	bes of contr	ol syste	ems.		
CO2	Students will be able to Apply order to obtain models that as functions, and state space equati	syst re e ons	tems expro	s theo essed	ory to com using dif	plex real w ferential e	vorld p quatior	roblems in ns, transfer		
CO3	The student will be able to Pr model of that system where th domain.	redia ne n	ct sy node	/stem el ma	behavior y be expi	based on ressed in ti	the ma ime or	athematical frequency		
CO4	The students will be able to Ana such as root locus. Routh Hurwi	lyze tz. F	e the Bode	beha	vior of clo	osed loop sy	stems	using tools		

Control Systems: Introduction, Brief History of Automatic Control, Examples of Control Systems, Engineering Design, Mechatronic Systems, the Future Evolution of Control Systems

UNIT II

Mathematical Models of Systems: Differential Equations of Physical Systems, Linear Approximations of Physical Systems, the Laplace Transform, the Transfer Function of Linear Systems, Block Diagram Models and Signal-Flow Graph Models

UNIT III

Feedback Control System Characteristics: Error Signal Analysis, Sensitivity of Control Systems to Parameter Variations, Disturbance Signals in a Feedback Control System, Control of the Transient Response, Steady-State Error, The Cost of Feedback.

UNIT IV

The Design of Feedback Control Systems: Approaches to System Design, Cascade Compensation Networks, Phase-Lead Design Using the Bode Diagram, Phase-Lead Design Using the Root Locus, System Design Using Integration Networks, Phase-Lag Design Using the Root Locus, Phase-Lag Design Using the Bode Diagram, Design on the Bode Diagram Using Analytical Methods.

Text Books:

1. Modern Control System by Richarc C. Drof and Robert H. Bishop,11th Edition Person Int.

2. Modern Control Engineering by Katsuhiko Ogata, 4th Edition, Prentice Hall of India.

3. Automatic Control Systems by Benjamin C.Kuo, 8th Edition, John Wiley & Sons.

4. Control Systems Engineering by Nagrath and Gopal New Age Publication

5. Feedback and Control Systems by Joseph J Distefano 2nd Edition TMH

NOTE: In the semester examination, the examiner will set 8 questions in all, at least

	B. Tech. 7^{•••} Semester Mechanical Engineering										
Course No.	Course Title	Teaching		Allotn	rks	Duration					
		Sch	nedu	ıle				of Exam			
		L	Т	Р	Theory	Sessional	Total	(Hrs.)			
ME – 437N	ENVIRONMENTAL	3	0	0	75	25	100	3			
	POLLUTION AND										
	ABATEMENT										
Purpose	This course is very important fo	r Me	cha	nical	Engineers	s considerir	ng the e	expectation			
	of the Industries for pollution co	ontro	ol in	their	r premises	so as to co	omply v	with newer			
	and tougher laws and acts that are being enforced in India and globally. This course										
	introduces the principles and methods to control air, water and soil pollution to the										
	undergraduate students of chemi	cal e	ngi	neeri	ng.						
	Cours	e Ou	itco	mes							
CO1	To make students aware with th	e Re	сус	le an	d reuse of	waste, ene	ergy re	covery and			
	waste utilization.		-					-			
CO2	To make students aware with	the .	Air	poll	ution and	its measur	ement,	design of			
	pollution abatement systems for	parti	cula	ite m	atter and g	gaseous cor	stituen	ts.			
CO3	To make students aware with	the	Des	ign o	of waste-v	vater and i	ndustri	al effluent			
	treatment; Hazardous waste treatment and disposal; Solid-waste disposal and										
	recovery of useful products.							-			
CO4	To make students aware with	the	wat	er, a	ir and lan	d pollution	n; legis	slation and			
	standards; Recycle and reuse of	wast	e, ei	nergy	recovery	and waste	utilizat	ion.			

one question from each unit, and students will be required to attempt only 5 questions.

UNIT I

Environmental pollution: Introduction: Environment and environmental pollution from chemical process industries, characterization of emission and effluents, environmental Laws and rules, standards for ambient air, noise emission and effluents.

UNIT II

Pollution Prevention: Process modification, alternative raw material, recovery of by co-product from industrial emission effluents, recycle and reuse of waste, energy recovery and waste utilization. Material and energy balance for pollution minimization. Water use minimization, Fugitive emission/effluents and leakages and their control-housekeeping and maintenance.

Air Pollution Control: Particulate emission control by mechanical separation and electrostatic precipitation, wet gas scrubbing, gaseous emission control by absorption and adsorption, Design of cyclones, ESP, fabric filters and absorbers.

UNIT III

Water Pollution Control: Physical treatment, pre-treatment, solids removal by setting and sedimentation, filtration centrifugation, coagulation and flocculation. Waste water, waste water management.

UNIT IV

Solids Disposal: Solids waste disposal - composting, landfill, briquetting / gasification and incineration. **Biological Treatment:** Anaerobic and aerobic treatment biochemical kinetics, trickling filter, activated sludge and lagoons, aeration systems, sludge separation and drying.

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Reference books:

- 1. "Pollution Control Acts, Rules, Notifications issued there under" CPCB, Ministry of Env. and Forest, G.O.I., 3rd Ed. 2006.
- 2. Vallero D; "Fundamentals of Air Pollution", 4 th Ed; Academic Press.
- 3. Eckenfelder W. W; "Industrial Water Pollution Control", 2 Ed; McGraw Hill.
- 4. Kreith F. and Tchobanoglous G., "Handbook of Solid Waste Management", 2 Ed; Mc Graw Hill.
- 5. Pichtel J; "Waste Management Practices: Municipal, Hazardous and Industrial", CRC.
- 6. Tchobanoglous G.,Burton F. L. and Stensel H.D., "Waste Water Engineering: Treatment and Reuse", 4th Ed; Tata McGraw Hill.

	B. Tech. 8 th Semester Mechanical Engineering										
Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam				
		L	Т	Р	Theory	Sessional	Total	(Hrs.)			
ME – 402N	AUTOMOBILE ENGINEERING	4	0	0	75	25	100	3			
Purpose	To make aware the students with the study of engineering which teaches manufacturing, and mechanical-mechanisms as well operations of automobiles. It is an introduction to vehicle engineering which deals with motorcycles, cars, buses trucks etc. It includes branch study of mechanical, electronic, and safety elements. Some of the engineering attributes and disciplines that are of importance to the automative anginger.										
	Cours	e O	utco	omes							
CO1	Students will be able to De developments in the automobile	evel ind	op ustr	a st y	rong base	e for unde	erstand	ing future			
CO2	Students will be able to Exp transmission, gear box etc.	olair	n tł	e wo	orking of	various p	arts li	ke engine,			
CO3	Students will be able to Desc operate	ribe	ho	w the	e brakes a	and the sus	spensio	on systems			
CO4	Students will be able to Under system.	star	nd t	he ste	eering geo	metry and	emissi	on control			

Introduction: Brief history of automobiles, Main components of an automobile, Brief description of each component. Brief description of constructional details and working of a four stroke I.C. Engine (S.I. Engines and C.I. Engines) including lately developed overhead cam shaft, Multi-cylinder engines, Introduction to recent developments in I.C. Engines- Direct injection systems, Multi-point fuel injection systems, Introduction, Brief description of different components of Transmission System.

Clutch: Clutch Introduction to Clutch and its different types, Principle of Friction Clutch, Clutch Lining and friction materials used in Friction Clutches, Torque transmitted, Brief description of Cone Clutch, Single Plate and Multiplate Clutches, Dry and wet clutches, Automatic clutch action, Centrifugal clutches, Electromagnetic clutches, Fluid Flywheel.

UNIT II

Gear Box: Gear Box Air resistance, gradient resistance and rolling resistance coming across a moving automobile, Tractive effort, Variation of tractive effort with speed, Performance curves (object and need of a gear box), Sliding mesh gear box, Control mechanism, Sliding type selector mechanism, Ball type selector mechanism, Steering column gear shift control, Constant mesh gear box, Synchromesh device, Automatic transmission in general, AP automatic gear box, Torque converter, Torque converter with direct drive, Lubrication of Gear Box.

Propeller Shaft: Functions and requirements of a propeller shaft, Universal joints, Constructional forms of universal joints, Flexible-ring joints, Rubber-bushed flexible joints. Constant-velocity joints. Differential : Principle of operation, Constructional details of a typical Differential unit, Traction control differentials, Multi-plate clutch type traction control device.

UNIT III

Brakes: Functions and methods of operation, Brake efficiency. Elementary theory of shoe brake, brake shoe adjustments, A modern rear-wheel brake, Disc brakes, Brake linkages, Leverage and adjustment of the brake linkage, Servo- and power operated brakes, Vacuum brake operation,' Hydraulic Brakes-constructional details and working, Direct action vacuum servos, Power-operated brakes, A dual power air brake system,

Suspension system: Suspension principles, Road irregularities and human susceptibility, Suspension system, Damping, Double tube damper, Single tube damper, Lever arm type damper, Springs-Leaf springs, Coil and torsion springs, variable rate springs, Composite leaf springs, Rubber springs, Air springs, Adjustable and self-adjusting suspensions, Interconnected suspension system, Interconnected air and liquid suspensions, Independent suspension system, Different independent suspension layouts, McPherson strut type, Rear suspension-live axle, McPherson strut rear suspension.

UNIT IV

Steering Geometry: Castor, Camber, Kingpin inclination, Combined angle, Toe-in, Steering system-basic aims, Ackerman linkage, Steering linkages for independent suspension, Center point steering, Costarring or trailing action, Cornering power, Self-righting torque, Steering characteristics-over steer and under steer, Axle beam, Stub-axle construction, Steering column, Reversible and irreversible steering, Rack-and-pinion steering mechanism, Effect of toe-in on steering, Power steering, Vickers System. Recent trends in automobile engineering Multi fuel automobiles, Automobiles running on alternate sources of energy, Emission control through catalytic converter, Double catalytic converter, Aspects of pollution control in Automobiles.

Reference and Text Books:

- 1. The Motor Vehicle By Newton, Steeds and Garretle Basic
- 2. Automobile Engineering By Kirpal Singh
- 3. Automobile Engineering *' -By K.M. Gupta, Umesh Publications

	B. Tech. 8th Semester Mechanical Engineering										
Course No.	Course Title	Teaching Schedule		Allotment of Marks		rks	Duration of Exam				
		L	Т	Р	Theory	Sessional	Total	(Hrs.)			
ME – 404N	POWER PLANT ENGINEERING	4	0	0	75	25	100	3			
Purpose	To make student aware about the modern aspects of power generation, problems of energy demand and supply and power plant economics.										
	Course	e O	utco	mes							
CO1	To introduce about the different generation.	it s	ourc	es of	energy, 1	nydrology	and hy	dro power			
CO2	To analyze the steam power cyc systems in power plants.	cles	, ste	am g	enerators,	fuels and o	differer	nt handling			
CO3	To understand the concept of co power plants.	mb	inec	l cycl	es power	generation	and die	esel engine			
CO4	To know about the nuclear energ	y a	nd ti	he eco	onomics of	f power gen	eration	l.			

Energy Sources: Conventional and non-conventional sources of energy, Geothermal power plants, Tidal power plants, Windmills, Solar power plants, Solar thermal, Solar Photovoltaic: Direct energy conversion systems, Energy sources in India, Recent developments in power plants.

Hydroelectric Power Plant: Hydrology, Rainfall, runoff, hydrographs, flow duration curves, Site selection for hydro power plants, Classification of hydro power plants, Storage type hydro power plant and its operation, Estimation of power availability, Selection of water turbines, Combination of hydro power plants with steam plants, advantages and disadvantages of hydro power plants.

UNIT II

Analysis of Steam Cycle: The Carnot, The ideal Rankine cycle, externally irreversible Rankine cycle, Superheat, Reheat, Regeneration, internally irreversible Rankine cycle, open feed water heaters, closed type feed water heaters, Typical layout of steam power plant, Efficiency and heat rate.

Steam Generators: Introduction to steam generators, Steam generator control, Fluidized bed boilers, Modern high pressure boilers, Supercritical boilers, Ultra supercritical technology, Advanced Ultra supercritical technology, Flue gas de-nitrification and desulphurization, fabric filters and baghouses, feed water treatment, Deaeration, Internal treatment, boiler blowdown, steam purity.

Fuel and Combustion: Coal as fuel, classification of coals, analysis of coal, Coal handling, Dead and live storage, Combustion of coal, combustion equipment for coal burning, mechanical stokers, pulverized fuels and burners, Cyclone furnace, Low NO_X burners, Ash handling and disposal, Dust collectors. Heat balance sheet for thermal power plants, environmental aspects of power generations.

UNIT III

Diesel Engine Power Plants: Applications of diesel engines in power field, Advantages and disadvantages of diesel plants over thermal power plants, Schematic arrangement of diesel

engine power plant, Different systems of diesel power plant, Performance Characteristics, Supercharging, Layout of Diesel Engine power plant.

Gas Turbine and Combined Cycles: Gas turbine cycles, the ideal Brayton cycle, the non-ideal Brayton cycle, Modification of the Brayton cycle, Gas turbine characteristics, Combined Cycles: combined cycles with heat recovery boiler, The STAG combined-cycle power plant, combined cycles with multi-pressure steam, combined cycle for nuclear power plants.

UNIT IV

Nuclear Power Plants: Basic theory and terminology, Nuclear fission and fusion processes, Fission chain reaction, Moderation, Fertile materials, Nuclear fuels, General components of nuclear reactor, Different types of reactors: PWR, BWR, GCR, LMFBR, CANDU-PHW, India's nuclear power program, Disposal of nuclear waste and related issues.

Economics of Power Generation: Introduction to economics of power generation, Different terms and definitions, Cost analysis, Selection of power plant equipment, factors affecting economics of generation and distribution of power, Performance and operating characteristics of power plants, Economic load sharing, Tariff for electrical energy.

Text Books:

- 1. Power Plant Engineering by Morse.
- 2. Power Plant Engineering by PK Nag.
- 3. Power Plant Technology -By El-Wakil.
- 4. Power Plant Engineering by Domkundawar.

Reference Books:

- 1. Power Plant Engineering -By P.C. Sharma
- 2. Power Plant Technology- By G.D.Rai
- 3. Power Plant Engineering by R.K. Rajput

	B. Tech. 8th Semester Mechanical Engineering											
Course No.	Course Title	Teaching Schedule		Teaching Al Schedule		Allotment of Marks						
		L	Т	Р	Theory	Sessional	Total	(Hrs.)				
ME – 406N	QUALITY ASSURANCE & RELIABILITY	4	0	0	75	25	100	3				
Purpose	This course provides the understanding of Concepts of quality in engineering domain. Various aspects of quality such as quality management, statistical quality control, system reliability, etc. will be taught to students.											
	Cours	e O	utco	omes								
CO1	Students will understand the management.	e c	onc	epts	of qualit	zy, quality	assu	rance and				
CO2	Students will be able to demor process control and able to use a	nstra nd i	ate 1 inter	he al pret c	oility to us control cha	se the meth rts for varia	nods of ables.	f statistical				
CO3	Students will be able to use and understand sampling inspection.	1 in	terp	ret co	ontrol char	ts for attrib	outes, a	llso able to				
CO4	Understand the concepts of reacquainted with computation of methods.	eliał of s	oility syste	y, cai em re	rry out re eliability a	eliability da and reliabil	ata ana lity im	alysis, Get provement				

Introduction- Definition of Quality, Quality function, Dimensions of Quality, Brief history of quality methodology, Statistical methods for quality improvement, Quality costs, Introduction to Quality function deployment.

Quality Assurance (QA) - Introduction, Definition, Management principles in QA, Forms of QA, QA in different stages. Quality planning, QA program, QA aspect, Quality in material management, Vendor selection & development.

UNIT II

Statistical Process Control - Introduction to statistical process control, Concept of variation, Assignable & Chance causes, Attributes & variables, Frequency distribution curve & its types. Normal Distribution curve, Problems on FD curve & ND curve, Application of SPC.

Control Charts for Variables- Definition, Formulae & its problems. Control chart patterns, Process capability. Problems on x & R chart and Process capability.

UNIT III

Control Charts for Attributes- Definition, Formulae & its problems. Problems on p, c charts. Choice between variables and attributes control charts. Guidelines for implementing control charts.

Sampling Inspection - Sampling: Definition, types of sampling, importance, benefits and limitations of sampling, Operating Characteristic Curve, Average Outgoing Quality Curve, Errors in Making Inferences from Control Charts (Type I and II errors).

UNIT IV

Reliability Concepts - Introduction of Reliability concepts, Failure data analysis and examples, Failure rate, Failure density, Probability of failure, Mortality rate, Mean time to failure,

Reliability in terms of Hazard rate and Failure Density, examples, Useful life and wear out phase of a system,

System Reliability and Improvement: Reliability of series and parallel connected systems and examples, Logic diagrams, Improvement of system reliability, Element Redundancy, Unit redundancy, Standby redundancy.

Suggested Reading:

- 1. Grant E L, Statistical Quality Control", McGraw-Hill.
- 2. Mahajan, "Quality Control and Reliability", Dhanpat Rai & Sons
- 3. Srinath L S, "Reliability Engineering", East west press.
- 4. Sharma S C, Inspection Quality Control and Reliability, Khanna Publishers
| | B. Tech. 8th Semester | r M | ech | anica | l Enginee | ring | | | | |
|------------|---|----------------------|---------------|-----------------|---------------------------|-------------------------|--------------------|-------------------|--|--|
| Course No. | Course Title | Teaching
Schedule | | Allotn | Allotment of Marks | | | | | |
| | | L | Т | Р | Theory | Sessional | Total | (Hrs.) | | |
| ME – 408N | AUTOMOBILE
ENGINEERING LAB | 0 | 0 | 2 | 40 | 60 | 100 | 3 | | |
| Purpose | urpose To understand construction details and working of various parts of automotive system | | | | | | | | | |
| | Course | e O | utco | mes | | | | | | |
| CO1 | To make students aware with Ignition System and Injection Sy | co
stei | nstr
n of | uctior | nal details
Engine. | and work | ting of | Cylinder, | | |
| CO2 | To make students aware with
Automotive Transmission System | n co
ms A | onst
Auto | ructio
moti | onal detail
ve Drive L | s of Auto
ines & Dif | motive
ferentia | Clutches,
als. | | |
| CO3 | To make students aware with the Suspension Systems and Automotion | ne E
otiv | Desig
e Su | gn an
Ispens | d construc
sion Syster | tional detai
ns. | ils of A | Automotive | | |
| CO4 | To make students aware with t Design and constructional details Automotive Tyres & wheels Automotive Brake Systems Automotive Emission / Pollution control systems. | | | | | | | | | |

LIST OF EXPERIMENTS:

1. To study and prepare report on the constructional details, working principles and operation of the following Automotive Engine Systems & Sub Systems.

- (a) Multi-cylinder: Diesel and Petrol Engines.
- (b) Engine cooling & lubricating Systems.
- (c) Engine starting Systems.
- (d) Contact Point & Electronic Ignition Systems.

2. To study and prepare report on the constructional details, working principles and operation of the following Fuels supply systems:

(a) Carburetors (b) Diesel Fuel Injection Systems (c) Gasoline Fuel Injection Systems.

3. To study and prepare report on the constructional details, working principles and operation of the following Automotive Clutches. (a) Coil-Spring Clutch (b) Diaphragm – Spring Clutch. (c) Double Disk Clutch.

4. To study and prepare report on the constructional details, working principles and operation of the following Automotive Transmission systems. (a) Synchromesh – Four speed Range. (b) Transaxle with Dual Speed Range. (c) Four Wheel Drive and Transfer Case. (d) Steering Column and Floor – Shift levers.

5. To study and prepare report on the constructional details, working principles and operation of the following Automotive Drive Lines & Differentials. (a) Rear Wheel Drive Line. (b) Front Wheel Drive Line. (c) Differentials, Drive Axles and Four Wheel Drive Line.

6. To study and prepare report on the constructional details, working principles and operation of the following Automotive Suspension Systems. (a) Front Suspension System. (b) Rear Suspension System.

7. To study and prepare report on the constructional details, working principles and operation of the following Automotive Suspension Systems. (a) Manual Steering Systems, e.g. Pitman –arm steering, Rack & Pinion steering. (b) Power steering Systems, e.g. Rack and Pinion Power Steering System. (c) Steering Wheels and Columns e.g. Tilt & Telescopic steering Wheels, Collapsible Steering Columns.

8. To study and prepare report on the constructional details, working principles and operation of the following Automotive Tyres& wheels. (a) Various Types of Bias & Radial Tyres. (b) Various Types of wheels.

9. To study and prepare report on the constructional details, working principles and operation of the Automotive Brake systems. (a) Hydraulic & Pneumatic Brake systems. (b) Drum Brake System. (c) Disk Brake System. (d) Antilock Brake System. (e) System Packing & Other Brakes.

10. To study and prepare report on the constructional details, working principles and operation of Automotive Emission / Pollution control systems.

NOTE:

1. At least ten experiments are to be performed in the Semester.

2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or as designed & set by the concerned institution as per the scope of the syllabus

	B. Tech. 8 th Se	emes	ter N	/lecha	nical Engin	eering		
Course No.	Course Title	Teaching Schedule		Allotn	Duration of Exam			
		L	L T P		Practical	Sessional	Total	(Hrs.)
ME – 410N	PROJECT-II	0	0	10	100	100	200	3

The students expected to take up a project under the guidance of teacher from the college. The project must be based on mechanical engineering problems, which can be extended up to the full semester. The students may be asked to work individually or in a group not more than four students in a group. Viva- voce must be based on the preliminary report submitted by students related to the project.

	B. Tech. 8 th S	emes	ter M	[echa	nical Engin	leering		
Course No.	Course Title	Tea Scł	Teaching Schedule		Allotment of Marks			Duration of Exam
		L	L T P		Practical	Sessional	Total	(Hrs.)
ME-412N	SEMINAR- II	0	0 2 0 0 100 100					

The students are required to deliver a seminar on some emerging areas of Mechanical Engineering, given as follows:

- CAD/CAM/CAE/FEA
- Robotics
- Machine Vision
- Automation
- Tribology
- CFD
- Energy Conservation
- Alternate Energy Sources
- Hybrid Fuels
- Advances in IC Engines
- Vehicle Dynamics

- Aerodynamics
- Advanced Manufacturing Techniques
- Advanced Engineering Materials
- Supply Chain Management
- Business Process Re-engineering
- Six-Sigma Technique
- Lean Manufacturing Technique
- Just-in-Time Technique
- Agile Manufacturing
- Value Engineering
- Reliability Engineering
- Any other topic related to Design/Thermal/Industrial/Production Engineering

The student will deliver a power point presentation for about 30 minutes in the seminar on any of the above topics. This will be followed by question answering session for about 10 minutes. The questions on the seminar topic will be asked by the teacher concerned and class students. The students will also prepare a detailed report in MS word and after spiral binding will submit it to the teacher concerned. The report is to be submitted at least one week prior to the presentation. The grades/awards will be given according to the student's presentation, report submitted, and answering of questions asked after the presentation.

ELECTIVE-III

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	B. Tech. 8th Semester	r M	[ech	<u>anica</u>	l Enginee	ring		
Course No.	Course Title	Teaching Schedule		Allotn	nent of Ma	rks	Duration of Exam	
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME – 414N	SMART MATERIALS,	4	0	0	75	25	100	3
	STRUCTURES & DEVICES							
Purpose	This course is designed to give	an	ins	ight i	nto the la	test develo	pments	regarding
	smart materials and their use in structures.							
	Course	e O	utco	omes				
CO1	Describe the basic concepts relat	ed	to S	mart 1	materials a	nd Intellige	nt Mat	erials.
CO2	Describe the role of various sr	nar	t m	ateria	ls in struc	tural syste	ms and	d usage of
	Electrorheological fluids.							
CO3	Describe the working and Engine	Describe the working and Engineering applications of Piezoelectric materials						
CO4	To make student understand the Structural Applications of Smart Materials and							
	different aspects of Biomimetic structural design.							

UNIT-I

Smart materials:

Introduction, Historical Perspective, Overview of Microsystems and Smart Systems, Need for Miniaturization, Role of Microfabrication, Typical applications of Microsystems and Smart Systems.

Intelligent materials:

Structural Materials, Functional Materials, Primitive functions of Intelligent Materials, Intelligence inherent in Materials, Materials Intelligently Harmonizing with Humanity, Intelligent Biological Materials.

UNIT-II

Smart Materials and Structural Systems:

The principal ingredients of a premier class of smart materials, Actuator Materials, Sensing Technologies, Micro-sensors, Intelligent Systems, Hybrid Smart Materials, Passive Sensory Smart Structures, Reactive actuator based Smart Structures, Active Sensing and Reactive Smart Structures. Smart Skins, Synthesis of Future smart systems.

Electrorheological Fluids:

Suspension and Electro-rheological fluids, The Electro-Rheological Phenomenon, Charge Migration mechanism for the dispersed phase, Electrorheological Fluid Actuators, Experimental investigations.

UNIT-III

Piezoelectric Materials:

Introduction, Basic Principle, History, Classification of Dielectric materials, Important Dielectric Parameters, Electrostrictive effect, Piezoelectric Effect, Pyroelectric Effect, Ferroelectric Materials, Poling. Examples of Piezoelectric Materials: Quartz, Lead Zirconate Titanate(PZT), Fabrication of PZT, Polymer Piezoelectric Materials, Barium Titanate, Zinc Oxide Thin Films, Polymer Composites.

Engineering Applications of Piezoelectric Materials:

Gas Lighter, Pressure Sensor, Accelerometer, Piezoelectric Gyroscope, Piezoelectric Microphone, Piezoelectric Actuators, Piezoelectric Motor, Piezoelectric Transformer

UNIT-IV

Structural Applications of Smart Materials:

Introduction, Materials and Applications; Shape Memory alloys, Substitute for steel, Engineered Cementitious Composites, Carbon Fiber Reinforced Concrete, Smart Concrete, ER/MR Fluids, Induced Strain Actuators. Active Control of Structures, Passive Control of Structures, Hybrid Control, Smart Material Tag, Retrofitting, Restoration of Cultural Heritage using SMA Devices, SMA for Seismic Retrofit of Bridges, Self-Healing Materials, Self-Stressing for Active Control, Structural Health Monitoring, Active Railway Track Support, Active Structural Control against Wind.

Biomimetic Structural Design:

Biomimetic, Characteristics of Natural Structures, Biomimetic Structural Design; Fiber Reinforced Organic Matrix Natural Composites, Fiber Reinforced Natural Ceramers: Bone and Antler, Fiber Reinforced Organic Matrix and Ceramic Matrix Composites: Mollusks, Biomimetic Sensing, Cochlea, Bats, Challenges and Opportunities

References:

- 1. Smart Materials and Structures by B.V. Gandhi and B.S. Thompson, Chapman and Hall Pub.
- 2. Smart Materials Edited by Mel Schwartz , CRC Press.
- 3. Smart Structures Analysis and Design by A.V. Srinivasan and D. Michael McFarlaid, Cambridge University Press.
- 4. Piezoelectric Materials and Devices: Applications in Engineering and Medical Sciences by M.S. Vijaya, CRC Press.
- 5. Smart Structures and Materials by Brian Culshaw, Artech House.
- 6. Smart Structures by Gauenzi, P., Wiley Publication.
- 7. Piezoelectricity by Cady, W. G., Dover Publication.

	B. Tech. 8th Semeste	r M	ech	anica	l Enginee	ring			
Course No.	Course Title	Teaching Schedule		Allotn	nent of Ma	rks	Duration of Exam		
		L	Т	Р	Theory	Sessional	Total	(Hrs.)	
ME - 416N	LUBRICATION	4	0	0	75	25	100	3	
	TECHNOLOGY								
Purpose	Providing a fundamental unde	rsta	ndiı	ng of	lubricant	s and lubr	ricant 1	technology	
	including emerging lubricants	suc	ch a	as sy	nthetic an	d environ	nentall	y friendly	
	lubricants & application & usage	e of	lub	ricant	s in Auton	nobiles & N	lachine	es.	
	Course Outcomes								
CO1	Students will interpret, exemplif	y &	use	e the t	terminolog	y pertaining	g to Lu	bricants &	
	Lubrication as in Industries d	& c	an	diffe	rentiate &	classify	various	s types of	
	lubricants based upon their prop	ertie	es.						
CO2	Students will attain knowledge r	ega	rdin	g the	production	n or distillat	tion of	Mineral &	
	Chemically modified lubricating	bas	se o	ls &	Need, App	lication, Us	ses, Cla	assification	
	& Properties of Synthesized base	e oil	ls &	Meta	ıl Working	Fluids.			
CO3	Students will attain a theoretica	l ur	nder	stand	ing of var	ious types	of lubr	rications &	
	their applications to avoid/reduc	e fri	ctio	n & v	vear.				
CO4	Students will be able to classify	&	theo	oretica	ally disting	uish betwe	en vari	ious Steam	
l .	& Gas Turbine Oils, Compresso	r, V	acu	um Pu	ump & Ref	rigeration (Dils.		

UNIT I

BASICS OF LUBRICANTS

Terminology related to Lubricants & Lubrication: Viscosity; Absolute & Kinematic Viscosity; Newtonian & Non- Newtonian Fluids; Viscosity Measurement; Viscosity Index; Additives; Base Stocks; Anti-Foam Agents; Anti-oxidant; Anti-Wear Agents; Aromatic agents; Role of lubricants in Asperity; Boundary Lubrication; Corrosion Inhibitor; Demulsibility; Detergent; Dielectric Strength; Diester; Dispersant; Dropping Point; Dry Running; Emulsifier; Extreme-Pressure Agent; Film Strength (Lubricity); Hydrolytic Stability; Neutralization Number; Oxidative Stability; Paraffinic etc.

Lubricants: Introduction; Functions of lubricants, types and properties; Mineral Oils, Synthetic Oils, Biodegradable, Environment friendly oils; Automotive Engine Oils; Metal Working Fluids; Aviation Oils; Greases.

UNIT II

Mineral & Chemically modified lubricating base oils: Introduction; Steps Involved in production of Mineral base oils in refineries; Vacuum Distillates characteristics & Properties; Conventional refinery production of Lubricating base oils;

Synthesized base oils: Introduction, Need, Application & Uses, Classification, Properties.

Metal Working Fluids: Classification of Metal Working Fluids; Emulsions & Lubricants; Surface Active compounds in metal working fluids; rolling oils for steel; performance evaluation of steel rolling oils.

UNIT III

Lubrication, Friction & Wear

Introduction; Dry friction; Boundary lubrication; Hydrodynamic, Hydrostatic and Elastohydrodynamic lubrication; Lubricant additives; Principles, application to rolling contact bearings, cams, Gears.

UNIT IV

Industrial Lubricants

Steam & Gas Turbine Oils: Classification of Turbine Oils, Properties & Functions of Turbine Oils, Viscosity, Rust & Corrosion Protection, Demulsibility, Air Release, Foam Control, Antiwear Property, Oxidation Stability, Gas Turbine Oils.

Compressor, Vacuum Pump & Refrigeration Oils: Classification & Specifications of Compressor Oils, Functions of Compressor Oils; Lubrication of Reciprocating Compressor: Compressor Oil properties; Synthetic compressor oils; Vacuum Pump oils; Refrigeration compressor oils; requirement & specification of Refrigeration oils.

Suggested Reading:

- 1. Developments in Lubricant Technology By S.P. Srivastava, Wiley
- 2. Mechanics and Chemistry in Lubrication- By Dorinson and Ludema, Elsevier
- 3. Friction and wear of Materials- By E. Robinowicz, Johan Wiley
- 4. Principles of Lubrication-By A. Cameron, Longmans
- 5. Chemistry and Technology of Lubricants By R. M. Mortier, S. T. Orszulik, Springer-Science + Business Media, B.V.
- **6.** Lubricant Additives: Chemistry and Applications Second Edition edited by Leslie R. Rudnick, CRC Press, Taylor & Francis Group.

	B. Tech. 8 th Semeste	r M	lech	anic	al Engine	eering			
Course No.	Course Title	Τe	each	ing	Allotme	ent of Marl	KS	Duration	
		Sc	hed	ule				of Exam	
		L	Т	Р	Theory	Sessional	Total	(Hrs.)	
ME-418N	ENERGY MANAGEMENT	4	0	0	75	25	100	3	
Purpose	This course will enlighten the students about the knowledge of Site & Building Surveys, HVAC Systems, Illumination Systems, Process Energy, Building Envelope, Economics & Use of Computers in Energy Management.								
Course Out	comes		_						
CO1	Students will be able to discuss parameters involved. The tech HVAC Systems.	ho [*] nica	w S ılitie	ite &	k Building	g Surveys a	are done & classi	& the key fication of	
CO2	Students can describe the fur technical problems regarding l advantages of Process Energy.	ndar Ilur	nen nina	tal p tion	orinciples, Systems	, classifica & princip	tion & oles, app	can solve lication &	
CO3	Students will be able to describe the Economics of Energy Management & Conservation Building Envelopes its design & other key considerations.								
CO4	Students can theoretically explai	n th	e us	se of	Compute	rs in Energy	y Manag	ement.	

UNIT I

Site & Building Surveys: Phases involved in surveys: Initiation phase, audit and analysis phase, implementation phase; General methodology for Building and Site Energy Audit; **Site survey**: Methodology, Site survey-electrical system, steam and water systems; **Building Survey**: Methodology, Basic energy audit instrumentation, Measurement for building surveys.

Heating, Venting & Air Conditioning System: General principles; The requirements for human comfort; Description of typical systems-dual duct HVAC system; Multi zone HVAC systems: Variable and Volume systems, Terminal repeat system, Evaporative systems, Package system; Basic principle governing HVAC system, Package system; Energy management opportunities in HVAC systems; Modeling of Heating and cooling loads in buildings; Problems.

UNIT II

Illumination or Lightning Systems: General principles; Illumination and human comfort; Basic principles of lighting system; Typical illumination system and equipment; Fundamentals of single phase and 3 phase A.C. circuits; Energy management opportunities for lighting systems, motors and electrical heat; Electrical analysis and their parameters, peak demand control; Problems.

Process Energy: General principles; Process heat; Energy saving in: Condensate return, Steam generation and distribution, Automotive fuel control, Hot water and Water pumping; Direct and indirect Fired furnaces *over* process electricity; Other process energy forms-compressed air and manufacturing processes; Problems.

UNIT III

Economics of Energy Management: General consideration, life cycle costing, break-even analysis, cost of money, benefit/cost analysis, payback period analysis, prospective rate of to return, problems.

Building Envelope: Environmental conformation; Passive design; Conservation building envelope design consideration; Integration of building system; Energy storage problems.

UNIT IV

Energy Management Principle Involving Computers: Basics of computer use; Analysis: Engineering and Economic calculations, Simulation, Forecast; CAD/CAM controls: Microprocessor and Minicomputers; Building cycling and control; Peak demand limiting and control: Industrial power management; Problems.

Text Book:

1. Energy Management Principles by Criag B. Smith, Published by Pergamon Press.

2. Energy systems and developments – Jyoti Parikh, Oxford University Press.

Reference Books:

1. Energy – resources, demand and conservation with reference to India – Chaman Kashkari, Tata Mc Graw Hill Co. Ltd.

2. Integrated renewable energy for rural development – Proceedings of Natural solar energy convention, Calcutta.

Course No.	Course Title	Te	each	ing	Allotme	ent of Marl	KS	Duration
		Sc	hed	ule				of Exam
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME-420N	WASTE HEAT RECOVERY SYSTEM	4	0	0	75	25	100	3
Purpose	This course provides the know Recovery Systems & Cogenera analyse the techno economic via	wleo atio bili	dge n ai ty oi	abo nd a f var	ut upcom lso enabl ious energ	es the stud	pt of V dents to systems.	Vaste Heat think and
Course Out	comes							
CO1	Students will develop an underst can classify the commercially v applications & associated saving	tanc iab po	ling le w tenti	to th vaste ial.	he basics of heat reco	of Waste he overy devic	eat recov es along	ery & then with their
CO2	Students will be able to de cogeneration, the cogeneration to IC engine.	escr ech	ibe nolo	the gies	basic tl based on	hermodynai steam turbi	mic pri ine, gas t	nciples of curbine and
CO3	Students will attain a theoretica waste heat recovery & cogenerat	l ur ion	nder tecl	stanc nnole	ling of ap ogies.	plications	& issues	s related to
CO4	Students will theoretically anal	lyze	the	e Ec	onomical	& enviror	nmental	aspects of

UNIT I

Waste Heat Recovery

Introduction; Heat Losses; Heat recovery from heat treatment furnace; Heat Recovery Classification and Application; Benefits of Waste Heat Recovery; Development of a Waste Heat Recovery System; Commercial Waste Heat Recovery Devices: Heat Pipe, Economizer, Shell and Tube Heat Exchanger, Plate heat exchanger, Run Around Coil Exchanger, Waste Heat Boilers, Heat Pumps, Thermo compressor, Direct Contact Heat Exchanger.

UNIT II

Cogeneration

Principles of cogeneration; Performance indices of cogeneration systems; Cogeneration systems based on steam turbine, gas turbine, combined cycle, and IC engines.

Advanced cogeneration systems based on fuel cells, Stirling Engines; Cogeneration plants electrical interconnection issues - Utility and cogeneration plant-interconnection issues.

UNIT III

Waste Heat Recovery & Cogeneration: Applications

Applications of cogeneration: Utility sector, Industrial, Construction and Rural sectors; Impacts of waste heat recovery & cogeneration plants: Fuel, Electricity and Environment.

Waste heat sources; Selection criteria for waste heat recovery technologies; Recuperative and regenerative heat exchangers for waste heat recovery; Waste heat boilers: Classification, Design considerations, Sizing, Location, Performance calculations, Service conditions; Heat pumps - types, design.

UNIT IV

Waste Heat Recovery & Cogeneration: Economics

Application. Economic analysis of cogeneration and waste heat recovery systems. procedure for optimization of system selection and design, load curves, sensitivity analysis. Regulatory and financial framework for cogeneration and waste heat recovery systems. Environmental considerations. Mitigation of harmful emissions from energy production, conversion and utilization technologies. Control of air, water and ground pollution.

Suggested Reading:

- 1. Khartchenko N.V. Green Power: Eco-Friendly Energy Engineering, Tech Books, New Delhi,2004.
- 2. Boyce M.P. cogeneration and combined cycle power plants, ASME press, 2nd ed., 2010
- 3. Pehnt M. et al. Micro Cogeneration Springer, 2005.
- 4. Meckler, M., Hyman L.B. Sustainable on-Site CHP Systems, McGraw-Hill, 2010.
- 5. Obara S. Distributed energy systems, Nova Science, 2009.
- 6. Khartchenko N.V. Advanced Energy Systems, Taylor and Francis, Washington DC, 1998.
- 7. Harvey D.L. Handbook on Low-Energy Buildings and District-Energy Systems, Earthscan, 2006.

	B. Tech. 8 th Semeste	r M	[ech	anic	al Engine	eering			
Course No.	Course Title	Teaching Schedule		Allotme	ent of Marl	KS	Duration of Exam		
		L	Т	Р	Theory	Sessional	Total	(Hrs.)	
ME-422N	FOUNDRY ENGINEERING	4	0	0	75	25	100	3	
Purpose	The present course focus on giving the exposure of various Foundry processes for a product whose scale ranges from miniature to extra-large, Moulding-Coring practice, Melting inoculations practices, Quality Control of the casting.								
Course Out	comes								
CO 1	Express Knowledge about the related to casting process.	fu	ndai	nent	als of th	e casting,	basic to	erminology	
CO 2	Decide the alternative method for Applications.	or ti	he n	nanu	facturing	of compon	ent for e	engineering	
CO 3	Select the methods of the castin cast alloy & different melt-treatr	ng a nen	ind ts.	Deci	de correc	t melting p	ractice	of different	
CO 4	Demonstrate the ability to select the proper molding material, type of furnace with relevant refractory material, use appropriate casting design and temperature measurement device to obtain quality cast products.								
CO 5	Minimize the defects generated during casting.								

UNIT-I

Introduction: Introduction to metal casting and foundry industry in modern industrial scenario. Advantages and limitations of casting methods. Classification of foundries. Different sections in a foundry and their functions. Important cast metals and alloys-their composition, properties and uses.

Patterns: Types of patterns, brief classification of pattern making materials, consideration in selection of pattern materials, color coding, pattern allowances, core boxes, types of core boxes.

UNIT-II

Moulding and core making: Ingredients of common type of moulding and core making sands, their properties and behavior, testing of sands and clay.

Moulding processes: Classification of molding processes and casting processes, brief description of all processes such as green sand dry sand, loam sand floor, pit and machine molding.

Casting processes: Shell molding, CO₂ silicate process, Investment casting process, permanent moulding process, Gravity and pressure die casting, centrifugal casting process.

UNIT-III

Elements of Gating system: Classification, basic consideration in gating design, gating ratio, gating practice for ferrous and nonferrous alloys, pouring equipment.

Risering Practice: function of riser, directional and progressive solidification, centerline feeding resistance, riser efficiency, riser design consideration, risering curves, Cain's, N.R.L and modulus method, feeding distance feeding aids, blind and atmospheric risers.

UNIT-IV

Melting Practice: Melting of cast iron, Mechanical features of cupola, operational steps and principles of cupola operation, Advanced practices in the cupola operation, melting of aluminum

and copper based alloys including mold treatments such as dressing, grain refining, and modification.

Quality control in foundry: Casting defects, their causes and remedies. Shop floor quality control tests such as composition control, Wedge test, fluidity, temperature measurement. Casting Modification by different methods like Friction stir processing.

Reference Books:

1. Manufacturing Technology: Foundry, Forming and Welding by P.N.Rao, Tata McGraw Hill Education Private Limited

2. Principles of Metal Casting, R. W. Heine, C. R. Loper and P. C. Rosenthal, (Tata McGraw Hill)

- 3. Principles of Foundry Technology, P. L. Jain, (Tata McGraw Hill).
- 4. Fundamentals of Metal Casting Technology, P. C. Mukherjee, (Oxford & IBH)
- 5. Foundry Technology, P. R. Beeley
- 6. Foundry Engineering, H. F. Taylor, M. C. Flemings, (Wiley Eastern)
- 7. Foundry Technology, D. Kumar & S. K. Jain, (CBS Pub.)

	<u>B. Tech. 8th</u> Semeste	r M	[ech	anic	al Engine	eering		
Course No.	Course Title	Te Sc	each hed	ing ule	Allotme	ent of Marl	KS	Duration of Exam
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME-424N	ERGONOMICS IN DESIGN	4	0	0	75	25	100	3
Purpose	To introduce basic approaches of work system design, ergonomic principles and their application in the design of work, equipment and the workplace.							ciples and
Course Out	comes							
CO 1	To demonstrate the application of	of w	ork	study	y and its r	nethods		
CO 2	To familiarize the students with	the	wor	k me	asuremen	t and samp	ling tech	niques
CO 3	To introduce the human factor engineering and the factors affecting the human performance.							
CO 4	To exercise for the design of the work space, equipment's and environment.							

UNIT I

Introduction to Work Study: Productivity, Scope of methods, motion and time study. **Work Methods Design:** Operation Process Chart, Flow Process Chart, Flow Diagram, String Diagram, Man and machine chart, Two handed process chart, Travel Chart, Micro motion and memo motion study.

UNIT II

Work Measurement: Tools and Techniques

Work Sampling: Determining time standards from standard data and formulas, Pre-determined motion time standards, Work factor system, Methods time measurement, Analytical Estimation, Measuring work by physiological methods – heart rate measurement – measuring oxygen consumption– establishing time standards by physiology methods.

UNIT III

Human Factors Engineering: Introduction to ergonomics, Man/machine/environment systems concept, Human Anthropometry and its use in work place layout.

Human Performance: Information input and processing, factors affecting human performance, physical work load and energy expenditure, heat stress, manual lifting, Static and dynamic muscular load, human motor activity, metabolism, physical work load, repetitive and inspection work, measurement of physical work load, mental work load and its measurement, musculo-skeleton disorder, work duration and work pauses, principles of motion economy.

UNIT IV

 vibrations, methods of reducing vibrations, Noise - Physiological effects of noise, annoyance of noise, speed interference, hearing loss, temporary and permanent threshold shift, effect of noise on performance, reduction of noise, personal noise protection, Standards and social aspects. **Text Books:**

1. Introduction to Work Study, I.L.O., 3rd Revised Edn.

- 2. Motion and Time Study Design and Measurement of Work, Barnes, Raeph.m., John Wiley & sons, New York.
- 3. Human Factors in Engineering and Design, Macormick, E.J., Tata McGraw-Hill
- 4. A Guide to Ergonomics of Manufacturing, Martin Helander, TMH.
- 5. Human Factor Engineering, Sanders & McCormick, McGrawhill Publications.
- 6. Sound, Noise and Vibration Control, Lyle, F. Yerges, Van Nostrand.

Reference Books:

- 1. Improving Productivity and Effectiveness, Mundel, Marvin, E., Prentice Hall.
- 2. Human Factors Engineering & Design, Sounders, M.S. and McCornic, E.J., McGraw Hill.
- 3. Motion and time study, Benjamin .W. Neibel,, Richard .D .Irwin Inc., Seventh Edition.
- 4. Work design Stephen Konz., Publishing Horizon Inc., Second Edition.
- 5. Introduction to Ergonomics, Bridger R.S., McGraw Hill.
- 6. Applied Ergonomics, Hand Book: Brien Shakel (Edited) Butterworth Scientific, London.
- 7. Work Study and Ergonomics, Shan, H.S, DhanpatRai& Sons.

ELECTIVE-IV

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Course No.	Course Title	Te Sc	each hed	ing ule	Allotme	ent of Marl	KS	Duration of Exam	
		L	Т	Р	Theory	Sessional	Total	(Hrs.)	
ME-426N	Manufacturing Management	4	0	0	75	25	100	3	
Purpose	Students will be able to comprehend the major aspects of Manufacturing management like production & operation management, plant location and layout material handling and management, Waste Management & Automation.								
Course Out	comes								
CO 1	Students will be able to attain the management.	ne tl	heor	etica	ıl knowled	dge of prod	uction &	z operatior	
CO 2	Students will be able to attain location and layout.	the	the	oreti	cal know	ledge of th	e conce	pt of plant	
CO 3	Students will be able to attain t management.	he	theo	oretic	al knowle	edge of ma	terial ha	ndling and	
CO 4	Students will be able to attain t Automation.	he t	heo	retica	al knowle	edge of Wa	ste Man	agement &	

UNIT-I

Introduction to Production and Operation Management: Introduction, Historical Evolution of Production and Operation Management, Concept of Production, Production System, Production Management, Operation System, Operation Management, Managing Global Operations, Scope of Production and Operation Management.

UNIT-II

Plant Location and Layout: Introduction and Meaning, Need for Selecting a Suitable Location, Factors influencing Plant location, Location theories, Location models, Location economics, Plant layout, Classification of layout, Design of Product layout, Design of Process layout, Service layout, Organization of physical facilities.

UNIT-III

Material Handling and Management: Introduction, Objectives of Material Handling, Principles of Material Handling, Selection of Material Handling Equipment, Evaluation of Material Handling System, Material Handling Equipment, Guidelines for Effective Utilization of Material Handling Equipment, Relationship Between Plant Layout and Material Handling, Scope and Function of Material Management, Material Planning and Control, Inventory Control, Standardization, Simplification, Ergonomics, Just-in-Time(JIT) Manufacturing.

UNIT-IV

Waste Management: Introduction Reasons for Generation and Accumulation of Obsolete, Surplus and Scrap Items, Identification and Control of Waste, Disposal of Waste.

Automation: Introduction, Types of Automation, Computer Integrated Manufacturing, Reasons for Automation, Advantages and Disadvantages of Automation, Automation Strategies, Automated Flow Lines, Automated Guided Vehicles System, Automated Storage/Retrieval System.

REFERENCES AND TEXT BOOKS:

1. Production and operational management by S. Anil Kumar/N. Suresh.

- 2. Production and operational management by Pratibha Garg.
- 3. Modern Production Management Systems by Sushil Gupta Martin Starr.

4. Manufacturing Operations Management by Sanjay Sharma.

	the second se							
	B. Tech. 8 th Semeste	r M	lech	anic	al Engine	ering		
Course No.	Course Title	Teaching		Allotme	Duration			
		Sc	hed	ule		of Exam		
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME-428N	DESIGN OF PRESSURE	4	0	0	75	25	100	3
	VESSELS AND PIPING							
Purpose	The main objective is to prese	nt t	he i	ndus	strial relat	ted problem	ns, proc	edures and
	design principles for pressure vessels and enhance the understanding of design							
	procedure of pressure vessel and	De	sign	of p	piping layo	out.		
Course Out	comes							
CO 1	Student will attain the knowledg	ge o	f In	trodu	ction to j	piping syste	em and s	selection of
	piping components							
CO 2	Student will attain the knowledg	ge o	f St	resse	s induced	in Pressur	e vessels	s and stress
	analysis							
CO 3	Student will attain the knowledg	e of	f De	tail I	Designing	of vessels	and intro	oduction to
	ASME pressure vessel codes 23							
CO 4	Student will attain the knowledge of the Buckling of vessels and its preventions							

UNIT I

INTRODUCTION

Methods for determining stresses – Terminology and Ligament Efficiency – Applications.

Layout of Piping Systems

Selection of Piping Components (Flanges, Valves, Supports, Expansion Joints, etc.), Selection of Material

UNIT II

STRESSES IN PRESSURE VESSELS

Introduction – Stresses in a circular ring, cylinder – Membrane stress Analysis of Vessel Shell components – Cylindrical shells, spherical Heads, conical heads – Thermal Stresses – Discontinuity stresses in pressure vessels.

UNIT III

DESIGN OF VESSELS

Design of Tall cylindrical self-supporting process columns –Supports for short, vertical and horizontal vessels – stress concentration – at a variable Thickness transition section in a cylindrical vessel, about a circular hole, elliptical openings. Theory of Reinforcement – pressure vessel Design. Introduction to ASME pressure vessel codes 23, Piping Codes & Standards (ASME B31.3)

UNIT IV

BUCKLING OF VESSELS

Buckling phenomenon – Elastic Buckling of circular ring and cylinders under external pressure – collapse of thick walled cylinders or tubes under external pressure – Effect of supports on Elastic Buckling of Cylinders – Buckling under combined External pressure and axial loading. **<u>PIPING</u>**:-Introduction – Flow diagram – piping layout and piping stress Analysis, Pipe sizing, Flow and Pressure Drop Calculations, Piping Flexibility.

TEXT BOOKS:

1. John F. Harvey, "Theory and Design of Pressure Vessels", CBS Publishers and Distributors, 1987.

REFERENCES:

- 1. Henry H. Bedner, "Pressure Vessels, Design Hand Book", CBS publishers and Distributors, 1987.
- 2. Stanley, M. Wales, "Chemical process equipment, selection and Design". Buterworths series in Chemical Engineering, 1988.
- 3. William. J., Bees, "Approximate Methods in the Design and Analysis of Pressure Vessels and Piping", Pre ASME Pressure Vessels and Piping Conference, 1997.
- 4. Sam Kannapan, "Introduction to Pipe Stress Analysis". John Wiley and Sons, 1985.

Course No.	Course Title	Te Sc	each hed	ing ule	Allotme	ent of Mark	KS .	Duration of Exam	
		L	Т	Р	Theory	Sessional	Total	(Hrs.)	
ME-430N	CONCURRENT ENGINEERING	4	0	0	75	25	100	3	
Purpose	To make students aware of objectives of Concurrent engineering, Design P for Customer, Design for Manufacture (DFM), Quality by Design and Design ability.							gn Produc sign for X-	
Course Out	comes								
CO 1	Students will attain the knowled	ge c	of ot	ojecti	ves of Co	ncurrent en	gineerin	ıg.	
CO 2	Students will attain the knowled	ge c	of D	esign	Product	for Custom	er		
CO 3	Students will attain the knowledge of Design for Manufacture (DFM)								
CO 4	Students will attain the knowledge of Quality by Design and Design for X-ability:								

UNIT I

Introduction: Background and challenges faced by modern production environment, sequential engineering process, Concurrent engineering definition and requirement, meaning of concurrent objectives of CE, benefits of CE, Life cycle design of products, life cycle costs. Support for CE: Classes of support for CE activity, CE organizational, structure CE, team composition and duties, Computer based Support, CE Implementation Process.

UNIT II

Design Product for Customer: Industrial Design, Quality Function Deployment, house of quality, Translation process of quality function deployment (QFD). Modeling of Concurrent Engineering Design: Compatibility approach, Compatibility index, implementation of the Compatibility model, integrating the compatibility Concerns.

UNIT III

Design for Manufacture (DFM): Introduction, role of DFM in CE, DFM methods, e.g. value engineering, DFM guidelines, design for assembly, creative design methods, product family themes, design axioms, Taguchi design methods, Computer based approach to DFM. Evaluation of manufacturability and assemble ability.

UNIT IV

Quality by Design: Quality engineering & methodology for robust product design, parameter and Tolerance design, Quality loss function and signal to noise ratio for designing the quality, experimental approach.

Design for X-ability: Design for reliability, life cycle serviceability design, design for maintainability, design for economics, decomposition in concurrent design, concurrent design case studies.

Text Books:

1. Concurrent Engineering- Kusiak - John Wiley & Sons

2. Concurrent Engineering- Menon - Chapman & Hall

Course No.	Course Title	Teaching Schedule			Allotment of Marks			Duration of Exam
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME-432N	INDUSTRIAL COMBUSTION	4	0	0	75	25	100	3
Purpose	This course is designed to offer applied Combustion. By studyi industrial power plants and autor	er b ng mot	asic this vile	kno cou secto	owledge t rse, the s or.	o the stude student sha	ents in t ll be ab	the area of le work in
Course Out	comes							
CO 1	Apply fundamental principles of the rate of chemical reactions and emission characteristics of fuels used in power plants and transportation sector.							
CO 2	Determine and calculate the values of the flame temperature of commercial fuels burning in the combustion chambers of internal combustion engines							
CO 3	Express the concept of Thermodynamic and transport properties of fuels at elevated pressures and temperatures prevalent in the combustion chambers of actual engines.							
CO 4	Solve the problems on the bu combustion characteristics of dif	rnin fus	ig v ion∶	eloci flame	ity of pre es.	emixed flar	mes and	important

UNIT-I

Introduction

Historical perspective of combustion science, perspective of fuels and combustion technology. Types and general characteristics of fuels, proximate and ultimate analysis of fuels. ROM, DMMF, DAF and bone dry basis. Moisture and heating value determination, gross and net hearting values, calorimetry, Du Long's formula for HV estimation, Flue gas analysis, Orsat apparatus.

Fuel Types

UNIT-II

Solid Fuels: Peat, coal, biomass, wood waste, agro fuels, refuse derived solid fuel, testing of solid fuels. Bulk and apparent density, storage, wash ability, coking and caking coals. Liquid Fuels: Refining, molecular structure, liquid fuel types and their characteristics, fuel quality. Liquefaction of solid fuels. Gaseous Fuels: Classification and characterization.

UNIT-III

Thermodynamics and Kinetics of Combustion

Properties of mixture, combustion stoichiometry, chemical energy, chemical equilibrium and criteria, properties of combustion products. First law combustion calculations, adiabatic flame temperature (analytical and graphical methods), simple second law analysis. Elementary reactions, chain reactions, pre-ignition kinetics, global reactions, kinetics, reaction at solid surface.

UNIT-IV

Combustion of Solid, Liquid and Gaseous Fuel

Drying, devolatilization, char combustion. Fixed bed combustion, suspension burning, fluidized bed combustion. Spray formation and droplet behavior, oil fired furnace combustion, gas turbine spray combustion, direct and indirect Injection combustion in IC engines. Energy balance and furnace efficiency, gas burner types, pulse combustion furnace. Premixed charge engine combustion. Detonation of gaseous mixtures.

Text Books:

1. Combustion Engineering by Kenneth W. Ragland, Kenneth M. Bryden, CRC press

2. Fundamental of combustion by D P Mehta, PHI Delhi.

Reference Books:

1. Principles of combustion by Kenneth Kuan Kuo, John Wiley & Sons

2. An introduction to combustion: concept and applications by Stephen R Turns, Mc Graw-Hill companies

Course No.	Course Title	Teaching Schedule		Allotment of Marks			Duration of Exam	
		L	Т	P	Theory	Sessional	Total	(Hrs.)
ME-434N	METAL FORMING AND FINISHING	4	0	0	75	25	100	3
Purpose	Metal forming and finishing in manufacturing considers a metal-forming process a system consisting of several interacting variables. These Includes an over review and classification of all metal-forming processes.						process as an overall	
Course Out	comes							
CO 1	The Students will be able to apply the fundamentals of plastic deformation process							
CO 2	The student will be able to understand the shearing mechanism processes.							
CO 3	The students will be able to anal	yze	the	meta	al finishin	g processes	•	
CO 4	The students will be able to comprehending the techniques of powder metallurgy.							

UNIT-I

Bulk Deformation Processes: Introduction Elastic and plastic deformation. Concept of strain hardening. Hot and cold working processes -rolling, forging, extrusion, swaging, wire and tube drawing. Machines and equipment for the processes. Parameters and force calculations. Test methods for formability.

Basics of plastic forming & forging, mechanics of metal working, temperature in metal working, strain rate effects, friction and lubrication, deformation zone geometry. Forging process, classification – equipment, calculation of forging loads, forging defects, residual stresses.

UNIT-II

Sheet Metal Working: Applications of sheet formed products. Shearing mechanism. Processes like blanking, piercing, punching, trimming, etc. Forming processes like bending, cup drawing, coining, embossing, etc. Presses for sheet metal working; Part feeding systems; Elements of die; punch and die clearances; Progressive, compound and combination dies. High energy rate forming processes.

UNIT-III

Metal finishing: Technological importance of metal finishing. Effect of plating variables on electro deposits. Electroplating techniques - methods of electroplating, surface preparation, Metal finishing processes: Such as diamond machining, honing, lapping's buffing etc.

UNIT-IV

Powder Metallurgy: Introduction. Production of metal powders. Compaction and sintering processes. Secondary and finishing operations. Economics, advantages, and applications of powder metallurgy.

Reference books:

1. Mechanical Metallurgy by G. E. Dieter, McGraw-Hill.

2. Metal Forming: Fundamentals and Applications by Taylan Altan (ASM Series in Metal Processing)

3. Introduction to Industrial Mechanical Working Process by G. W. Rowe

4. Materials & Processes In Manufacturing By E.Paul De Germo, J T Black & Ronald A Koshav

Course No.	Course Title	Teaching Schedule		ing ule	Allotment of Marks			Duration of Exam
		L	Т	Р	Theory	Sessional	Total	(Hrs.)
ME-436N	AIR CRAFT AND ROCKET PROPULSION	4	0	0	75	25	100	3
Purpose	Starting with the basic principles action, the course is developed aspects of jet engines and the co	s of logi mpo	Me cally	chani y and its th	ics behind l systema at make tl	the genera tically to lo nem.	tion of t ok into	hrust by jet the various
Course Out	comes							
CO 1	Students will be able to synthesize compressible flow of thermodynamics properties.							
CO 2	Students will be able to evaluate Aircraft maintainability.							
CO 3	Students will be able to design performance parameters of rocket propulsion.							
CO 4	Students will be able to analyze	the	basi	c tur	boiet engi	ne cvcle.		

UNIT I

Review of Thermodynamics and Compressible Flow: Review Of relevant basic thermodynamics. First Law and energy analysis for closed and open systems. Second law of thermodynamics, limitations on energy conversion, process representation on h-s plane (Mollier diagrams). One-dimensional compressible flow with lumped effects of area change, friction. Heat transfer, and mass transfer and the implications there of for the production of thrust. Detailed analysis of one-dimensional steady flow in variable area passages with special reference to nozzles and diffusers.

UNIT II

Aircraft structure and Maintenance:

Various types of structures in airframe construction, tubular, stringers, formers, bulkhead, spars and ribs, honeycomb construction. Aircraft Maintainability: Evolution of maintenance philosophy, periodic maintenance system based on checks at specific intervals and continuous maintenance system. Daily Inspection and trip inspection system. On Condition maintenance techniques, their evolution and effect on design of aircraft systems.

UNIT-III

Rocket Propulsion: Application of nozzle theory and performance evaluation of rocket engines. Performance parameters of relevance to rocketry such as characteristic velocity, thrust coefficient, specific impulse, etc. Preliminary design and sizing of rocket thrust chambers.

UNIT-IV

Gas Turbine based Jet Engines: Ideal Cycle Analysis The basic turbojet engine cycle, analysis of the ideal cycle. Turbojet with afterburner, Ideal cycle, comparison of turbojet performance with and without afterburner. 4 The ideal turbofan, mixed and unmixed exhaust streams, design point optimization and performance. The turboprop engine, analysis of the ideal performance.

Reference books :

1. Oates, G. C., "Aerothermodynamics of Gas Turbine and Rocket Propulsion", AIAA Educational Series, AIAA, Washington, 1988.

- 2. Hill, P. G. and Peterson, C. R., "Mechanics and Thermodynamics of Propulsion", 2nd ed., Addison-Wesley Publishing Company, Inc., Reading, MA,1992.
- 3. Treager, I. E., "Aircraft Gas Turbine Engine Technology", 2nd ed., McGraw Hill , Inc., New York, 1979. 4. Jones, J. B. and Dugan, R. E., "Engineering Thermodynamics", Prentice Hall of India, New Delhi,2002

PG DIPLOMA IN GUIDANCE, COUNSELING AND PSYCHOTHERAPY

Scheme of Examination (From 2018-19)

There shall be three theory papers and one practical-cum-field work of 100 marks each. All the four papers are compulsory.

Paper	Nomenclature	Marks	Time
Paper-I.	GUIDANCE	100	3 Hour
Paper-II:	COUNSELLING PSYCHOLOGY	100	3 Hours
Paper-III:	PSYCHOTHERAPY	100	3 Hours
Paper-IV (i) (ii)	PRACTICAL FIELD WORK	50 50	3 Hours 3 Hours

PAPER -I

GUIDANCE

Max. Marks-100 Time: 3 Hours

NOTE- The paper setter shall set TEN questions-TWO questions from each unit. The candidates will have to attempt FIVE in all, selecting ONE from each unit

UNIT I

Guidance - Nature, need , principles, goals and scope of Guidance. Process of Guidance

Types of Guidance-Educational, Vocational and Personal Guidance

UNIT-II

Assessment in Guidance- Formal and Informal techniques.

Nature and types of Psychological tests.

Cognitive and behavioural assessment of children with Special needs

UNIT-III

Adjustment: Meaning, Nature and Determinants.

Adjustment Problems of Children and Adolescents.

Use of Clinical Methods for shaping healthy adjustment.

UNIT- IV

Approaches of Guidance: Individual V/S Group,

Meaning and Nature of Individual and Group Guidance;

Techniques of Group Guidance

UNIT- V

Organisation of Guidance services.

Guidance Personnel-Roles, skills and training

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Recommended books

Anastasi, A. & Urbina, S. (1997). Psychological Testing. New York: Mc Millan.

- Bernard, H.W. & Fuller, D.W. (1977). Principles of Guidance. New York: Crowell.
- Bhatnagar, A. & Gupta, N. (2001). Guidance and Counselling, Vol. 1, A theoritical Perspective. New Delhi: Vikas Publishing House.
- Bhatnagar, A. & Gupta, N. (2001). Guidance and Counselling, Vol. 2, A Practical Approach. New Delhi: Vikas Publishing House.
- Crow, L. D. & Crow, A. V. B. (1961). Introduction to Guidance: Basic principles and practices. New Delhi: Eurasia.
- Gibson, R. & Mitchell, M. (2005). Introduction to Guidance and Counsellling. New Delhi: Prentice Hall of India.
- Pietrofesa, J.J. (1980). Guidance: An introduction. Chicago: Rand Mc Nally.
- Shaffer, L.P. and Shoben, E.J. (1986). Psychology of Adjustment: A Dynamic and Experimental Approach to Personality and Mental Hygiene. Boston:Houghton Mifflin.

Paper-II

COUNSELING PSYCHOLOGY

Max. Marks: 100 Time: 3 Hours

Note: The paper setter shall set TEN questions- TWO questions from each unit. The candidate will have to attempt FIVE questions in all, selecting ONE from each unit.

UNIT-I

Introduction to counseling: Meaning, Goals and Objectives of counseling. Basic assumptions and principles of counseling.

UNIT-II

Role, Characteristics and training of counselor. Counseling skills: Listening, Reflecting, Summarizing, Confronting, Interpreting and Informing skills. Ethical issues in counseling.

UNIT-III

Components of Counseling Practice: Conduction of first session, developing communication and attending skills, Rapport/Relationship building, Assessing client problems, Process and outcome goals, Termination and Follow-up.

UNIT-IV

Counseling Approaches & Techniques- Directive, Non-Directive and Eclectic Counseling. Case study, Counseling interview, Sensitivity training, Transactional analysis, Psychodrama.

UNIT-V

Special areas of counseling: Counseling for children with emotional disturbance and learning disability; Exceptional children, Marital counseling Occupational counseling, Counseling patients with terminal disease/chronic illness – HIV/AIDS, cancer patients and their caretakers, Counseling drug addicts and alcoholics.

Recommended Books:

- Clough, P. Pardeck, J.T. & Yuen, F. (Eds) (2005). Handbook of emotional and behavioural Difficulties.
- Mozdzierz, G.J., Peluso, P.R. & Lisiecki, J. (2009). Principles of Counseling and Psychotherapy. New York: Routledge.
- Cormier, L.S. and Hackney, H. (1993). The Professional Counsellor. Englewood Cliffs, N.J: Prentice Hall.
- Woolfe, R. and Dryden, W. (1996). Handbook of Counselling. London: Sage Publications.
- Bender, W.N. (1995). Identification and Teaching Strategies for Learning Disabilities. New York: Allyn Bacon.
- Dryden, W. (1995). Key Issues for Counselling in Action. London: Sage Punlications.
- Sharry, J. (2006). Counselling Children, Adolescents and Families: A Strength Based Approach. New York: Sage Publishers.
- George, R.L. Cristiani, T.S. (1990). Counselling: Theory and Practice. New Jercey: Prentice Hall (3rd edition).
- Peterson, J.V. and Nishenholz, B. (1999). Orientation to Counselling, New York: Allyn & Bacon.

Paper-III

PSYCHOTHERAPY

Max. Marks: 100

Time: 3 Hours

Note: The paper setter shall set TEN questions- TWO questions from each unit. The candidate will have to attempt FIVE questions in all, selecting ONE from each unit.

UNIT-I

Psychopathology: Meaning, Critertia, Approaches: Psychodynamic, Behaviouristic, and Humanistic and Existential.

Classification of Mental Disorders: ICD & DSM Systems.

UNIT-II

Psychotherapy: Definition, Objectives, ethical issues. Significant variables in Psychotherapy Training of Psychotherapist, Clinical Formulation.

Therapeutic Relationship: Client and Therapist characteristics, Factors Influencing Relationship.

UNIT-III

Taking History and Mental status examination.

Behaviour Therapies: Origin, Foundations and Principles; Behavioural Assessment. Desensitization- Extinction, Skill Training, Operant Procedures and Aversion.

UNIT-IV

Cognitive Therapies: Introduction to cognitive Model (Beck and Ellis), Basic Principles and Assumptions, Cognitive Behaviour Therapy, Rational Emotive Behaviour Therapy, Cognitive Restructuring, Gestalt Therapy

UNIT-V

Systemic Therapies: Origin, Theoretical Models and Techniques with respect to Family therapy, Marital Therapy, and Group therapy.

Recommended Books:

- Bellack, A.S., & Hersen, M. (2000). Comprehensive Clinical Psychology (Vol. 5 & 6), New York: Elsevier Science Ltd.
- Gelder, M., Cowen, P., & Harrison, P. (2005). Shorter Textbook of Psychiatry, London: Oxford Press.
- Carson, R.C., Butcher, J.N., & Mineka, S. (2000). Abnormal Psychology and Modern Life, Delhi: Pearson Education.
- Wolberg, L.R. (1988). The Techniques of Psychotherapy (Vol. I & II). London: Jason Aronson Inc.
- Hamilton, M. (1985). Fish's Clinical Psychopathology: Signs and Symptoms in Psychiatry, Bombay: Varghese Publishing House.
- Masters, J.C., Burish, T.G., Hollon, S.D., & Rimm, D.C. (1987). Behaviour Therapy: Techniques and Empirical Findings, Florida: Harcourt Brace & Company.
- Hawton, K., Salkovskis, P.M., Kirk, J., & Clark, D.M. (2004). Cognitive Behaviour Therapy for Psychiatric Problems: A Practical Guide. New York: Oxford University Press.

Paper-IV(i): Practical (Diagnostic Assessment Techniques)

Max. Marks: 50

Time: 3 Hours

Note: Any 8 practicals out of the following are to be conducted and reported during the course. One practical will be allotted to a candidate during the examination and evaluation will be based on Practical Note Book, Performance during practical examination and viva-voce.

N.B.: A series of lectures will be delivered on Diagnostic Testing to acquaint the students inth: Nature of Psychological Tests, their functions, Psychometric Properties- Reliability, Validity Norms; Ethical Issues.

- 1. Clinical Analysis Questionnaire.
- 2. NEO PI- R
- 3. IPAT- ASQ
- 4. Interest Inventory
- 5. Beck Depression Inventory
- 6. WAIS-R
- 7. Wechsler Memory Scale
- 8. Rorschach Inkblot
- 9. AIIMS Neuropsychological Assessment Battery
- 10. Adjustment Inventory
- 11. Stress Inventory
- 12. Clinical Rating Scales- Autism, ADHD.
- 13. D.A.T.B
Paper-IV (ii) Field Work

Field Work

To provide hands on experience in acquiring the necessary skill and competency in selecting, administering, scoring, and interpreting psychological tests and treating the individuals suffering from Psychological problems, the candidates need to engage themselves in active training under supervision.

Submission of Psychodiagnostic and Psychotherapy records.

- Four full-length Psychodiagnostic records to be prepared and submitted by the candidate. The records should include a detail clinical history and a discussion on a) rationale for testing b) areas to be investigated c) tests administered (d) test findings and e) Impression.
- Four full-length counseling and Psychotherapy records to be prepared and submitted by the candidate. The records should include a) reasons for interventions (b) short-term and long term objectives (c) type and techniques of intervention used with rationale d) Process of therapy (e) changes occurred during therapy and (e) final outcome.

DEPARTMENT OF PSYCHOLOGY KURUKSHETRA UNIVERSITY KURUKSHETRA

('A^{+'} Grade, NAAC Accredited) M.PHIL. PSYCHOLOGY

Scheme of Examination w.e.f. 2018-19 (CBCS)

Scheme of Examination for M.Phil. Psychology:

- 1. The M.Phil Psychology Course is under annual system.
- 2. The M.Phil. Psychology Course is of 12 Credits.
- 3. There are Three components of M. Phil. Programme i.e. A, B & C as placed below:-
 - A. Section comprises two papers –

Paper – I: Research Methodology Paper II: Paper –II is optional. The students are required to select one out the following

two papers

Paper - II (i): Psychology of Individual Differences

Paper – II (ii): Currents Trends in Psychotherapy

- B. Seminars: Two Seminars each 50 marks from Paper I and Paper- II mentioned in section A.
- C. Dissertation:

Every M. Phil Student will submit Dissertation under the Supervision of an eligible Teacher as partial fulfillment to complete the M. Phil. Degree. The candidate shall appear in Viva-Voce Examination on the Dissertation submitted by him/her.

On the successful declaration of Papers I &II, and the successful completion of the evaluation of the dissertation including viva-voce, the M. Phil. Degree will be awarded.

SECTIONS	PAPER	NOMENCLATURE	EXTERNAL	INTERNAL	CREDITS (Theory)
Α	Paper-1	Research Methodology	80	20	4
	Paper-II(i)	Psychology of Individual Differences	80	20	4
	Paper-II(ii)	Current Trends in Psychotherapy	80	20	4
В	Paper-III	Seminar-I		50	-
		Seminar-II		50	-
С		Dissertation	-	-	-
Total			3	00	12

Total Marks: 300 Total Credits: 12

Section C: Dissertation:

There will be grading system in dissertation as:-

- i) Grade-'O' (Outstanding) If the candidate deserves 85 to 100% marks
- ii) Grade-'A+' (Excellent) If the candidate deserves between 75 to 84% marks
- iii) Grade-'A' (Very Good) If the candidate deserves 65 to 74% marks
- iv) Grade-'B+' (Good) If the candidate deserves 55 to 64% marks

v) Grade- 'F' (Fail) If the candidate deserves less than 55% marks

M.Phil. Psychology

Paper-I: RESEARCH METHODOLOGY

Max. Marks :100 External Marks:80 Internal marks:20 Credit: 4 Time: 3 hrs.

Note: The question paper will consist of NINE questions. The candidate will have to attempt FIVE questions selecting ONE question from each unit. The first question will be compulsory and will include 8 short-answer questions spread over entire sullabus. The remaining EIGHT questions will be set taking TWO questions from each unit.

Course objectives:

- (i) To acquaint the students with psychological research and various types of research designs used in psychological research.
- (ii) To provide understanding into univariate and multivariate research approaches.
- (iii) To acquaint the students with the procedure of test construction and its psychometric properties.
- (iv) To provide familiarity with different multivariate techniques of data analyses and applications of SPSS.

UNIT-I

Psychological Research: Nature, Steps, Sources of Bias, and Ethical Issues. Preparing a Research proposal. Major Approaches: Univariate and Multivariate.

UNIT-II

Research Designs: Principles and Basic Parameters of Experimental Design.

Within Groups Designs: Two Factors Repeated Measures, Latin Square and Greeco-Latin Square Designs. Between Groups Designs: Factorial- Two and Three Dimensional, Multivariate Analysis of Variance.

UNIT-III

Psychological Tests: Nature; Internal Structure: Reliability- Meaning, Sources of Error, Methods of Estimate; Validity- Meaning, Factors Affecting, Validation Procedures.

Test Construction and Standardization.

UNIT-IV

Multivariate Analyses: Factor Analysis- Methods: Centroid and Principal Components; Rotation of Factors; Applications and Limitations.

Linear Multiple Regression: Standard and Stepwise. Structural Equation Modeling: Concept and Applications. SPSS: Introduction and Applications.

Recommended Books:

Anastasi, A. (1988). Psychological Testing. New York: McMillan

Cattell, R.B. (1966). Handbook of Multivariate Experimental Psychology. Chicago: Rand McNally & Company.

Edwards, A.L. (1971) Experimental Design in Psychological Research.. New York: Holt.

Guilford, J.P. (1954) Psychometric Methods. New Delhi: McGraw Hill.

Hair, Joseph F. Jr., Black, William C., Babin, Barry J., Anderson, Rolph E., and Tatham, Ronald L. (2006). *Multivariate* Analysis (VI Edition). Pearson Education.

Herman, H.H. (1976). Modern Factor Analysis. Chicago: University of Chicago Press.

Nunnally, J.C. (1981). Psychometric Theory. New York: McGraw Hill.

Shaughnessy, J.J. and Zechmeister, E.B. (1997). Research Methods in Psychology. New York: Mc Graw Hill.

Tabachnick, B.G. and Fidell, L.S. (1989). Using Multivariate Statistics. New York: Harper and Row.

Winder, B.J. (1971). Statistical Principles and Experimental Designs. Kogakusha: McGraw Hill.

Paper-II (i):PSYCHOLOGY OF INDIVIDUAL DIFFERENCES

Max. Marks :100 External Marks:80 Internal Marks:20 Credit:4 Time: 3 hrs.

Note: The question paper will consist of NINE questions. The candidate will have to attempt FIVE questions selecting ONE question from each unit. The first question will be compulsory and will include 8 short-answer questions spread over entire sullabus. The remaining EIGHT questions will be set taking TWO questions from each unit.

Course objectives:

- (i) To acquaint the students with various theories of personality and their current research trends.
- (ii) To acquaint the students with various approaches of intelligence and creativity.

UNIT-I

Personality, Nature of Personality Theory: Consistency of Personality, Cattell's Scientific Analysis of Personality: Primary and Second-order Factors, Dynamic Structure Factors. Genetic and Environment determinants.

UNIT-II

Eysenckian Model: Basic concepts, Biological basis of Personality. Research Trends: Relating Learning, Memory; Personality and Crime, Big-Five and Big-Seven Factor Models: Basic concepts, Research Evidence.

UNIT-III

Intelligence: Nature, Approaches, Structured Appraoch: Cattell, Horn and Guilford. Cognitive and Information Processing Approach: Jensen, Dass, and Sternberg. Genetic and Environment Determinants.

UNIT-IV

Creativity: Nature; Theoretical Approaches: Psychometric, Psychodynamic, Cognitive. Research Trends: Creativity and Intelligence; Personality and Creativity. Measurement Creativity.

Recommended Books:

Cattell, R.B. and Kline. P.(1977). *The Scientific Analysis of Personality and Motivation*, London: Academic Press.
Cattell, R.B. (1982). *The Inheritance of Personality and Ability of NY:* Academic Press.
Cattell, R.B. (1987). *Intelligence: Its Structure, Growth, and Action*, North Holland: Amsterdam.
Eysenck, H.J. (1981). *Model for Personality*, New York: McGraw Hill.
Hall, G.S. and Lindzey, G. (1985), *Theories of Personality* (3rd ed.), New Delhi: Wiley Eastern.
Hogan, R., Johanson, J. and Briggs, S. (1997). *Handbook of Personality Psychology*, New York: Academic Press.
Sternberg, R.J. (2003) *Handbook of Intelligence*, London: Cambridge University Press.
Sternberg, R.J. (2003), *Handbook of Creativity*, London: Cambridge University Press.
Torrance, E.P. (1969) *Guilding Creative Talent*, NJ: Prentice Hall.
Waller, N.G. (1996). *Evaluating the structure of personality*. In C.R.Cloninger (Ed.) *Personality and Psychopathology*, Washington, DC: American Psychiatic Press.
Wolman, B.B. (1985). *Handbook of Intelligence*, New York: John Wiley & Sons.
Zuckerman, M. (1991), *Psychology of Personality*, New York: Cambridge.

Paper-II (ii):CURRENT TRENDS IN PSYCHOTHERAPY

Max. Marks :100 External Marks:80 Internal Marks:20 Credit:4 Time: 3 hrs.

Note: The question paper will consist of NINE questions. The candidate will have to attempt FIVE questions selecting ONE question from each unit. The first question will be compulsory and will include 8 short-answer questions spread over entire sullabus. The remaining EIGHT questions will be set taking TWO questions from each unit.

Course objectives:

- (i) To develop understanding into basic nature of psychotherapies and clinical formulation.
- (ii) To acquaint the students with the applications of various psychotherapies.

UNIT-I

Psychotherapy: Nature, General Principles, objective, approaches and Effectiveness of Psychotherapy. Significant variables in Psychotherapy; Clinical Formulation.

UNIT-II

Supportive therapies: Nature and Objective, Milieu Therapy. Creative Art, Music Art, Dance and Drama Therapies.

UNIT-III

Reeducative therapies: Behaviour Therapy; Nature, Principles and Techniques. Cognitive and cognitive behaviour therapy; Client centered therapy, Family Therapy.

UNIT-IV

Reconstructure therapies: Freudian Psychoanalysis, Object Relation therapy; Transactional Analysis; Hypnosis; Play therapy.

Recommended Books:

 Bellack, A.S., and Hersen, M. (2000), Comprehensive Clinical Psychology (Vol.5 & 6) New York: Elsevier Science Ltd.
 Garfield, S.L., and Bergin, A.E. (1986) Handbook of Psychotherapy and Behaviour Change, New York: John Wiley & Sons inc.
 Korchin, S.J. (1975), Modern Clinical Psychology, NY: Basic Books.

Wolberg, L.R. (1988). *The Techniques of Psychotherapy* (Vol. 1 & 2). London: Jason Aronson Inc. Gelder, M. Cowen, P., and Harrison, P. (2005), *Shorter Textbook of Psychiatry*, London: Oxford Press.

M.A. (Semester-IV)

Paper: Psy404(E) - PRINCIPLES AND APPLICATIONS OF COUNSELLING

NOTE: The question paper will consist of NINE questions. The candidate will have to attempt FIVE questions, selecting ONE question from each unit. The first question will be compulsory and will include 8 short-answer questions spread over entire syllabus. The remaining EIGHT questions will be set taking TWO questions from each unit. Each question will carry 16 marks.

Objectives: (i) Making the students aware about the need and importance of counseling in day-today life.

(ii) To provide knowledge about various counseling techniques and their applications.

UNIT-I

Counselling: Need, principles, goals, emergence of counselling as a profession. Skills, training and traditional activities of counselors. Counselling process: Establishing structure, therapeutic environment, and strategy.

UNIT-II

Counselling techniques: Directive, non-directive, and eclectic. Assessment in counseling: Meaning, purpose, and types of assessment, psychological tests and nontest methods. Using assessment for treatment planning, monitoring treatment progress, for evaluation and accountability.

UNIT-III

Counseling and psychotherapies: Psychoanalytic, individual psychology, person centered, behavioural, rational emotive behaviour therapy, reality therapy, transactional analysis. Counselling in schools, organizations and mental health settings.

UNIT-IV

Counselling applications: Counselling for parents and children, counselling for special populationssubstance abusers, AIDS patients, abuse victims, women, older adults, and differentially abled people. Ethical and legal issues in counselling practice.

Recommended Books:

Gelso, C. J. & Fretz, B.R. (2000). Counselling Psychology (2nd Ed.). London: Wadsworth.
 Nystul, M.S. (2001). Introduction to Counselling, New Mexico State University: Allyn and Bacon.
 Palmer, S. & McMohan, G. (1997). Handbook of Counselling Psychology, London: British Association for Counselling.

Pietrofesa, J.J. et al. (1978). Counselling: Theory, Research, and Practice. Chicago: Rand McNally. Rao S.N. (2001). Counselling Psychology. New Delhi: Tata Mc Graw-Hill.

Gibson, R.L. (2005). Introduction to Counselling and Guidance. New Delhi: Pearson Education. Shertzer, N. & Stone, S.C. (1971). Fundamentals of Counselling (2nd Ed.). Boston: Houghton Mifflin. Whiston, S.C. (2009). Principles and Applications of Assessment in Counseling(3rd Ed). NY: Cengage Learning.

Max. Marks: 80+20

Time: 3 Hours

M.A. (Semester-III) Psychology

The 3rd Semester of M.A. Psychology would have four theory papers and one practical paper, all the theory papers are optional (E) and practical paper is compulsory (C). The students may opt for any four of the eight theory optional papers. However, the paper(s) to be floated in any particular year would be decided by the Chairperson of the Department keeping in view the available resources.

Paper No.	Nomenclature	No. of Cred it	Teaching Scheme		Exam. Scheme		
Psy301(E)	Psychopathology		L	т	т	Internal Assessme nt	Total
Psy302(E)	Intelligence	4	4	½ hrs.	80	20	100
Psy303 (E)	Industrial-Organizational Psychology (i)	4	4	½ hrs.	80	20	100
Psy304 (E)	Principles and Applications of Guidance	4	4	½ hrs.	80	20	100
Psy305 (E)	Human Development	4	4	½ hrs.	80	20	100
Psy306(E)	Psychometrics (i)	4	4	½ hrs.	80	20	100
Psy307(E)	Personality (i)	4	4	½ hrs.	80	20	100
Psy308(E)	Fundamentals of Military Psychology	4	4	½ hrs.	80	20	100
Psy309(C) (i)	Practical	4	6hrs/	-	100	-	100
Psy309(C) (ii)	Profiling of Instruments	2	per Group per paper	-	50	-	50
OESS	Candidate is required to take one open elective paper, other than Psychology from the common list of Papers of Social Sciences of the same subject as taken in Semester-II (Syllabus enclosed in the end).	2	2	-	-	-	50

M.A. (Semester-IV) Psychology

The 4th Semester of M.A. Psychology would have four theory papers and one practical paper. The theory papers would be corresponding to papers opted in Semester-III, the paper of practical is compulsory.

Paper No. Nomenclature		No. of Credit	Teaching Scheme		Exam. Scheme		
Psy401(E)	Clinical Psychology		L	Т	Т	Internal Assessment	Total
Psy402(E)	Creativity	4	4	½ hrs.	80	20	100
Psy403 (E)	Industrial Organizational Psychology (ii)	4	4	½ hrs.	80	20	100
Psy404 (E)	Principles and Applications of Counselling	4	4	½ hrs.	80	20	100
Psy405 (E)	Life Span Human Development	4	4	½ hrs.	80	20	100
Psy406(E)	Psychometrics (ii)	4	4	½ hrs.	80	20	100
Psy407(E)	Personality (ii)	4	4	½ hrs.	80	20	100
Psy408(E)	Advanced Military Psychology	4	4	½ hrs.	80	20	100
Psy409(C) (i)	Practical	4	6hrs/	-	100	-	100
Psy409(C)(ii)	Profiling of Instruments	2	per Group per paper	-	50	-	50

(Established by the State Legislature Act XII of 1956)

(A+ Grade NAAC Accredited)



COURSE CURRICULUM

POST-GRADUATE DIPLOMA IN HUMAN RIGHTS

(ACADEMIC SESSION: 2018-19)

DIRECTORATE OF DISTANCE EDUCATION

KURUKSHETRA UNIVERSITY KURUKSHETRA

HARYANA

2018

10(406)

POST-GRADUATE DIPLOMA IN HUMAN RIGHTS (ACADEMIC SESSION 2018-19)

CONTENTS

- 1. Introduction.
- 2. Syllabus and Scheme of Examination.

POST-GRADUATE DIPLOMA IN HUMAN RIGHTS (ACADEMIC SESSION 2018-19)

COURSE STRUCTURE

Duration of Course:	One Year (Annual).				
Eligibility for admission:	Bachelor's Degree in any Discipline of Kurukshetra University or any other recognised University.				
Medium of Instruction:	The medium of instruction of examination shall be English & Hindi.				
Fee Structure:	Rs. 10000/- (Rupees Ten thousand).				
Scheme of Instruction:	The Course of Study of Post-Graduate Diploma in Human Rights would be of five theory papers carrying 100 marks each (80 marks for Theory + 20 marks for Internal Assessment). The duration of Personal Contact Programme for the enrolled students in this Course would be 12 days.				

POST-GRADUATE DIPLOMA IN HUMAN RIGHTS (ACADEMIC SESSION 2018-19)

NOMENCLATURE OF PAPER	MAXIMUM	THEORY	INTERNAL	TIME
	MARKS	MARKS	ASSESSMENT	
			MARKS	
Historical and Philosophical	100	80	20	3 Hours
Perspectives of Human				
Rights				
Human Rights and Criminal	100	80	20	3 Hours
Instice Sugtern in India	100			2 110415
Justice System in India				
Human Rights and Duties in	100	80	20	3 Hours
International Perspective				
Human Rights and Duties in	100	80	20	3 Hours
India: Law, Policy, Society				
and Enforcement				
	100	00	20	2.11
Environment and Human	100	80	20	3 Hours
Rights				
	NOMENCLATURE OF PAPER Historical and Philosophical Perspectives of Human Rights Human Rights and Criminal Justice System in India Human Rights and Duties in International Perspective Human Rights and Duties in India: Law, Policy, Society and Enforcement Environment and Human Rights	NOMENCLATURE OF PAPERMAXIMUM MARKSHistorical and Philosophical100PerspectivesofHumanRights100Human Rights and Criminal100Justice System in India100International Perspective100International Perspective100India:Law, Policy, Societyand Enforcement100Rights100	NOMENCLATURE OF PAPERMAXIMUM MARKSTHEORY MARKSHistorical and Philosophical Perspectives of Human Rights10080Human Rights and Criminal Justice System in India10080Human Rights and Duties in International Perspective10080Human Rights and Duties in International Perspective10080Human Rights and Duties in International Perspective10080Human Rights and Duties in India: Law, Policy, Society and Enforcement10080Environment and Human Rights10080	NOMENCLATURE OF PAPERMAXIMUM MARKSTHEORY MARKSINTERNAL ASSESSMENT MARKSHistorical and Philosophical Perspectives of Human Rights1008020Purspectives of Human Rights1008020Human Rights and Criminal Justice System in India1008020Human Rights and Duties in International Perspective1008020Human Rights and Duties in International Perspective1008020Human Rights and Duties in India: Law, Policy, Society and Enforcement1008020Environment and Human Rights1008020

SYLLABUS AND COURSES OF READING

Paper-101: Historical and Philosophical Perspectives of Human Rights

Max. Marks: 80+20 Internal Assessment

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Foundational Aspects of Human Rights

- 1. Human Rights: Meaning, Evolution, Sources of Human Rights.
- 2. Classification of Human Rights: Natural, Moral and Legal Rights
- Civil and Political Rights: Economic, Social and Cultural Rights; Collective/ Solidarity Rights.
- Universal values of Human Rights: Human Dignity and Justice; Equality, Liberty and Fraternity.
- 5. Human Rights: Human Duties Obligated by Religion and Culture with special reference to Islam and Hinduism.

Unit-II Universal Declaration of Human Rights

- Universal Declaration of Human Rights: Magna Carta; the United States Declaration of Independence.
- 2. The French Declaration of the Rights of Man and the Citizen.
- 3. Declaration on the Protection of All persons from Enforced Disappearance and Detention or Imprisonment.
- 4. The Proclamation of Teheran and Vienna Declaration Programme of Action
- 5. UN Declaration on the Rights and Responsibility of Individuals, Groups and Organs of Society to Protect Human Rights.

Unit- III Diversity, Difference and Human Rights

- Value of Diversity: Collective Cultural Rights and the Idea of Universal Human Rights.
- 2. Multiculturalism and Minority Rights and Protection and Promotion of Human Rights in Diverses Societies.
- 3. International Bill of Rights: Preamble, Enumeration, Influence of the Universal Declaration.
- 4. Women's and Human Rights: Convention on the Elimination of all forms of Discrimination against Women (CEDAW).

 Implementation of Women's Rights: Police Stations, Court Procedures, Women's Health and Safety Provisions.

Unit –IV Development, Social Justice and Human Rights

- 1. Social Justice in the Discourse of Development and Human Rights.
- 2. State, Solidarity Rights and the Human Rights Movements.
- Recognition of States: Laws, Theories, Forms, Modes, Conditional and Consequences of Recognition of States.
- 4. State Territory: Land, Sea, Air Space and Subsoil under Earth Rights.
- Acquisition and Loss of State Territory: Modes of Acquisition and Loss of State Territory

- W. Friedmann, "International Law and Social Organisation on International Law", A. J. I. L., Vol. 62 (1992)
- N. Sanajaoba, "International Human Rights", Published by: Manas Publications, 4858, Prahlad Street, 24, Ansari Road, Darya Ganj, New Delhi-110002.
- 3. Delvin, "Law, Democracy and Morality" (1962) 110 U Pa Law Rev.
- 4. R. S. Pathak, "The Role and means of Codification and Progressive Development of International Law", I.J.I.L. Vol. 17 (1977).
- Ian Brownile, Principles of Public International Law, Second Edition (Clarendon Press, Oxford, 1973).
- P. Chandrasekhar Rao, "Charter of Economic Rights and Duties of States", I. J. I. L., Vol. 15 (1975).
- DonalPharand, "Historic Waters in International Law with Special Reference to the Article", University of Toronto.
- J. G. Starke, "Introduction to International Law", 10th Edition, Butterworths Singapore, 1999.
- 9. Stephen S. Godspeed, "The Nature and Functions of International Organisation", The Growth of World Law, (1985)
- L. M. Goodrich, "The Maintenance of International Peace and Security", International Organisation" (1988)

Paper-102: Human Rights and Criminal Justice System in India

Max. Marks: 80+20 Internal Assessment

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Social Problems and Issues of Human Rights

- 1. Concepts and Approaches: Concepts of Social Problems and Issues of Human Rights.
- 2. Theoretical Approaches to Social Problems and Social Changes.
- 3. Different Social Problems Areas: Problems of Scheduled Caste and Scheduled Tribes; Problems of Aged and Disabled; and Problems of Women.
- 4. Problems of Working Class: Meaning, Definitions and Classification of Working Class.
- 5. Status and Exploitation of Working Class: (i) Casual Worker's (ii) Bounded Labour (iii) Agriculture Labour (iv) Migrant Workers (v) Child Labour (vi) Unorganized Labour

Unit-II Human Rights Criminal Justice System

- 1. Human Rights Criminal Justice System: Criminal Justice System and Prosecution of Human Rights.
- 2. Offence Involving Human Rights: Rights of Accrued of Inmates of Persons and Custodial Homes.
- 3. Administration of Criminal Justice and Reforms: Administration of Criminal Justice; Ordinary Courts, Special Courts, Districts Human Rights Courts.
- 4. Rights to Legal Aid: Organisation and Working of National, State and Districts Legal Aid Machinery in India.
- 5. Intervention: Meaning, Kinds, Justification and Humanitarian of Intervention.

Unit- III Difficulties in the Promotion of Human Rights

- 1. Criminal Justice System: Police Behavior and Judicial System in India.
- 2. Rights of the Accused: Protection from Arbitrary Arrest, Fair and Speedy Trail. .
- 3. Protection against Torture and Degrading Treatment.
- 4. Difficulties rooted in Social, Economic, Political and Legal System of the Country.
- 5. Liberal, Democracy Polity Based on the Rule of Law.

Unit –IV United Nations' Bodies in the Promotion of Human Rights

- 1. United Nations: Organisation and Functions of General Assembly, Security Councils, International Court
- Composition and Functions of Secretariat and Special Agencies of United Nation's.
- 3. UNESCO, WHO and ILO: Organisation and Functions.
- Role of International and Regional Organisation in Peace and Security in World.
- 5. United Nations': Commission on Human Rights and Its Sub-Committees on Women and Children.

- P. Chandrasekhar Rao, "Charter of Economic Rights and Duties of States", I. J. I. L., Vol. 15 (1975).
- 2. DonalPharand, "Historic Waters in International Law with Special Reference to the Article", University of Toronto.
- J. G. Starke, "Introduction to International Law", 10th Edition, Butterworths Singapore, 1999.
- 4. Stephen S. Godspeed, "The Nature and Functions of International Organisation", The Growth of World Law, (1985)
- 5. L. M. Goodrich, "The Maintenance of International Peace and Security", International Organisation" (1988)
- W. Friedmann, "International Law and Social Organisation on International Law", A. J. I. L., Vol. 62 (1992)
- N. Sanajaoba, "International Human Rights", Published by: Manas Publications, 4858, Prahlad Street, 24, Ansari Road, Darya Ganj, New Delhi-110002.
- 8. Delvin, "Law, Democracy and Morality" (1962) 110 U Pa Law Rev.
- R. S. Pathak, "The Role and means of Codification and Progressive Development of International Law", I.J.I.L. Vol. 17 (1977).
- Ian Brownile, Principles of Public International Law, Second Edition (Clarendon Press, Oxford, 1973).

Paper-103: Human Rights and Duties in International Perspective

Max. Marks: 80+20 Internal Assessment Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I International Humanitarian Law

- 1. International Law: Meaning, Concept, Nature, Basis and Functions of International Law.
- 2. Historical Development and Relationship of International Law and Municipal Law.
- 3. International Humanitarian Law: Application, Historical Development, and Character of Humanitarian Law
- 4. Codification of International Law: Codification under League and United Nations.
- 5. Subject of International Law: Realist, Fictional and Functional Theory.

Unit-II International Concern for Violations of Human Rights

- 1. Extradition: Meaning, Definitions, Purpose and Law of Extradition.
- Diplomatic Agents: Classification, Functions, Basis and Immunities and Privileges of Diplomatic Agents.
- 3. Consuls and Special Mission: Classification, Functions, Judicial Settlement and Compulsive.
- 4. Enemy Character: Enemy Character of Individuals, Corporation, Goods and Ships.
- 5. War Crimes: U.N. War Crimes Commission and United Nations.

Unit- III International Covenants on Human Rights

- 1. International Covenants: Preparation of Drafts, Adoption, Implementation and Covenant on Civil and Political Rights.
- 2. International Covenants on Economic, Social and Cultural Rights.
- International Covenants on the Elimination of All forms of Racial Discrimination.
- Declaration and Covenants: Declaration of the Rights of Persons belonging to National or Ethnic, Religious and Linguistic Minorities.
- 5. Convention against Discrimination in Education, Employment and Occupation.

Unit –IV International Protection for the Refugees and the Minorities

- 1. Determination of Refugee Status: International Refugee Law and Protection.
- 2. Status of the Office of the United Nations High Commissioner for Refugees.
- 3. Convention Relating to the Status of Protocol and Stateless Persons.
- 4. International Human Rights: Sub- Commission on Minorities.
- 5. Regional Convention on Human Rights: European, American, African and Asian and Pacific Region.

- P. Chandrasekhar Rao, "Charter of Economic Rights and Duties of States", I. J. I. L., Vol. 15 (1975).
- 2. DonalPharand, "Historic Waters in International Law with Special Reference to the Article", University of Toronto.
- J. G. Starke, "Introduction to International Law", 10th Edition, Butterworths Singapore, 1999.
- 4. Stephen S. Godspeed, "The Nature and Functions of International Organisation", The Growth of World Law, (1985)
- 5. L. M. Goodrich, "The Maintenance of International Peace and Security", International Organisation" (1988)
- W. Friedmann, "International Law and Social Organisation on International Law", A. J. I. L., Vol. 62 (1992)
- N. Sanajaoba, "International Human Rights", Published by: Manas Publications, 4858, Prahlad Street, 24, Ansari Road, Darya Ganj, New Delhi-110002.
- 8. Delvin, "Law, Democracy and Morality" (1962) 110 U Pa Law Rev.
- 9. R. S. Pathak, "The Role and means of Codification and Progressive Development of International Law", I.J.I.L. Vol. 17 (1977).
- Ian Brownile, Principles of Public International Law, Second Edition (Clarendon Press, Oxford, 1973).

Paper-104: Human Rights and Duties in India: Law, Policy, Society and Enforcement

Max. Marks: 80+20 Internal Assessment

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Human Rights in Indian Context

- 1. Ideals enshrined in Indian Constitution: Social, Economic and Political Justice.
- 2. Fundamental Rights, Directive Principles and Fundamental Duties in Indian Constitution.
- 3. Fraternity: Assuring the Dignity of Individual and Unity of the Nation.
- 4. Social Hierarchy and Social Prejudices and Exploitation in India.
- 5. Socially approved racial and Communal Discrimination

Unit-II Human Rights – Enforcement Mechanism in India

- 1. Human Rights Act, 1993: Provisions.
- 2. Judicial Organs: Powers and Functions of Supreme Court and High Courts.
- 3. Human Rights Commission: Organisation and Functions of National and States Commission in India.
- 4. Human Rights Commission: Powers and Functions of National Commission for Scheduled Castes and Scheduled Tribes in India.
- 5. Women, Children and Minority Commission.

Unit- III Human Rights Violations and Indian Polity

- Inequalities in Society: Population, Illiteracy, Poverty and Caste Inaccessibility of Legal Redress.
- Abuse of Executive Power, Corruption, Nepotism and Favoritism in Indian Society.
- 3. Human Rights through the Ages: An Outlook.
- 4. Positive Action for a Human Society in India.
- 5. Human Rights and Good- Governance in Present Indian Scenario.

Unit -IV Human Rights and Role of Advocacy Groups in India

- 1. Professional Bodies: Press, Media, Role of Lawyers- Legal Aid.
- Educational Institutions: Universities, Research Institutions and Others Social Institutes.

- 3. Corporate Sector and Human Rights.
- 4. Role of Non- Governmental Organisations (NGO's) in Human Rights.
- 5. Role, Organization and Functions of Consumer Redressal Agencies.

- P. Chandrasekhar Rao, "Charter of Economic Rights and Duties of States", I. J. I. L., Vol. 15 (1975).
- 2. DonalPharand, "Historic Waters in International Law with Special Reference to the Article", University of Toronto.
- 3. J. G. Starke, "Introduction to International Law", 10th Edition, Butterworths Singapore, 1999.
- 4. Stephen S. Godspeed, "The Nature and Functions of International Organisation", The Growth of World Law, (1985)
- L. M. Goodrich, "The Maintenance of International Peace and Security", International Organisation" (1988)
- W. Friedmann, "International Law and Social Organisation on International Law", A. J. I. L., Vol. 62 (1992)
- N. Sanajaoba, "International Human Rights", Published by: Manas Publications, 4858, Prahlad Street, 24, Ansari Road, Darya Ganj, New Delhi-110002.
- 8. Delvin, "Law, Democracy and Morality" (1962) 110 U Pa Law Rev.
- 9. R. S. Pathak, "The Role and means of Codification and Progressive Development of International Law", I.J.I.L. Vol. 17 (1977).
- Ian Brownile, Principles of Public International Law, Second Edition (Clarendon Press, Oxford, 1973).

Paper-105: Environment and Human Rights

Max. Marks: 80+20 Internal Assessment

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Basic Concept of Environment and Human Rights

- 1. New Human Rights Dimensions: Obstacles and Threats to Human Rights.
- 2. New Challenges of Science and Technology: Biotechnology and Human Rights and Challenges of New Technology.
- 3. Environment Threats to India: Forest Denudation; and Pollution of Rivers.
- Indiscriminate Industrial Explosion; Depletion of Rare Species; and Bio-Diversity.
- 5. Globalization, Regionalism and Nationalism: opportunities and Threats.

Unit-II New Dimensions and Human Rights

- Human Rights and Peace: Values as Rights Precondition for Peace and Component of Peace.
- 2. Democracy and Human Rights: Democracy as a Condition for Economic and Social Rights Cultural Rights and Democracy.
- Right to Development: Adoption of the Declaration on the Right to Development and Removal of Obstacles to Development.
- 4. Judicial Contribution in Creation of New Human Rights.
- 5. Hazardous Waste and Human Rights.

Unit- III Human Rights and Environment

- 1. Growth of Human Rights Protection and Environmental Protection.
- 2. Human Rights and Extreme Poverty: Poverty as Crime.
- Discrimination: Xenophobia and Racism, International Convention on the Elimination of All Forms of Racial Discrimination.
- 4. Human Rights and Tolerance: Notion of Tolerance and Religious Tolerance.
- 5. Terrorism and Human Rights.

Unit –IV Human Rights: Scientific and Technological Advancement

 United Nation Approaches to Scientific and Technological Development: Scope, Objectives and Problems.

- Globalization and Human Rights: Competitiveness: Decline of Labour Unions and Workers' Rights and Globalization.
- 3. Rights of Indigenous People and the Challenges to Human Rights, Non-Governmental Solutions.
- 4. Right to Clean Environment and Public Safety: Issues of Industrial Pollution, Prevention and Rehabilitation.
- 5. Pollution Control Mechanisms for Human Rights.

- P. Chandrasekhar Rao, "Charter of Economic Rights and Duties of States", I. J. I. L., Vol. 15 (1975).
- 2. DonalPharand, "Historic Waters in International Law with Special Reference to the Article", University of Toronto.
- 3. J. G. Starke, "Introduction to International Law", 10th Edition, Butterworths Singapore, 1999.
- 4. Stephen S. Godspeed, "The Nature and Functions of International Organisation", The Growth of World Law, (1985)
- L. M. Goodrich, "The Maintenance of International Peace and Security", International Organisation" (1988)
- W. Friedmann, "International Law and Social Organisation on International Law", A. J. I. L., Vol. 62 (1992)
- N. Sanajaoba, "International Human Rights", Published by: Manas Publications, 4858, Prahlad Street, 24, Ansari Road, Darya Ganj, New Delhi-110002.
- 8. Delvin, "Law, Democracy and Morality" (1962) 110 U Pa Law Rev.
- 9. R. S. Pathak, "The Role and means of Codification and Progressive Development of International Law", I.J.I.L. Vol. 17 (1977).
- Ian Brownile, Principles of Public International Law, Second Edition (Clarendon Press, Oxford, 1973).

(Established by the State Legislature Act XII of 1956) (A+ Grade NAAC Accredited)



COURSE CURRICULUM POST-GRADUATE DIPLOMA IN URBAN DEVELOPMENT

(ACADEMIC SESSION: 2018-19)

DIRECTORATE OF DISTANCE EDUCATION KURUKSHETRA UNIVERSITY KURUKSHETRA HARYANA 2018

POST-GRADUATE DIPLOMA IN URBAN DEVELOPMENT (ACADEMIC SESSION 2018-19)

CONTENTS

- Introduction.
- Syllabus and Scheme of Examination.

POST-GRADUATE DIPLOMA IN URBAN DEVELOPMENT (ACADEMIC SESSION 2018-19)

COURSE STRUCTURE

Duration of Course:	One Year (Annual).
Eligibility for admission:	Bachelor's Degree in any Discipline of Kurukshetra University or any other recognised University.
Medium of Instruction:	The medium of instruction of examination shall be English & Hindi.
Fee Structure:	Rs. 10000/- (Rupees Ten thousand).
Scheme of Instruction:	The Course of Study of Post- Graduate Diploma in Urban Development would be of five theory papers carrying 100 marks each (80 marks for Theory + 20 marks for Internal Assessment), Project Report 50 Marks & Training 50 Marks (Total Marks 600Marks). The duration of Personal Contact Programme for the enrolled students in this Course would be 12 days.

POST-GRADUATE DIPLOMA IN URBAN DEVELOPMENT (ACADEMIC SESSION 2018-19)

SYLLABUS AND COURSES OF READING

PAPER CODE	NOMENCLATURE OF PAPER	MAXIMUM MARKS	THEORY MARKS	INTERNAL ASSESSMENT	TIME
101	Urban Development: Concepts and Practices	100	80	20	3 Hours
102	Urban Planning and Development: Issues and Challenges	100	80	20	3 Hours
103	Urban Basic Services: Issues and Perspectives	100	80	20	3 Hours
104	Urban Development: Environmental Laws and Polices	100	80	20	3 Hours
105	Urban Environmental Pollution and Sources of Energy	100	80	20	3 Hours
106	Project Report & Training	ort & Project Report= 50 Tanning 50= (Total Marks = 100)			
Total Marks= 600					

Paper-101: Urban Development: Concepts and Practices

Max. Marks: 80+20 (Internal Assessment)

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Foundational Aspects of Urban Development

- 1. Urban Development: Meaning, Evolution, Scope of Urban Development.
- 2. Trends in Urbanisation: Meaning, Challenges and Remedies
- 3. Urban Development: Administrative Structure, Organisation and Functions.
- 4. Theories of Urban Development.
- 5. Urban Development and Experience in India.

Unit-II Urban Planning

- 1. Urban Planning and Recent Trends in India.
- 2. Techniques for Urban Planning.
- 3. Urban Development and Land Use Planning.
- 4. Urban Development: Planning for City Development
- 5. Statutory and Institutional Planning for Urban Development.

Unit- III Urban Development and Management

- 1. Urban Development Institutional Framework
- 2. Role of E- Governance in Urban Development
- 3. Urban Management and Management of Urban Services.
- 4. Urban Development and Financial Management.
- 5. State- Urban Fiscal Relations for Urban Development.

Unit –IV Participatory Role in Urban Development

- 1. Role of Citizen Participation in Urban Development.
- 2. Participatory Tools and Methods for Urban Development.
- 3. Public Private Partnership for Urban Development.
- 4. State Territory: Land, Sea, Air Space and Subsoil under Earth Rights.
- 5. Role of Political Parties in Urban Development.

- K.K. Bhatnagar & K.K. Gadeock, Urban Development and Administration, Published by: Aalekh Publishers, Jaipur (Rajasthan) 2010.
- 2. Kala Seetharam Sridhar & Om Prakash Mathur, Costs and Challenges of Local Urban Services, Published by: Oxford University Press, 2009.
- 3. Micheal Spence, Patricia Clarke Annez & Robert. M. Buckley Published by: Rawat Publications, Jaipur (Rajasthan) 2010.
- 4. Kala Seetharam Sridhar & A. Venugopal Reddy, State Urban in India's Cities, Published by: Oxford University Press, 2010.
- Naib Singh, Urban Public Services (Pricing and Subsidy Component), Published by: Deep & Deep Publications Pvt. Ltd., F-159, Rajouri Garden, New Delhi-110027, 2013.
- Amiya Kumar Das, Urban Planning in India, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2010.
- 7. Vinita Pandey, Crisis Urban Middle Class, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2012.
- 8. Ramakant Rao M.G, *Good Governance: Modern Global and Regional Perspectives*, Published by: Kanishka Publishers, New Delhi, 2008.
- 9. Bhatnagar, Subhash, "E-Government: From Vision to Implementation: A Practical Guide with Case Studies", Sage Publications, New Delhi, 2004.
- 10. S.R. Das and R. Chandrasekhar, "*Capacity Building for e-Governance in India*," e-Governance division of the Department of Information Technology, Government of India.

Paper-102: Urban Planning and Development: Issues and Challenges

Max. Marks: 80+20 (Internal Assessment)

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Urban Development its Challenges

- 1. Development of Modern Urban Planning: Influence of Scientific and Technological Inventions.
- 2. Changing Urban Planning Concepts for Urban Development.
- 3. The General Plan Preparation for Urban Development.
- 4. Urban Development Planning Agency: Organisation and Structure.
- 5. Urban Development and Plan Implementation.

Unit-II Urban Development and Infrastructure

- 1. Urban Renewal and Infrastructure Improvement.
- 2. Urban Development Authority: Powers and Functions.
- 3. Urban Water Supply and Sanitation Management.
- 4. Urban Slums and Squatter Settlements.
- 5. Urban Transport, Communication and Traffic Management.

Unit-III Urban Poverty and Inequality

- 1. Urban Housing Crisis and Technological Innovations.
- 2. Urban Informal Sector for Urban Areas.
- 3. Urban Unemployment Sector.
- 4. Gender Dimensions for Urban Poverty.
- 5. Urban Safety and Security for Urban Poor.

Unit-IV Sustainable Urban Ecology and Environment

- 1. Impact of Industrial Pollution on Urban Development.
- 2. Urban Income and Expenditure for Developmental Functioning.
- 3. Urban Health Security Services
- 4. Urban Roads: Spatial Expansion and Coverage.
- 5. Urban Sewerage Drainage System: Infrastructure and Expansion.

- 1. K.K. Bhatnagar & K.K. Gadeock, Urban Development and Administration, Published by: Aalekh Publishers, Jaipur (Rajasthan) 2010.
- 2. Kala Seetharam Sridhar & Om Prakash Mathur, Costs and Challenges of Local Urban Services, Published by: Oxford University Press, 2009.
- 3. Micheal Spence, Patricia Clarke Annez & Robert. M. Buckley Published by: Rawat Publications, Jaipur (Rajasthan) 2010.
- 4. Kala Seetharam Sridhar & A. Venugopal Reddy, State Urban in India's Cities, Published by: Oxford University Press, 2010.
- Naib Singh, Urban Public Services (Pricing and Subsidy Component), Published by: Deep & Deep Publications Pvt. Ltd., F-159, Rajouri Garden, New Delhi-110027, 2013.
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- 9. Bhatnagar, Subhash, "E-Government: From Vision to Implementation: A Practical Guide with Case Studies", Sage Publications, New Delhi, 2004.
- S.R. Das and R. Chandrasekhar, "Capacity Building for e-Governance in India," e-Governance division of the Department of Information Technology, Government of India.

Paper-103: Urban Basic Services: Issues and Perspectives

Max. Marks: 80+20 (Internal Assessment)

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I	Sustai	istainable Urban Development		
	1.	Urban Development Sustainable Planning: An Overview		
	2.	Public Administration for Sustainable Urban Development.		
	3.	Natural Resource Management and Sustainable Environment.		
	4.	Urban Development Sustainable Environment System.		
	5.	Urban Development and Decentralized Planning Process.		
Unit-II	Reform	ms in Urban Development		
	1.	Urban Legal and Structural Reforms.		
	2.	Decentralization Process for Urban Development Reforms.		
	3.	Fiscal Decentralization- Developed and Developing Countries.		
	4.	Urban Financial Problems and Settlements.		
	5.	Urban Financial Resources for Urban Areas.		
Unit-III	Urban	Development Policies and Programmes		
	1.	Urban Development Policies: Global Overview.		
	2.	Urban Development Policy Perspectives in India.		
	3.	Urban Development Programmes.		
	4.	Urban Tax Revenue System for Urban Development.		
	5.	Urban Poverty Alleviation Programmes in India.		
Unit-IV	Disast	er Management and Environment		
	1.	Urban Health Care		
	2.	Urban Education		
	3.	Urban Safety and Security		
	4.	Urban Informal Sector		
	5.	Urban Unemployment		

- 1. K.K. Bhatnagar & K.K. Gadeock, Urban Development and Administration, Published by: Aalekh Publishers, Jaipur (Rajasthan) 2010.
- 2. Kala Seetharam Sridhar & Om Prakash Mathur, Costs and Challenges of Local Urban Services, Published by: Oxford University Press, 2009.
- 3. Micheal Spence, Patricia Clarke Annez & Robert. M. Buckley Published by: Rawat Publications, Jaipur (Rajasthan) 2010.
- 4. Kala Seetharam Sridhar & A. Venugopal Reddy, State Urban in India's Cities, Published by: Oxford University Press, 2010.
- Naib Singh, Urban Public Services (Pricing and Subsidy Component), Published by: Deep & Deep Publications Pvt. Ltd., F-159, Rajouri Garden, New Delhi-110027, 2013.
- Amiya Kumar Das, Urban Planning in India, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2010.
- 7. Vinita Pandey, Crisis Urban Middle Class, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2012.
- 8. Ramakant Rao M.G, *Good Governance: Modern Global and Regional Perspectives*, Published by: Kanishka Publishers, New Delhi, 2008.
- 9. Bhatnagar, Subhash, "E-Government: From Vision to Implementation: A Practical Guide with Case Studies", Sage Publications, New Delhi, 2004.
- 10. S.R. Das and R. Chandrasekhar, "*Capacity Building for e-Governance in India*," e-Governance division of the Department of Information Technology, Government of India.

Paper-104: Urban Development: Environmental Laws and Polices

Max. Marks: 80+20 (Internal Assessment)

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Urban Environment and Municipal Laws

- 1. 74th Constitutional Amendment Act, 1992: Features and Implementation.
- 2. National Urban Housing and Habitate Policy: Ministry of Housing & Urban Poverty Alleviation.
- 3. The National Green Tribunal Act, 2010.
- 4. Environment Law and the Indian Constitution.
- 5. The Environment Protection Act, 1986.

Unit-II International Environmental Organisation

- 1. Nature and Origin of International Environmental Organisation (IEO)
- 2. International Environmental Organisation and Negotiations.
- 3. Protection of Environment: International Concern and Efforts for

Environmental Protection.

- 4. Environmental Education: Need Problems and Solutions at National and International Level Environmental Ethics.
- 5. Global Warming and Climate Change: Reasons, Changes, Possible Effects and Measures to Combat the Problems.

Unit-III Urban Development Schemes and Programmes

- 1. Urban Development Policies: Swachh Bharat Mission.
- 2. Atal Mission for Rejuvenation and Urban Transformation (AMRUT)
- 3. Urban Development Programmes: Smart City Mission.
- 4. Heritage Cities Development and Augmentation Yojana (HRIDAY)
- 5. Urban Transport Programmes in India.

Unit-IV Disaster Management

- 1. Disaster Management: Meaning, Classification of Disaster Management.
- 2. Disaster Management: Recent Trends for Urban Development.
- 3. Urban Community Based Disaster Management.
- 4. Disaster Management Strategies for Urban Development.
- 5. National Institute for Disaster Management: Organisation and Functions in India.

Recommended Books

- 1. K.K. Bhatnagar & K.K. Gadeock, Urban Development and
- Administration, Published by : Aalekh Publishers, Jaipur (Rajasthan) 2010.

2. Kala Seetharam Sridhar & Om Prakash Mathur, Costs and Challenges of Local Urban Services, Published by: Oxford University Press, 2009.

 Micheal Spence, Patricia Clarke Annez & Robert. M. Buckley Published by: Rawat Publications, Jaipur (Rajasthan) 2010.

- 4. Kala Seetharam Sridhar & A. Venugopal Reddy, State Urban in India's Cities, Published by: Oxford University Press, 2010.
- 5. Naib Singh, Urban Public Services (Pricing and Subsidy Component),

Published by: Deep & Deep Publications Pvt. Ltd., F-159, Rajouri Garden, New Delhi-110027, 2013.

6. Amiya Kumar Das, Urban Planning in India, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2010.

7. Vinita Pandey, Crisis Urban Middle Class, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2012.

8. Ramakant Rao M.G, *Good Governance: Modern Global and Regional Perspectives*, Published by: Kanishka Publishers, New Delhi, 2008.

9. Bhatnagar, Subhash, "E-Government: From Vision to Implementation: A Practical Guide with Case Studies", Sage Publications, New Delhi, 2004.

10. S.R. Das and R. Chandrasekhar, "*Capacity Building for e-Governance in India*," e-Governance division of the Department of Information Technology, Government of India.

Paper-105: Urban Environmental Pollution and Sources of Energy Max. Marks: 80+20 (Internal Assessment)

Time: 3 hours

Note: Eight questions will be set, selecting at least two questions from each unit. Candidates are required to attempt four questions, at least one question from each unit.

Unit-I Urban Environmental Pollution

- 1. Environmental Pollution: Concept and Environmental Impacts.
- 2. Urban Heritage: Meaning, Concept, Types and Challenges of Urban Heritage.
- 3. Open Spaces: Meaning, Types, Causes and Significance.
- 4. Urban Water and Sanitation: Concept, Importance and Development Relationship.
- 5. Urban Industrlisation: Meaning, Growth, Phases and Structure of Industrlisation.

Unit-II Classification of Natural Environmental Pollution

- 1. Natural Environmental Pollution: Evolution, Structure and Composition of Atmosphere.
- 2. Air Pollution: Sources, Types of Air Pollution: Primary and Secondary Pollutants
- 3. Water Pollution: Major kinds of Water Uses- Domestic, Agriculture and Industrial Water Pollutants.
- 4. Effects of Water Pollution: Waste Water Pollution and Treatments.
- 5. Others Pollution: Soil Pollution, Noise Pollution, Electronic Pollution and Indoor Pollution.

Unit-III Urban Public Services

- 1. Public Health and Security Services: Sources, Income and Expenditure Trends
- 2. Urban Infrastructure Services: With special reference to Municipal Bodies.
- 3. Urban Environmental Improvement Services.

4. Subsidy Component in Urban Services: Correlates of Subsidy Elements and Renationalization Approaches.
5. Upgrading Municipal Service: Financial Needs and Strategies for Resource Generation.

Unit-IV Solid Waste Management

- Solid Waste Management: Meaning, Classification of Solid Waste Management.
- 2. Municipal Solid Waste Management: Community Groups Involvement in Solid Waste Management
- 3. Plastic Waste Management: Generation, Waste Collection and Disposal.
- 4. Hazardous Waste Management: Meaning, Characteristics and Strategies for Urban Development.
- 5. Sources of Energy: Renewable energy, Non- renewable sources and Techniques of energy conservation.

Recommended Books

1. K.K. Bhatnagar & K.K. Gadeock, Urban Development and Administration, Published by: Aalekh Publishers, Jaipur (Rajasthan) 2010.

2. Kala Seetharam Sridhar & Om Prakash Mathur, Costs and Challenges of Local Urban Services, Published by: Oxford University Press, 2009.

3. Micheal Spence, Patricia Clarke Annez & Robert. M. Buckley Published by: Rawat Publications, Jaipur (Rajasthan) 2010.

4. Kala Seetharam Sridhar & A. Venugopal Reddy, State Urban in India's Cities, Published by: Oxford University Press, 2010.

5. Naib Singh, Urban Public Services (Pricing and Subsidy Component), Published by: Deep & Deep Publications Pvt. Ltd., F-159, Rajouri Garden, New Delhi-110027, 2013.

6. Amiya Kumar Das, Urban Planning in India, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2010.

7. Vinita Pandey, Crisis Urban Middle Class, Published by: Rawat Publications, Jawahar Nagar, Jaipur, Rajasthan, 2012.

8. Ramakant Rao M.G, *Good Governance: Modern Global and Regional Perspectives*, Published by: Kanishka Publishers, New Delhi, 2008.

9. Bhatnagar, Subhash, "E-Government: From Vision to Implementation: A Practical Guide with Case Studies", Sage Publications, New Delhi, 2004.

10. S. R. Das and R. Chandrasekhar, "*Capacity Building for e-Governance in India*," e-Governance division of the Department of Information Technology, Government of India.

Department of History <u>Kurukshetra University Kurukshetra</u> <u>(NAAC A+ Accredited)</u> Scheme of Examination & Syllabi for M.Phil.–History Course under CBCS (Annual System) to be implemented w.e.f. 2018-2019)

Note: 1. The M.Phil.-History Course (Regular) shall be a One Year Degree Course under Annual System consisting of Two Theory Papers, Two Seminars and one Dissertation. In the theory papers, Paper-1 shall be a *core* paper of Research Methodology carrying 100 marks whereas Paper-2 shall be Specialized Optional paper with internal choice carrying 100 marks. There shall be internal assessment of 20 Marks each in both of the Theory Papers.

2. As per the M.Phil. Ordinance of the University, the Scheme of Examination shall be as follows:

Time	:	3 HO	urs	
Maximum Marks	:	100]	Marks	
External Marks	:	80 M	larks	
Internal Assessment	:	20 M	larks; The division of mar	ks shall be as given below:
		(i)	Two Class Tests:	50% (For Each Paper)

(1)	I WO CHASS I COUST	
(ii)	One Assignment :	25 % (One Period Duration)
(iii)	Attendance:	25% Marks

3. The Examination System will further be based on the **Choice Based Credit System (CBCS)** as per UGC/University guidelines. Under this system, every candidate has to pass 40 Credits (36 Compulsory Course Credits + 4 Optional Course Credits out of total 52 Credits as necessary to earn the Degree under the New Scheme of Examination.

4. There shall be two Seminars of 50 marks each, i.e., of total 100 marks. The first Seminar shall be based on Paper-2 (i.e., Specialization Paper) whereas the second Seminar shall be on any aspect related to the proposed theme of research.

5. The candidate shall write and submit a Dissertation on a theme of research pertaining to his/her concerned Area/Group of Specialization under the supervision of an eligible teacher and appear in viva-voce on the Dissertation. Grades will be awarded by the University after assessment of the Dissertation by an external examiner.

6. The other provisions of the M.Phil. Ordinance of the University will also be applicable *in toto*.

Paper No.	Name of the Paper	No. of	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)		
		Cred it	L	Т	Р	Theory Exam	Internal Assessm ent	Total
Core Paper								
MPH-1	Historical Research Methodology	4	4	1⁄2 hrs.G	-	80	20	100
Specialization	Papers:	- 1	1	_1		1		

The Paper Scheme details are as follows:

The candidates shall be required to choose **any one Group** out of the following two Groups of Specialization and then **select any one Optional Paper** out of the two Optional Papers given in the concerned Group of Choice:

Specialization	Papers:							
Group – A: Me	dieval India							
One Paper is to	be chosen from any of t	he follo	owing	Specializa	tion	Papers	of this Grou	ıp:
MPH(A)-2(i)	Historiography on Medieval India	4	4	¹ / ₂ hrs.G	-	80	20	100
MPH(A)-2(ii)	Medieval Indian Historiography	4	4	¹ / ₂ hrs.G	-	80	20	100
Group – B: Mo	dern India							
One Paper is to	be chosen from any of t	he follo	owing	Specializa	tion	Papers	of this Grou	ւթ։
MPH(B)-2(i)	Historiography on Modern India	4	4	¹ / ₂ hrs.G	-	80	20	100
MPH(B)-2(ii)	British Historiography on Modern India	4	4	¹ / ₂ hrs.G	-	80	20	100
	Seminars (Two)	-	-	-	4	-	50 Marks for each Seminar	100
	Dissertation*	-	-	-	28	-	-	-
Total:			·	40			300	

*The workload for Dissertation would be counted on the basis of Number of Students X Two Hours per week.

Maximum Marks: 100 External Marks: 80 Internal Assessment: 20 Time: 3 Hours

Part-A: Theory Exam Course Objectives:

The Paper is designed to provide adequate understanding of the historical research methodology.

At the end of the Course, the students will be able to:

- > Understand the theory and method of research in history.
- > Learn the different techniques and operations of historical research.
- > Analyze critically the different approaches of historical research.
- > Examine the past and present scenario through the perspective of history.

Note: The question paper will consist of *ten* questions, i.e., two questions from each unit. The candidate shall attempt *five* questions in all selecting one question from each unit.

Unit-I

Evolution of Historical Method: Islamic Method: Ibn Khaldoun; Empiricist Tradition: Leopold Von Ranke; Materialistic Approach; Annals Tradition and Post-Modernist Approach

Unit –II

Historical Evidence: Sources, Nature and Transmission; Nature of Historical Facts; Bias

and Objectivity in History; Requisites of a Researcher of History

Unit –III

Preliminary Operations: Selection of Theme; Preparation of Reading Lists/Tentative

Bibliography; Survey of Literature - How to Review A Book; Preparation of Synopsis; Collection of Data: Different Techniques

Unit –IV

Analytical Operations: Scrutiny of Data – External and Internal Criticism; Synthetic Operations: Determing and Grouping of Facts, Causation and Reasoning

Unit-V

Concluding Operations: Generalizations; Presentation - Organization of Material, Cauterization, Writing Style and Strategies; Documentation

Part – B Internal Assessment

Maximum Marks: 20

Two Class Tests (5+5=10 Marks), One Assignment (5 Marks) & Attendance (5 Marks)

Suggested Readings:

Ali, B. Sheikh	History: its Theory and Method, Madras, 1978
Atkinson, R.F.	Knowledge and Explanation in History, London, 1978
Bajaj, Satish, K.	Recent Trends in Historiography, New Delhi, 1988

Barnes, H.E. Bentley, Michael (ed) Bitterns, Hans Block, Marc Buddha Prakash Butterfield, H. Cannon, John (ed.) Carr, E.H. Clark, K.	A History of Historical Writing, Oklahoma Norman, 1937 Companion to Historiography, London, 1997 The Idea of Post Modern : A History, London, 1995 The Historian's Craft, Manchester, 1954 Itihas Darshan (Hindi), Varanasi, 1962 The Whig Interpretation of History, London, 1951 The Historian at Work, London 1980 What is History, Reprint, London, 1983 (First Publication: 1964) Guide for Research Students Working on Historical Subjects. Cambridge, 1969
Clark, Stuart	The Annals Historians: Critical Assessment, Vol. I, London, 1999
Collingwood, R. G. Delanlez, Jean (ed.) <i>Dictionary of History of</i> Dray, Arthur Durant, Will and Ariel Durant	The Idea of History, oxford, 1946 A Guide to Historical Method, New York, 1946 Ideas, Vols. 1 & 2, New York, d.d. On History and philosophers of History, New York, 1989 The Story of Civilization, Vols. I-IX, d.d.
Elton, Geoffrey Elton, Geoffrey	The Practice of History, London, 1967 Returns to Essentials: Some Reflections on the Present State of Historical Study, Cambridge, 1991
Encyclopedia of Islam ,	New Edition, Vols. 3 & 4, 1979
Evans, j. Richard	In Defense of History, London, 1997
Foucault, Michel	Power /Knowledge: Selected Interviews and Others Writings, Brighton, 1980
Gayle , Peter Gooch, G. P.	Debates with Historians, New York, 1958 History and Historians of the Nineteenth Century, London 1952 (First Publication: 1913)
Hegel G P	The Philosophy of History New York 1958
Hackett, H.C.	<i>The Critical method in Historical Research and Writing</i> , New York, 1955
Hughes , Warrington Hasan, Mohibbul (ed.) Jenkins , Keith (ed.) Jenkins , Keith (ed.)	Fifty Key Thinkers on History, London, 2000 Historians of Medieval India, Meerut, 1968 Post-Modern History Reader, London 1997 Why History? Reflections on the Possible End of History and Ethics
Marwick, Arthur	<i>Under the Impact of the Postmodern</i> , London, 1999 <i>The Nature of History</i> , <i>Reprint</i> , London, 1970 (First Publication : 1984)
Marwick , Arthur Marx, Karl and Fredrick Angles	What History Is and Why It Is Important? Buckinghamshire, 1970 The Communist Manifesto (edited by A. P. J. Taylor), London 1974
Munslow . Alan	Deconstructing History, London, 1997
Reiner . G.T.	History : Its Purpose and Method . London. 1961
Russel, Bertrand	History of Western Philosophy London 1947
Shafer R I	A Guide to Historical Method Homewood 1974
Sridharan , E.	A Textbook of Historiography 500 B.C. to A. D. 2000, New Delhi, 2004
Thompson, J. W. & Holm Bernard	A History of Historical Writing, Vols. 1 & 2, New York, 1942

<u>Specialization Papers:</u> <u>Group-A: Medieval India</u> Paper-MPH(A)-2(i): Historiography on Medieval India Total Credits: 4

Maximum Marks: 100 External Marks: 80 Internal Assessment: 20 Time: 3 Hours

Part-A: Theory Exam Course Objectives:

The Paper is designed to provide adequate understanding of the historiography on medieval India.

At the end of the Course, the students will be able to:

- > Understand the nature and scope of the historiography on medieval India.
- > Learn the different traditions/schools of the historiography on medieval India.
- > Analyze critically the different approaches of the historiography on medieval India.
- Examine the past and present scenario through the perspective of history.

Note: The question paper will consist of *ten* questions, i.e., two questions from each unit. The candidate shall attempt *five* questions in all selecting one question from each unit.

Unit-I

Contemporary Historiography of the Sultanate Period: Salient Features of the Indo-Persian

Writings with special reference to Mihaj Sirai and Ziyanddin Barni

Unit-II

Contemporary Historiography of the Mughal Period: Salient Features with special reference

to Abul Fazl and Badaoni

Unit-III

British Imperialist Historiography: Salient Features with special reference to Mount Stuart Elphinstone and W.H. Moreland

Unit – IV

Nationalist Historiography: Salient Features with special reference to Judunath Sarkar and Mohammed Habib

Unit –V

Marxist and Cambridge Historiography: Salient Features with special reference to Irfan Habib and J.F. Richards

Part –B: Internal Assessment

Maximum Marks: 20

Two Class Tests (5+5=10 Marks), One Assignment (5 Marks) & Attendance (5 Marks)

Suggested Reading:

Ashraf, K.M,	Life and Conditions of the People of Hindustan 1200-1550 A.D.,
	Delhi, 1959
Burn, Richard (ed.)	The Cambridge History of India, Vol. IV, Cambridge, 1937

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Dodwell, H.H. (ed.)	Cambridge History of India, Vol. V, Delhi, 1963
Duff, James Grant	A History of the Maratha, 3 Vols., Reprint, Bombay, 1963
Elphinstone, Mount Stuart	The History of India, 2.vols., London, 1841
Grewal J.S.	Muslim Rule in India : The assessments of British Historians
	Calcutta. 1970
Grewal I S	Iames Tod and Raiput History · Proceedings of the International
Glowar, J. S.	Congress of Orientalists New Delhi 1964
Grewal I S	The Medieval Indian State and Some British Historians
Glowar, J. S.	Chandigarh 1967
Habib Muhammad	Sultan Mahmud of Ghazni Aligarh 2 nd FD 1927 Delhi
Habib, Muhammad (ed.)	Politics and Society during the Farly medieval Period K A
Habib, Wuhaniniaa (ed.)	Nizami (ed.) Delhi 1974
	Historical Essays History and Historicaraphy New Delhi
Lai, K.S.	2001
Mittal S C	India Distorted Vol I Dolbi 2002
Moreland W H	The Agrarian System of Muslem India Poprint Dolhi 1060
Moreland WII	Enom Alban to Auranozoh A Study in Indian Economic History
Moreialia, w.n.	London, 1924
Moreland, W.H.	India at the Death of Akbar : An Economic Study, Reprint, Delhi,
	1972
Philips , C. H.	Historians of India , Pakistan and Ceylon , Oxford , 1975
Richards, J. F.	Mughal Administration in Golconda, Oxford, 1975
Richards, J. F. (ed.)	Kingship and Authority in South India, Madison, 1978
Richards, J, F, (ed.)	Imperial Monetary System of the Mughals , Bombay , 1992
Richards, J.F.	The Mughal Empire, Cambridge, 1993
Saran, Parmatma	<i>The Provincial Government of the Mughals</i> 1526-1658, Bombay 2 nd Ed., 1973, d.d.
Sardesai, G.S.	New History of the Maratha People . 2 Vols. Bombay 1946-1948
Sardesai, G.S.	The Main Currents of Maratha History, 1700-1750, Bombay 1949
Sarkar, Jadunath	Fall of the Mughal Empire, Vol. I-IV, Calcutta, 1964
Sarkar. Jadunath	Mughal Administration . Calcutta, 1952
Sarkar, Jadunath	History of Aurangzeb's 5 Vols., Calcutta, 1974
Sen. S.P. (ed.)	Historians and Historiography in Modern India, Calcutta, 1973
Sharma . G.N.	Social Life in Medieval Raiasthan (1500-1800), Agra , 1965
Sharma, G.N.	Mewar and the Mughal Emperor. Agra, 1951
Stein, Burton	Peasants, State and Society in Medieval South India, Delhi, 1980
Stein Burton	Vijavanagara: The New Cambridge History of India Vol XII
	Cambridge 1989
Stein Burton	A History of India Delhi 1988
Subodh, Sanjay	Historiography on Medieval India : A Study of Prof. Muhammad
Tod Col James	Annals and Antiquities of Paiaethan 2 Vol. London d.d. 1826
100, Col, James	1832
Tripathi , R.P.	Rise and Fall of the Mughal Empire, Allahabad, 1958
Tripathi, R.P.	Some Aspects of Muslim Administration in India, Allahabad, 1936
Babar	Tuzuk-i-Babari, Eng. Tr. By A. S. Beveridge, Delhi, 1970, Also
Radaani Abdul Oadin	IIIMI II. DY S.A.A. NILVI Muntahah ul Tawarikh Vol I Fna Tuhu Daukina Vol II Fna Tu
Dauaoiii, Aodui Qaulf	WHI LOWO VOL III Eng. Tr. Dr. W. Hoig, VOLII Eng. IT.
	by w.n. Lowe, vol. III, Elig. 11. by w. Halg, Kepfini, Deini,
Doroni Zivo	1775 Tavikh i Einiozshahi (Davoign) Coloutto 1960
Daralli, Ziya	Internet of India an Told by its Own Historian Male I VIII
Emot & Dowson(ed.)	nisiory of India as Iola by its Own Historians, vols. I-VIII,

	Allahabad, 1964
Fazl , Abul	Ain-i-Akbari, Eng. Tr. Vol. I by H. Bloachmann, Vol II & III, by
	H.S. Jarrett and J.N. Sarkar, Calcutta, 1948-49
Fazl,Abul	Akbarnama, 3Vols, Eng. Tr. By H. Beveridge, Reprint, Delhi
	1972
Habib, Irfan (ed.)	Medieval India, Vol. IV and VI, d.d.
Habib, Muhammad	Politics and Society during the Early Medieval Period, K.A.
	Nizami (ed.), Delhi, 1974
Hardy, Peter	Historians of Medieval India, London, 1960
Hardy, Peter	Studies in Indo- Muslim Historical Writings, London, 1983
Hasan, Muhibbul(ed.)	Historians of Medieval India, Meerut, 1968
Husain, Mehdi	A Critical Study of the Sources of Medieval India, Islamic
	Culture, Hyderabad, 1957
Isami	Futuh-us-Salatin, Eng. Tr. By A. Mehdi Hussain, Bombay, 1963
Khan , Khafi	Muntakhub-ul-Lubab, Eng. Tr by Anees Ahmad
Luniya, B.N.	Historians of Medieval India, Agra, 1971
Minhajsiraj	Tabaqat-i-Nasari, Eng. Tr. By Major Reverti
Mirza, M.Wahid	Life and Works of Amir Khusaro , Calcutta , 1935
Mukhia, Harbans	Historians and Historiography during the Reign of Akbur, New
	Delhi, 1976
Mushtaqi, Sheikh Rizqullah	Waquat-i-Mushtaqi, Eng. Tr. And Ed. By I.H. Siddiqui, Also
	Hindi. Tr. By S.A.A. Rizvi
Nizami, Azra	Sheikh Abul Fazl, Delhi, 1978
Nizami , K.A.	On History and Historians of Medieval India, Delhi, 1983
Phillips, C. H. (ed.)	Historians of India, Pakistan, and Ceylon, London, 1961
Rasul, M. G.	The Origin and Development of Muslim historiography, Delhi,
	1976
Rizvi, S.A.A.	Religious and Intellectual History of the Muslims in Akbar's
	Reign, Delhi, 1985
Sankar , Jagdish Narain	History of History Writing in Medieval India, Calcutta, 1977
Sridharan , E.	A Textbook of Historiography 500 B. C. to A. D. 2000, New
	Delhi, 2004

Paper-MPH(A)-2(ii): Medieval Indian Historiography Total Credits: 4

Maximum Marks: 100 External Marks: 80 Internal Assessment: 20 Time: 3 Hours

Part-A: Theory Exam

Course Objectives:

The Paper is designed to provide adequate understanding of the medieval Indian historiography.

At the end of the Course, the students will be able to:

- > Understand the nature and scope of the medieval Indian historiography.
- > Learn the different trends of the medieval Indian historiography.
- Analyze critically the different traditions of the medieval Indian historiography. Examine the past and present scenario through the perspective of history.
- **Note:** The question paper will consist of *ten* questions, i.e., two questions from each unit. The candidate shall attempt *five* questions in all selecting one question from each unit.

Unit-I

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Historiography during the Sultanate Period: Main Features of Indo-Persian Historiography

(13th-14th Century); Taj-ul-Maasir of Hasan Nizami; Tarikh-i-Firozshahi of Ziyauddin Barani

Unit-II

Metrical Historiography: Historical Masnavis of Amir Khusro; Isami's Futuh-us-Salatin

Unit-III

Afghan Historiography: Shaikh Rizqullah Mushtaqu's Waqiyat-i-Mushtaqi; Abbas Khan Sherwani's Tarikh-i-Shershahi

Unit-IV

Historiography of the Mughal India: *Baburnama*; Abul Fazl's *Akbarnama*; Badaoni's *Muntakhab-ut-Tawarikh*

Unit-V

18th Century Mughal Historiography: Khafi Khan's *Muntakhab-ul-Lubab*; Muhammad Qasim's *Ahwal-ul-Khawanin*

Part -B: Internal AssessmentMaximum Marks: 20Two Class Tests (5+5=10 Marks), One Assignment (5 Marks) & Attendance (5 Marks)

Suggested Reading:

Tuzuk-i-Babari, Eng. Tr. By A. S. Beveridge, Delhi, 1970, Also Hindi Tr.
By S.A.A. Rizvi
Muntahab-ul-Tawarikh, Vol. I Eng. Tr.by Ranking, Vol. II Eng. Tr. By
W.H. Lowe, Vol. III, Eng. Tr. By W. Haig, Reprint., Delhi, 1973
Tarikh-i-Firjozshahi (Persian), Calcutta, 1862
History of India as Told by its Own Historians, Vols. I-VIII, Allahabad, 1964
Ain-i-Akbari, Eng. Tr. Vol. I by H. Bloachmann, Vol II & III, by H.S.
Jarrett and J.N. Sarkar, Calcutta, 1948-49
Akbarnama, 3Vols, Eng Tr. By H. Beveridge, Reprint, Delhi 1972
Medieval India, Vol. IV and VI, d.d.
Politics and Society during the Early Medieval Period, K.A. Nizami
(ed.), Delhi, 1974
Historians of Medieval India, London, 1960
Studies in Indo- Muslim Historical Writings, London, 1983
Historians of Medieval India, Meerut, 1968
A Critical Study of the Sources of Medieval India, Islamic Culture,
Hyderabad, 1957
Futuh-us-Salatin, Eng. Tr. By A. Mehdi Hussain, Bombay, 1963
Muntakhub-ul-Lubab, Eng. Tr by Anees Ahmad
Historians of Medieval India, Agra, 1971
Tabagat-i-Nasari, Eng. Tr. By Major Reverti
Life and Works of amir Khusaro, Calcutta, 1935
Historians and Historiography during the Reign of Akbur, Nuw Delhi, 1976
Waquat-i-Mushtaqi, Eng. Tr. And Ed. By I.H. Siddiqui, Also Hindi. Tr.
By S.A.A. Rizvi

Nizami, Azra	Sheikh Abul Fazl, Delhi, 1978
Nizami , K.A.	On History and Historians of Medieval India, Delhi, 1983
Phillips, C. H. (ed.)	Historians of India, Pakistan, and Ceylon, London, 1961
Rasul, M. G.	The Origin and Development of Muslim historiography, Delhi, 1976
Rizvi, S.A.A.	Religious and Intellectual History of the Muslims in Akbar's Reign, Delhi, 1985
Sankar , Jagdish Narain	History of History Writing in Medieval India, Calcutta, 1977
Sridharan , E.	A Textbook of Historiography 500 B. C. to A. D. 2000, New Delhi, 2004

Group-B: Modern India

Paper-MPH(B)-2(i): Historiography on Modern India Total Credits: 4

Maximum Marks: 100 External Marks: 80 Internal Assessment: 20 Time: 3 Hours

Part-A: Theory Exam

Course Objectives:

The Paper is designed to provide adequate understanding of the historiography on modern India.

At the end of the Course, the students will be able to:

- > Understand the nature and scope of the historiography on modern India.
- > Learn the different traditions/schools of the historiography on modern India.
- > Analyze critically the different approaches of the historiography on modern India.
- > Examine the past and present scenario through the perspective of history.

Note: The question paper will consist of *ten* questions, i.e., two questions from each unit. The candidate shall attempt *five* questions in all selecting one question from each unit.

Unit-I

Evangelicals and Utilitarians' Interpretations: Sources, Objectives and Approaches;

Interpretations on Religion and Society, State, Politics and Economy

Unit-II

Imperialist Perspectives during the Late 19th and Early 20th Century: Objectives,

Sources and Approaches; Interpretations on State, Economy, Uprising of 1857 and National & Communal Politics

Unit-III

Nationalist Perspectives: Approaches, Methods and Historical Contributions; Interpretations on State and Politics, Society, Colonial Economy and National Movement

Unit-IV

Cambridge School: Approaches and Methods; Major Historical Contributions; Interpretations on State and Society, Economy, National and Communal Politics

Unit-V

Marxist and Subaltern Schools: Approaches and Methods; Interpretations on Colonial

Economy, National Movement and Peasant & Worker Movements; Historiography on Lower Caste

Movements

Part –B: Internal Assessment

Maximum Marks: 20

Two Class Tests (5+5=10 Marks), One Assignment (5 Marks) & Attendance (5 Marks)

Suggested Reading:

Bajaj, S.K.	Recent Trends in Historiography, New Delhi, 1988
Brown, Judith	Gandhi's Rise To Power : India Politics 1915-1922, Cambridge, 1972
Brown, Judith	Gandhi and Civil disobedience : The Mahatma in Indian Poetics 1928-
	1934, Cambridge ,1977
Brown, Judith	Gandhi : Prisoner of Hope, Delhi, 1992
Butterfield, Herbert	The Whig Interpretation of History, London, 1873
Chandra, Bipan (ed.)	The Indian Left : Critical Appraisals, new Delhi, 1984
Chirol, Valentine	Indian Unrest, London, 1926
Chirol, Valentine	India: Old and New, London, 1927
Colbrollke, T.E.	Life of the Honorable Mount Stuart Elphinstone, 2 Vols. London, 1889
Collingwood, R.G.	The Idea of History, Oxford, 1946
Cunningham, J.D,.	A History of the Sikhs from the Origin of the Nation to the Battle of the
-	Satluj, Reprint, Delhi, 1972
Desai, A.R.	Social Background of Indian Nationalism, Bombay, 1959
Desai, A.R. (ed.)	Peasant Struggle in India, Delhi, 1979
Dodwell, H.H.	A Sketch of the History of India from 1858-1918, London, 1925
Dodwell. H.H.	The Cambridge History of India, Vols. V & VI, Cambridge, 1932
Duff.J.C. Grand	History of the Marathas, 3 Vols., Reprint, Bombay, 1963
Dutt, R. Palme	Prolems of Contemporary History, London, 1963
Dutt, R.C.	The Peasantry of Bengal, London, 1874
Dutt, R.C.	The Economic History of India, 2 Vols., London, d.d., 1901, 1903
Dutt, R.C.	Speeches and Papers on Indian Question, 2 Vols., Calcutta, 1904
Dutt, R.Palme	India Today, Bombay, 1949
Elphinstone Mount	Report on the Peshwa's Territories, London, 1822
Stuart	
Elphinstone, Mount	Rise of the British Power in the East, London, 1841
Stuart	
Fisher, Thomas	Memoirs of the Late Charles Grant. London, 1833
Gadgil, D.R.	The Industrial Evolution of India in Recent Time, Calcutta, 1948
Gallaghar, J and	Locality, Province and Nation, Cambridge, 1973
Anil Seal (ed.)	
Gooch, G.P.	History and Historians of the Nineteenth Century, London, 1913
Grant, Charles	Observations on the State of Society Among the Asiatic Subjects of Great
	Britain, London.
Guha, Ranjit	Elementary Aspects of Peasant Insurgency in Colonial India, Delhi, 1983
Guha, Ranjit (ed.)	Subaltern Studies : Essay on South Asian History and Society, Vols. I-IV, New Delhi, d.d. 1982-1988
Gupta.K.P.S	The Christian Missionaries in Bengal 1793-1833, Calcutta, 1971
Hunter, W.W	The Indian Mussalmans, London, 1871
Hunter, W.W	A Brief History of the Indian Peoples, London, 1883
Hunter, W.W	History of British India, 2 Vols. London, 1900
Kaye, J.W.	Christianity in India : An Historical Narration, London, 1859

Kaye. J.W. Kaye.J.W.	<i>The Administration of the East India Company</i> , London, 1866 <i>A History of the Sepoy War in India</i> 1857-1858, 3 Vols., London, d.d.1861-
	1874
Marshman, J.C.	Memoirs of Sir Henry Havelock, London, 1860
Marshman, J.C.	The History of India, 2 Vol. London 1871
Mittal, S.C.	India Distorted: A Study of British Historians on India, 3 Vols. New Delhi, 1998
Moll, James	The History of British India, 6 Vol. London 1840
Omvedt, Gail	Cultural revolt in a Colonial Society : The Non-Brahmin Movement in Western India, Bombay, 1976
Omvedt, Gail	Dalits and the Democratic Revolution : Dr.Ambedkar and the Dalit Movement in Colonial India, New Delhi, 1994
Philips, C.H.	The East India Company, 1784-1834, London, 1961
Philips, C.H.	Evolution of India and Pakistan 1857-1947 : Select Documents, London, 1962
Philips, C.H. (ed.)	The Partition of India : Policies and Perspectives1935-1947, London, 1970
Philips, C.H.(ed.)	Historians of India, Pakistan and Ceylon, London, 1967
Seal, Anil	<i>The Emergence of Indian Nationalism : Competition and Collaboration in the Late 19th Century</i> , Cambridge, 1968
Sen, S.P. (ed.)	Historians and Historiography in Modern India, Calcutta, 1963
Smith, W.C.	Modern Islam in India, Lahore, 1963
Smith, W.C.	The Muslim League, Lahore, 1947
Stokes, Eric	The English Utilitarinas and India, Oxford, 1959
Tara Chand	History and the Freedom Movement in India, 4 Vols., Delhi, d.d., 1961-1972
Tara Chand	Influence of Islam on Indian Culture, Allahabad, 1963s

Paper- MPH(B)-2(ii): British Historiography on Modern India Total Credits: 4

Maximum Marks: 100 External Marks: 80 Internal Assessment: 20 Time: 3 Hours

Part-A: Theory Exam

Course Objectives:

The Paper is designed to provide adequate understanding of the British historiography on modern India.

At the end of the Course, the students will be able to:

- > Understand the nature and scope of the British historiography on modern India.
- > Learn the different trends of the British historiography on modern India.
- Analyze critically the different traditions and approaches of the British historiography on modern India.
- Examine the past & present scenario of India through the perspective of the British Historiography.
- **Note:** The question paper will consist of *ten* questions, i.e., two questions from each unit. The candidate shall attempt *five* questions in all selecting one question from each unit.

Unit –I

Evangelical Interpretation of Indian Society, Religion, Polity, Trade and Commerce: Charles Grant and J.C. Marsh man

Unit – II

10(444)

The Utilitarians and their Understanding of Indian State, Politics, Economy and Society: James Mill and Mount Stuart Elphinstone

Unit – III

British Administrator Historians and their Interpretation of Indian State, Politics, Society and Economy: John William Kaye and W.W. Hunter

Unit – IV

Imperialist Historiography on India during the Early 20th Century and its Interpretation of Indian State, Society, Politics and National Movement: Valentine Chirol and H.H. Dodwell

Unit – V

Imperialist Writings on Regional History: Sources, Objectives and Interpretation - James C.

Grand Duff and J. D. Cunningham

Part -B: Internal AssessmentMaximum Marks: 20Two Class Tests (5+5=10 Marks), One Assignment (5 Marks) & Attendance (5 Marks)

Suggested Readings:

Butterfield, Herbert	The Whig Interpretation of History, London, 1873
Chirol, Valentine	Indian Unrest, London, 1926
Chirol, Valentine	India: Old and New, London, 1927
Colbrollke , T.E.	Life of the Honorable Mount Stuart Elphinstone, 2 Vols. London, 1889
Collingwood, R.G.	The Idea of History, Oxford, 1946
Cunningham, J.D,.	A History of the Sikhs from the Origin of the Nation to the Battle of the Satluj, Reprint, Delhi, 1972
Dodwell. H.H.	The Cambridge History of India, Vols. V & VI, Cambridge, 1932
Dodwell, H.H.	A Sketch of the History of India from 1858-1918, London, 1925
Duff, J. C. Grand	History of the Marathas, 3 Vols., Reprint, Bombay, 1963
Elphinstone, Mount	Rise of the British Power in the East, London, 1841
Stuart	
Elphinstone Mount	Report on the Peshwa's Territories, London, 1822
Stuart	
Fisher, Thomas	Memoirs of the Late Charles Grant. London, 1833
Gooch, G.P.	History and Historians of the Nineteenth Century, London, 1913
Grant, Charles	Observations on the State of Society Among the Asiatic Subjects of
	Great Britain, London.
Gupta, K.P.S	The Christian Missionaries in Bengal 1793-1833, Calcutta, 1971
Hunter, W.W	The Indian Mussalmans, London, 1871
Hunter, W.W	A Brief History of the Indian Peoples, London, 1883
Hunter, W.W	History of British India, 2 Vols. London, 1900
Kaye, J.W.	Christianity in India: An Historical Narration, London, 1859
Kaye. J.W.	The Administration of the East India Company, London, 1866
Kaye.J.W.	A History of the Sepoy War in India 1857-1858, 3 Vols., London,
	d.d.1861-1874
Marshman, J.C.	Memoirs of Sir Henry Havelock, London, 1860
Marshman, J.C.	The History of India, 2 Vol. London 1871
Moll, James	The History of British India, 6 Vol. London 1840
Mittal, S.C.	India Distorted: A Study of British Historians on India, 3 Vols. New Delhi, 1998

Scheme of M.Phil. (Commerce) CBCS w.e.f. Academic Session 2017-18

The syllabi for M.Phil. (Commerce) CBCS has been revised w.e.f. 2017-18 session. The paper Research Methodology and Statistical Methods is compulsory paper and carries Total 100 marks (External-80, Internal-20). There shall be three optional theory papers (syllabi enclosed) out of which every student is required to offer one paper. Each optional paper carries 100 marks (External-80, Internal-20). There is no change in the syllabi of these papers. The scheme of Examination with credit score is as follows:

M.Phil. (Commerce)									
Course	C/E	Title of Course	Total	Ext.	Int.	Hrs			Credits
Code	/		Marks	Marks	Marks	Loot	Tutorial	Tatal	(L/T/P)
	OE					Leci.	1 utoriai	Total	
A1	C	Research	100	80	20	4	-	4	4
		Methodology &							
		Statistical							
		Methods							
Paper (i)	E	Contemporary	100	80	20	4	-	4	4
(OR)		Accounting &							
		Finance							
Paper (ii)	E	Contemporary	100	80	20	4	—	4	4
(OR)		Human							
		Resource							
		Management							
Paper	E	Advanced	100	80	20	4	—	4	4
(iii)		Marketing							
	C	Seminar	50	—	50	2	—	2	2
		(Research							
		Methodology &							
		Statistical							
		Methods)*							
	C	Seminar	50	—	50	2	—	2	2
		(Optional							
		Subject) *							
	С	Dissertation	Grade	-	_	_	_	-	_
		Total	300	160	140	12	_	12	12

Course Symbol: C denotes 'Compulsory', E 'Elective' and OE 'Open Elective'

*To be conducted by Committee of 2/3 teachers of the Department.

In addition to the above, every student shall submit a Dissertation and shall also appear in Viva-voce Examination on the same.

The Scheme of M.Phil. (Commerce) CBCS shall be regulated by the Amendments/Additions to various Clauses of the Ordinance – Master of Philosophy (M.Phil.) Examination (Annual System) appearing at pages 565-571 of K.U. Cal. Vol. II, 2014 as per Annexure pages (1-12) of Agenda w.e.f. the Session 2017-18 as per meeting of Academic Council held on 09.01.2018.

M. Phil (Commerce) Course A1 RESEARCH METHODOLOGY AND STATISTICAL METHODS

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: The paper setter will set eight questions and the candidates are required to attempt any five questions. All questions will carry equal marks.

Scientific research/approach: meaning and process, place of logic in scientific research; Hypothesis; types, source and characteristics of usable hypothesis; formulation of a research problem; Research in business: definition, significance and limitations.

Research design: meaning, purpose and principles, formulative and explorative, descriptive and experimental research designs.

Survey based research: data collection, questionnaire and interview methods, Analysis and interpretation of data; Report writing; Sampling and sampling methods; precision and accuracy of sample based research.

Statistical estimation, interval and point estimation; Chi-square test and T-test.

Analysis of Variance: One way and two way, factor analysis; regression analysis, Data analysis using software packages-excel, SPSS.

REFERENCES:

- 1. Saravanavel P- Research Methodology, Kitab Mahal, Allahabad.
- 2. Donald R. Cooper and Pamela S. Schindkler- Business Research Methods, Tata McGraw Hill, New Delhi.
- 3. Sharma R.D. Research methods in Social Science, National Book Organizations, New Delhi.
- 4. Kothari C.R. : Research Methodology, Wiley Eastern Ltd. New Delhi.
- 5. Francis J. Rummer & Wesley C. Balline, Research Methodology in Business, Harper & Row, New York.
- 6. Sharma K. R., Research Methodology, National Publishing House, Jaipur.
- 7. Hooda, R.P., Statistics for Business And Economics, Vikas Publishing., New Delhi.

M.Phil (Commerce)

Paper (i) CONTEMPORARY ACCOUNTING AND FINANCE

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: The paper setter will set eight questions and the candidates are required to attempt any five questions. All questions will carry equal marks.

Review of Accounting Theory: Meaning, Nature and Approaches to the Development of Accounting Theory. Accounting Standards: Need, Importance, Formulation of International Accounting Standards and Accounting Standards in India. Disclosure Practices; Social Reporting. Corporate Governance and Business Ethics.

Finance Function: Nature, scope and objectives; Time value of money, Risk and return. Capital Budgeting: Process and Risk Analysis, Mergers Takeovers and Restructuring: Meaning, Nature and Types, Takeover Process and Models. Legal, Tax and Accounting Issues in Mergers and Acquisitions. International Mergers and Restructuring.

Investment Function: Meaning, Nature, Objectives, Avenues, Process and Constraints; Risk and Return, Systemic and Unsystematic Risk & Efficient Market Hypothesis: Theory and Evidence. Securities Markets: Primary Market; Secondary Market. Regulation of Indian Securities Market. CAPM and APT, Single Index Model, Options and Futures, Portfolio Performance Measurement and Evaluation; Decomposition of Portfolio Performance on Selectivity and Timing.

REFERENCES

- 1. Arulanandam, M.A. and Raman, K.S.: Advanced Accountancy, Himalya Publishing House, Delhi.
- 2. Shukla M.C. and Grewal, T.S.: Advanced Accounts, S. Chand and Co. Delhi.
- 3. Porwal, L.S. : Accounting Theory, Tata McGraw Hill, New Delhi.
- 4. Hendriksen, E.S.: Accounting Theory, Richard D. Irwin, Inc.
- 5. Chandra, Prasanna: Financial Management, Tata McGraw Hill, Delhi.
- 6. Verma J.C.: Corporate Mergers, Amalgamations and Takeovers, Bharat Pub. House, New Delhi.
- 7. Clark, James Fransis: Investment-Analysis & Management McGraw Hill (Int. Edition).
- 8. Fisher, Donald E. and Ronald, J. Jordan: Security Analysis and Portfolio Management, Prentice Hall, Delhi.

M.Phil (Commerce) Paper (ii) CONTEMPORARY HUMAN RESOURCE MANAGEMENT

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: The paper setter will set eight questions and the candidates are required to attempt any five questions. All questions will carry equal marks.

Human Resource Management- meaning, objectives and scope; Functions and role of human resource manager; Emerging issues and challenges in human resource management; Strategic human resource management; Human resource strategies and cultural compatibility; Human resource planning; Potential appraisal and succession planning; Job design; Redesign of work systems; Outsourcing human resource management; Managing employee separation.

Human Resource Development- meaning, goals and sub-systems; Assessment and Development centers; Employee empowerment; Total quality management and quality of work life; Job satisfaction; Stress management; Ethical issues in human resource development.

Management of employees in service organizations; Human resource issues in virtual organizations; International human resource management.

Reference:

- 1. Ivancevich, J.M., Human Resource Management, Tata McGraw Hill, New Delhi.
- 2. Pattanayak, B., Human Resource Management, Prentice Hall of India, New Delhi.
- 3. Aswathappa, K., Human Resource Management, Tata McGraw Hill, New Delhi.
- 4. Snell, S. and Bohlander, G., Human Resource Management, Thomson, South-Western, New Delhi.

M.Phil (Commerce) Paper (iii) ADVANCE MARKETING

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: The paper setter will set right questions and the candidates are required to attempt any five questions. All questions will carry equal marks.

Defining Marketing for the New Age

Marketing Theory: need, sources and status

Gathering Information and Scanning the Environment

Conducting Marketing Research and Forecasting Demand

Analysing and Selecting Markets

Developing Marketing Strategies and Plans

Dealing with Competition

Global Markets and Marketing: EPRG, influence of environment, entry methods

Analysing and Developing Marketing Mix for Local and Global Markets

Brand Equity: understanding, building, measuring and managing

Marketing Implementation, Evaluation and Control

Managing a Holistic Marketing Organization

Socially Responsible Marketing

Marketing and the Information Economy

Applications of Marketing: service sector, retail and rural sector

REFERENCES:

- Baker, Michael J., Marketing: Theory and Practice (Ed.) Mc Millan Business
- Kotler and Keller, Marketing Management, Prentice Hall of India
- Etzel, Michael J., Bruice J Walker, William J Stanton and Ajay Pandit, Marketing Concept and Cases, McGraw Hill Publications.
- Lancaster, Geoff and Lasteer Massingham, Esstentials of Marketing, McGraw Hill Publications.
- Pride, William M and O C Ferral, Marketing, Houghton Mifflin Co.
- Orville Walker, Jean-Claude Larreche, John Mullins, Harper Boyd, Marketing Strategy, McGraw Hill Publication.

Structure and Syllabi of **M.Phil. Punjabi (Annual system)** (Under Choice Based Credit System) Effective from the session 2018-19

Paper	Core Course	Credit	Teaching Hours	Maximum Marks				
			(Per week)	Internal	End session	Total		
				Assessment	Examination	Marks		
Ι	Khoj Vidhi Vigyan Ate sahitik Alochna	4	4	20	80	100		
Paper	Elective Courses	Credit	Teaching Hours	Maximum Marks				
			(Per week)	Internal	End session	Total		
				Assessment	Examination	Marks		
II (i)	Madhkali Panjabi Kavita Da Gehan Adhyan	4	4	20	80	100		
II (ii)	Adhunik Panjabi Kavita Da Gehan Adhyan	4	4	20	80	100		
II (iii)	Adhunik Panjabi Galap Da Gehan Adhyan	4	4	20	80	100		
II (iv)	Panjabi Lokdhara ate Sabhyachar da Gehan Adhyan	4	4	20	80	100		
II (v)	Panjabi Natak ate Vartak Da Gehan Adhyan	4	4	20	80	100		
2								
Paper	Open Elective Course	Credit	Teaching	Maximum Marks				
	(Interdisciplinary course		Hours	Internal	End session	Total		
	Departments)		(Per week)	Assessment	Examination	Marks		
III	Anuvad : Sidhant Ate Vihar	2	2	10	40	50		
~								
Ser	ninar And Assignment	Credit	Maximum Marks					
		4						
	Two Seminars		40x2=80					
Two Assignments			10x2=20					
Grand Total Credit/ Marks		14	350					

ਖੋਜ ਨਿਬੰਧ : ਵਿਭਾਗ ਵੱਲੋਂ ਹਰ ਵਿਦਿਆਰਥੀ ਨੂੰ ਵਿਸ਼ੇ ਚੋਣ ਮੁਤਾਬਕ ਇਕ ਖੋਜ-ਨਿਬੰਧ (Dissertation) ਲਿਖਣ ਲਈ ਵਿਸ਼ਾ ਦਿੱਤਾ ਜਾਵੇਗਾ। ਇਸ ਨੂੰ ਵਿਦਿਆਰਥੀ ਨੇ ਉੱਪਰ ਦਿੱਤੇ ਪੇਪਰਾਂ ਤੋਂ ਬਾਅਦ ਮੁਕੰਮਲ ਕਰਕੇ ਜਮ੍ਹਾ ਕਰਵਾਉਣਾ ਹੋਵੇਗਾ। ਜਿਸ ਦਾ ਮੁਲਾਂਕਣ ਕੋਈ ਇਕ ਬਾਹਰੀ ਪਰੀਖਿਅਕ ਕਰੇਗਾ ਅਤੇ ਮੌਖਿਕ ਪਰੀਖਿਆ (viva-voce) ਲਵੇਗਾ। ਬਾਹਰੀ ਪਰੀਖਿਅਕ ਵੱਲੋਂ ਪੁੱਛੇ ਗਏ ਸਵਾਲਾਂ ਦੇ ਦਿੱਤੇ ਗਏ ਜਵਾਬਾਂ ਦੇ ਪੱਧਰ ਦੇ ਆਧਾਰ 'ਤੇ ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਨਿਯਮਾਂ ਮੁਤਾਬਕ ਇਹ ਬਾਹਰੀ ਪਰੀਖਿਅਕ ਗ੍ਰੇਡ ਵੀ ਪ੍ਰਦਾਨ ਕਰੇਗਾ। ਮੌਖਿਕ ਪਰੀਖਿਆ ਪਾਸ ਕਰਨ ਤੋਂ ਬਾਅਦ ਹੀ ਵਿਦਿਆਰਥੀ ਨੂੰ ਡਿਗਰੀ ਮਿਲੇਗੀ। ਨੋਟ: ਐਮ.ਫਿਲ਼. ਪੰਜਾਬੀ ਵਿਚ ਦਾਖਲਾ ਲੈਣ ਵਾਲੇ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪਹਿਲਾ ਪੇਪਰ (Core Course) ਪੜ੍ਹਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਦੂਸਰਾ ਪੇਪਰ (Elective Courses) ਵਿਚ ਦਿੱਤੀਆਂ ਆਪਸ਼ਨਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਕੋਈ ਇਕ ਆਪਸ਼ਨ ਆਪਣੀ ਮਰਜ਼ੀ ਦੀ ਚੁਣ ਸਕਦਾ ਹੈ। ਤੀਸਰਾ ਪੇਪਰ ਯੂਨੀਵਰਸਿਟੀ ਵਿਚ ਕਲਾ ਅਤੇ ਭਾਸ਼ਾਵਾਂ ਫੈਕਲਟੀ ਦੇ ਹੋਰ ਵਿਭਾਗਾਂ ਵਿਚ ਚਲ ਰਹੀ ਐਮ.ਫ਼ਿਲ. ਵਿਚੋਂ ਚੁਣਨਾ ਹੋਵੇਗਾ।

ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਉੱਤੇ ਲਿਖਿਆ ਜਾਵੇਗਾ :

- 1. ਸਾਰਿਆਂ ਪੇਪਰਾਂ ਵਿਚ ਪਹਿਲਾ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ ਅਤੇ ਵਿਦਿਆਰਥੀ ਨੇ ਹਰ ਯੂਨਿਟ ਵਿੱਚੋਂ ਇੱਕ ਸੁਆਲ ਕਰਨਾ ਹੈ। ਕੁੱਲ ਪੰਜ ਸੁਆਲ ਕਰਨੇ ਹਨ।
- 2. ਪੇਪਰ ਪਹਿਲਾ ਅਤੇ ਦੂਸਰਾ ਦਾ ਹਰ ਪ੍ਰਸ਼ਨ 16 ਨੰਬਰ ਦਾ ਹੋਵੇਗਾ ਅਤੇ ਪੇਪਰ ਤੀਸਰਾ ਦਾ ਹਰ ਸਵਾਲ 08 ਨੰਬਰ ਦਾ ਹੋਵੇਗਾ।

ਪੇਪਰ ਸੈੱਟਰ ਲਈ ਹਿਦਾਇਤਾਂ :

- ਪੇਪਰ ਸੈਟਰ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਵਿੱਚ ਕੁੱਲ ਨੌਂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇਗਾ।
- ਪ੍ਰਸ਼ਨ ਨੰਬਰ ਇੱਕ ਵਿੱਚ ਚਾਰ ਛੋਟੇ ਸੁਆਲ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਲੇਬਸ ਵਿਚ ਦਿੱਤੇ ਯੂਨਿਟਾਂ ਵਿਚਲੇ ਟਾਪਿਕਾਂ ਵਿਚੋਂ ਹੋਣਗੇ। ਹਰ ਸੁਆਲ ਦਾ ਜੁਆਬ ਘੱਟ ਤੋਂ ਘੱਟ ਇੱਕ ਪੰਨੇ ਦਾ ਦੇਣਾ ਹੋਵੇਗਾ। ਇਸ ਸੁਆਲ ਵਿੱਚ ਕੋਈ ਅੰਦਰੂਨੀ ਛੋਟ ਨਹੀਂ ਹੋਵੇਗੀ।
- ਹਰ ਯੂਨਿਟ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਪ੍ਰਸ਼ਨ ਦਾ ਜੁਆਬ ਘੱਟੋ ਘੱਟ ਪੰਜ ਪੰਨਿਆਂ ਦਾ ਹੋਵੇ।

ਪੇਪਰ ਪਹਿਲਾ

ਖੋਜ ਵਿਧੀ ਵਿਗਿਆਨ ਅਤੇ ਸਾਹਿਤ ਆਲੋਚਨਾ

ਕੁੱਲ ਅੰਕ : 100 (ਪੇਪਰ : 80, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 20) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

- ੳ) ਖੋਜ : ਪ੍ਰਕਿਰਤੀ ਅਤੇ ਪ੍ਰਕਾਰਜ
- ਅ) ਖੋਜ ਅਤੇ ਖੋਜ-ਚੋਰੀ (Plagiarism) : ਕਾਰਣ ਅਤੇ ਨਿਵਾਰਣ ਦੇ ਸੁਝਾਅ।
- ੲ) ਖੋਜ ਕਾਰਜ ਦੀ ਆਰੰਭਕ ਪ੍ਰਕਿਰਿਆ : ਵਿਸ਼ੇ ਦੀ ਚੋਣ, ਆਰਜ਼ੀ ਰੂਪ ਰੇਖਾ (ਵਿਸ਼ੇ ਚੋਣ ਦਾ ਤਰਕ, ਅਧਿਆਇ ਵੰਡ, ਚੋਣਵੀਂ ਪੁਸਤਕ ਸੂਚੀ)।
- ਸ) ਵਿਸ਼ੇ ਚੋਣ ਉਪਰੰਤ ਪ੍ਰਕਿਰਿਆ : ਨੋਟਸ ਲੈਣ ਦੀ ਵਿਧੀ, ਟਿੱਪਣੀ, ਹਵਾਲੇ ਤੇ ਪੁਸਤਕ ਸੂਚੀ ਤਿਆਰ ਕਰਨ ਦੀਆਂ ਵਿਧੀਆਂ ਅਤੇ ਅਨੁਕ੍ਰਮਣਿਕਾ।
- ਹ) ਖੋਜ ਦੇ ਸੰਦ : ਟੇਬਲ ਵਰਕ, ਮੁਲਾਕਾਤ, ਪੱਤਰੀ ਸਵਾਲ ਅਤੇ ਰਿਕਾਰਡਿੰਗ ਆਦਿ।
- ਕ) ਲਾਇਬ੍ਰੇਚੀ ਕੈਟਾਲਾਗ ਅਤੇ ਇੰਟਰਨੈੱਟ ਦੀ ਵਰਤੋਂ (ਡਿਜ਼ੀਟਲ ਸ਼੍ਰੋਤ)।
- ਖ) ਖੋਜ ਸਾਮੱਗਰੀ ਦਾ ਪ੍ਰਸਤੁਤੀਕਰਨ : ਚੁਣੇ ਗਏ ਵਿਸ਼ੇ ਲਈ ਵਰਤੀ ਗਈ ਵਿਸ਼ਲੇਸ਼ਣ ਪ੍ਰਣਾਲੀ ਦੀ ਸਪੱਸ਼ਟਤਾ, ਮੂਲ ਸਾਮੱਗਰੀ ਦਾ ਤਾਰਕਿਕ ਵਿਸ਼ਲੇਸ਼ਣ ਅਤੇ ਅੰਤਰ-ਦਿਸ਼੍ਰਟੀ ਦੀ ਉਸਾਰੀ, ਮੌਲਿਕ ਚਿੰਤਨ (ਮੂਲ ਸੂਤਰ)।
- ਗ) ਖੋਜ ਸਾਮੱਗਰੀ ਦਾ ਸੰਯੋਜਨ : ਖੋਜ-ਪ੍ਰਬੰਧ ਦਾ ਮੁੱਖ ਪੰਨਾ, ਤਤਕਰਾ, ਧੰਨਵਾਦ, ਭੂਮਿਕਾ, ਵਿਸ਼ੇ ਅਨੁਕੂਲ ਅਧਿਆਇ ਦੀ ਤਰਤੀਬ, ਸਾਰ ਤੇ ਸਥਾਪਨਾਵਾਂ, ਪੁਸਤਕ ਸੂਚੀ ਅਤੇ ਅਨੁਕ੍ਰਮਣਿਕਾ।

ਯੂਨਿਟ ਦੂਸਰਾ

- ੳ) ਪ੍ਰਚੀਨ ਪੱਛਮੀ ਕਾਵਿ ਸ਼ਾਸਤਰ ਪਰੰਪਰਾ : ਅਰਸਤੁ, ਲਾਂਜਾਈਨਸ, ਸੇਮੁਅਲ ਜਾਨਸਨ ਅਤੇ ਸੇਮੁਅਲ ਟੇਲਰ ਕਾਲਰਿਜ਼।
- ਅ) ਸੰਸਕ੍ਰਿਤ ਕਾਵਿ ਸ਼ਾਸਤਰ : ਰਸ ਸੰਪ੍ਰਦਾਇ, ਅਲੰਕਾਰ ਸੰਪ੍ਰਦਾਇ, ਧੁਨੀ ਸੰਪ੍ਰਦਾਇ ਅਤੇ ਵਕ੍ਰੋਕਤੀ ਸੰਪ੍ਰਦਾਇ।

ਯੂਨਿਟ ਤੀਸਰਾ

- ੳ) ਮਾਰਕਸਵਾਦ ਅਤੇ ਨਵ-ਮਾਰਕਸਵਾਦ
- ਅ) ਸੰਰਚਨਾਵਾਦ ਅਤੇ ਉੱਤਰ-ਸੰਰਚਨਾਵਾਦ
- ੲ) ਉੱਤਰ-ਆਧੁਨਿਕ ਸਾਹਿਤ ਸਿਧਾਂਤ
- ਸ) ਵਿਰਚਨਾ ਸਾਹਿਤ ਸਿਧਾਂਤ
- ਹ) ਹਾਸ਼ੀਆਗਤ ਸਾਹਿਤ ਚਿੰਤਨ

ਯੂਨਿਟ ਚੌਥਾ

- ੳ) ਪੰਜਾਬੀ ਸਾਹਿਤ ਖੋਜ ਚਿੰਤਨ ਪਰੰਪਰਾ : ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁੱਲਾਂਕਣ
- ਅ) ਮੱਧਕਾਲੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਖੋਜ : ਵਿਸ਼ਲੇਸ਼ਣ ਅਤੇ ਮੁੱਲਾਂਕਣ
- ੲ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਸਾਹਿਤ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਖੋਜ : ਵਿਸ਼ਲੇਸ਼ਣ ਅਤੇ ਮੁੱਲਾਂਕਣ (ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਗਲਪ, ਪੰਜਾਬੀ ਨਾਟਕ ਅਤੇ ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਦੇ ਵਿਸ਼ੇਸ਼ ਪ੍ਰਸੰਗ ਵਿਚ)
- ਸ) ਪੰਜਾਬੀ ਆਲੋਚਨਾ : ਨਿਕਾਸ, ਵਿਕਾਸ, ਸਥਿਤੀ ਤੇ ਸੰਭਾਵਨਾਵਾਂ

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ਕੁੱਲ ਅੰਕ : 100 (ਪੇਪਰ : 80, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 20) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

- ੳ) ਭਗਤੀ ਕਾਵਿ ਦਾ ਕਾਵਿ ਸ਼ਾਸਤਰ
- ਅ) ਸੁਫ਼ੀ ਕਾਵਿ ਦਾ ਕਾਵਿ ਸ਼ਾਸਤਰ
- ੲ) ਗੁਰਮਤਿ ਕਾਵਿ ਦਾ ਕਾਵਿ ਸ਼ਾਸਤਰ
- ਸ) ਕਿੱਸਾ ਕਾਵਿ ਦਾ ਕਾਵਿ ਸ਼ਾਸਤਰ
- ਹ) ਬੀਰ ਰਸੀ (ਵਾਰ ਤੇ ਜੰਗਨਾਮਾ) ਕਾਵਿ ਦਾ ਕਾਵਿ ਸ਼ਾਸਤਰ

ਯੂਨਿਟ ਦੂਸਰਾ

- ੳ) ਮੱਧਕਾਲ ਅਤੇ ਮੱਧਕਾਲੀ ਚੇਤਨਾ
- ਅ) ਮੱਧਕਾਲੀ ਕਾਵਿ : ਸਮਾਜ-ਸਭਿਆਚਾਰਕ ਪਿਛੋਕੜ
- ੲ) ਮੱਧਕਾਲੀ ਕਾਵਿ ਇਤਿਹਾਸਕ ਪਰਿਪੇਖ
- ਸ) ਮੱਧਕਾਲੀ ਕਾਵਿ ਧਾਰਾਵਾਂ : ਤੁਲਨਾਤਮਕ ਅਧਿਐਨ
- ਹ) ਮੱਧਕਾਲੀ ਕਾਵਿ ਧਾਰਾਵਾਂ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਯੂਨਿਟ ਤੀਸਰਾ

- ੳ) ਭਗਤੀ, ਗੁਰਮਤਿ ਅਤੇ ਸੂਫ਼ੀ ਕਾਵਿ ਵਿਚ ਪ੍ਰਾਪਤ ਕਾਵਿ ਰੂਪਾਂ ਦਾ ਅਧਿਐਨ
- ਅ) ਭਗਤੀ, ਗੁਰਮਤਿ ਅਤੇ ਸੂਫ਼ੀ ਕਾਵਿ : ਪ੍ਰਮੁੱਖ ਸਰੋਕਾਰ
- ੲ) ਭਗਤੀ, ਗੁਰਮਤਿ ਅਤੇ ਸੁਫ਼ੀ ਕਾਵਿ : ਅੰਤਰ ਸੰਵਾਦ
- ਸ) ਭਗਤੀ, ਗੁਰਮਤਿ ਅਤੇ ਸੂਫ਼ੀ ਕਾਵਿ : ਕਲਾਤਮਕ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ
- ਹ) ਸ੍ਰੀ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਦੀ ਸੰਪਾਦਨ ਕਲਾ

ਯੂਨਿਟ ਚੌਬਾ

- ੳ) ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਰਸੀ ਕਾਵਿ : ਵਿਧਾਗਤ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ
- ਅ) ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਰਸੀ ਕਾਵਿ : ਸਮਾਜ ਸਭਿਆਚਾਰਕ ਅਧਿਐਨ
- ੲ) ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਰਸੀ ਕਾਵਿ : ਪ੍ਰਮੁੱਖ ਸਰੋਕਾਰ
- ਸ) ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਉੱਪਰ ਸੁਫ਼ੀ ਮੱਤ ਦਾ ਪ੍ਰਭਾਵ
- ਹ) ਅਧਿਆਤਮਕ ਅਤੇ ਬੀਰ ਰਸੀ ਵਾਰਾਂ : ਅੰਤਰ ਸਬੰਧ ਅਤੇ ਅੰਤਰ ਨਿਖੇੜ

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ਕੁੱਲ ਅੰਕ : 100 (ਪੇਪਰ : 80, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 20) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

- ੳ) ਆਧੂਨਿਕਤਾ ਦਾ ਸੰਕਲਪ ਅਤੇ ਆਧੂਨਿਕ ਸੰਵੇਦਨਾ
- ਅਾਧੂਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਕਾਵਿ ਸ਼ਾਸਤਰ
- ੲ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਾਵਿ ਰੁਪਾਕਾਰ : ਸਿਧਾਂਤਕ ਪਰਿਪੇਖ
- ਸ) ਵਿਸ਼ਵੀਕਰਨ ਅਤੇ ਨਵੀਂ ਪੰਜਾਬੀ ਕਵਿਤਾ
- ਹ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਵਿਚ ਦਲਿਤ ਅਤੇ ਨਾਰੀ ਸੰਵੇਦਨਾ

ਯੂਨਿਟ ਦੂਸਰਾ

- ੳ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਸਮਾਜਕ-ਰਾਜਨੀਤਕ ਪਿਛੋਕੜ
- ਅ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ
- ੲ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ : ਵਿਚਾਰਧਾਰਾਈ ਪਰਿਪੇਖ
- ਸ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਦੀਆਂ ਪ੍ਰਮੁੱਖ ਪ੍ਰਵਿਰਤੀਆਂ (ਰਹੱਸਵਾਦੀ/ ਨਵ-ਰਹੱਸਵਾਦੀ, ਰੁਮਾਂਸਵਾਦੀ, ਪ੍ਰਗਤੀਵਾਦੀ, ਪ੍ਰਯੋਗਵਾਦੀ, ਜੁਝਾਰਵਾਦੀ, ਰਾਸ਼ਟਰੀ-ਚੇਤਨਾ ਅਤੇ ਪੰਜਾਬ ਸੰਕਟ ਨਾਲ ਸਬੰਧਤ)
- ਹ) ਮੱਧਕਾਲੀ ਕਾਵਿ ਧਾਰਾਵਾਂ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਯੂਨਿਟ ਤੀਸਰਾ

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- ਅ) ਪੰਜਾਬੀ ਗੁਜਲ ਦਾ ਦੀਰਘ ਅਧਿਐਨ
- ਬ) ਪੰਜਾਬੀ ਮਹਾਂਕਾਵਿ ਦਾ ਦੀਰਘ ਅਧਿਐਨ
- ਸ) ਪੰਜਾਬੀ ਰੁਬਾਈ ਕਾਵਿ ਦਾ ਅਧਿਐਨ
- ਹ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਯੂਨਿਟ ਚੌਥਾ

- ੳ) ਹਰਿਆਣਾ ਦੀ ਪੰਜਾਬੀ ਕਵਿਤਾ
- ਅ) ਜੰਮੂ ਕਸ਼ਮੀਰ ਦੀ ਪੰਜਾਬੀ ਕਵਿਤਾ
- ੲ) ਪਾਕਿਸਤਾਨੀ ਪੰਜਾਬੀ ਕਵਿਤਾ
- ਸ) ਪਰਵਾਸੀ ਪੰਜਾਬੀ ਕਵਿਤਾ
- ਹ) ਹਰਿਆਣਾ, ਜੰਮੂ-ਕਸ਼ਮੀਰ, ਪਾਕਿਸਤਾਨੀ ਅਤੇ ਪਰਵਾਸੀ ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਤੁਲਨਾਤਮਕ ਅਧਿਐਨ

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ਕੁੱਲ ਅੰਕ : 100 (ਪੇਪਰ : 80, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 20) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

- ੳ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਗਲਪ ਅਤੇ ਮੱਧਕਾਲੀ ਬੋਧ
- ਅ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਗਲਪ ਰੂਪਾਕਾਰ (ਨਾਵਲ, ਨਿੱਕੀ ਕਹਾਣੀ, ਨਾਵਲਿਟ, ਲੰਮੀ ਕਹਾਣੀ ਅਤੇ ਮਿੰਨੀ ਕਹਾਣੀ : ਵਿਧਾਗਤ ਪਰਿਪੇਖ)
- ੲ) ਪੰਜਾਬੀ ਨਾਵਲ ਦਾ ਗਲਪ ਸ਼ਾਸਤਰ
- ਸ) ਪੰਜਾਬੀ ਨਿੱਕੀ ਕਹਾਣੀ ਦਾ ਕਥਾ ਸ਼ਾਸਤਰ
- ਹ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਗਲਪ ਵਿਚ ਦਲਿਤ ਅਤੇ ਨਾਰੀ ਸੰਵੇਦਨਾ

ਯੂਨਿਟ ਦੂਸਰਾ

- ੳ) ਪੰਜਾਬੀ ਨਾਵਲ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ
- ਅ) ਪੰਜਾਬੀ ਨਾਵਲ : ਪ੍ਰਮੁੱਖ ਪ੍ਰਵਿਰਤੀਆਂ
- ੲ) ਇਤਿਹਾਸਕ ਪੰਜਾਬੀ ਨਾਵਲ
- ਸ) ਸਮਕਾਲੀ ਪੰਜਾਬੀ ਨਾਵਲ : ਨਵੀਨ ਝੁਕਾਅ
- ਹ) ਪੰਜਾਬੀ ਨਾਵਲ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਯੂਨਿਟ ਤੀਸਰਾ

- ੳ) ਪੰਜਾਬੀ ਕਹਾਣੀ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ
- ਅ) ਪੰਜਾਬੀ ਕਹਾਣੀ : ਪ੍ਰਮੁੱਖ ਪ੍ਰਵਿਰਤੀਆਂ
- ੲ) ਸਮਕਾਲੀ ਪੰਜਾਬੀ ਕਹਾਣੀ : ਨਵੀਨ ਝੁਕਾਅ
- ਸ) ਪੰਜਾਬੀ ਨਿੱਕੀ ਕਹਾਣੀ, ਲੰਮੀ ਕਹਾਣੀ ਅਤੇ ਮਿੰਨੀ ਕਹਾਣੀ : ਅੰਤਰ ਸਬੰਧ ਅਤੇ ਅੰਤਰ ਨਿਖੇੜ
- ਹ) ਪੰਜਾਬੀ ਕਹਾਣੀ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਯੂਨਿਟ ਚੌਥਾ

- ੳ) ਹਰਿਆਣਾ ਦਾ ਪੰਜਾਬੀ ਗਲਪ
- ਅ) ਜੰਮੂ ਕਸ਼ਮੀਰ ਦਾ ਪੰਜਾਬੀ ਗਲਪ
- ੲ) ਪਾਕਿਸਤਾਨੀ ਪੰਜਾਬੀ ਗਲਪ
- ਸ) ਪਰਵਾਸੀ ਪੰਜਾਬੀ ਗਲਪ
- ਹ) ਹਰਿਆਣਾ, ਜੰਮੂ-ਕਸ਼ਮੀਰ, ਪਾਕਿਸਤਾਨੀ ਅਤੇ ਪਰਵਾਸੀ ਪੰਜਾਬੀ ਗਲਪ ਦਾ ਤੁਲਨਾਤਮਕ ਅਧਿਐਨ

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ਕੁੱਲ ਅੰਕ : 100 (ਪੇਪਰ : 80, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 20) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

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- ਅ) ਸਭਿਆਚਾਰ ਅਤੇ ਸਭਿਆਚਾਰ ਸ਼ਾਸਤਰ
- ੲ) ਸਭਿਆਚਾਰ ਅਤੇ ਹੋਰ ਅਨੁਸ਼ਾਸਨ
- ਸ) ਲੋਕਧਾਰਾ ਅਤੇ ਲੋਕਧਾਰਾ ਸ਼ਾਸਤਰ, ਲੋਕਧਾਰਾ ਵਿਗਿਆਨ ਅਤੇ ਹੋਰ ਗਿਆਨ ਅਨੁਸ਼ਾਸਨ
- ਹ) ਭਾਸ਼ਾ, ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ ਦੀਆਂ ਅਧਿਐਨ ਵਿਧੀਆਂ
- ਕ) ਸਾਹਿਤ, ਭਾਸ਼ਾ, ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ : ਅੰਤਰ-ਸਬੰਧ ਅਤੇ ਅੰਤਰ ਨਿਖੇੜ

ਯੂਨਿਟ ਦੂਸਰਾ

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- ਅ) ਕਵਿਤਾ ਦੀ ਭਾਸ਼ਾ
- ੲ) ਗਲਪ ਦੀ ਭਾਸ਼ਾ
- ਸ) ਨਾਟਕ ਦੀ ਭਾਸ਼ਾ
- ਹ) ਸਮੀਖਿਆ ਦੀ ਭਾਸ਼ਾ

ਯੂਨਿਟ ਤੀਸਰਾ

- ੳ) ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਸ਼ਾਸਤਰ : ਆਰੰਭ ਅਤੇ ਵਿਕਾਸ ਪੜਾਅ
- ਅ) ਪੰਜਾਬੀ ਲੋਕਧਾਰਾਈ ਸਾਮੱਗਰੀ : ਖੇਤਰ ਅਤੇ ਮਹੱਤਵ
- ੲ) ਪੰਜਾਬੀ ਲੋਕਧਾਰਾਈ ਵੰਨਗੀਆਂ ਦਾ ਗਹਿਨ ਅਧਿਐਨ (ਇਕ ਲੋਕਗੀਤ/ ਲੋਕ ਕਥਾ/ ਲੋਕ ਨਾਟਕ/ ਲੋਕ ਰਸਮ)
- ਸ) ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਧਿਐਨ ਦੇ ਖੇਤਰ ਵਿਚ ਹੋਏ ਕਾਰਜ ਦਾ ਸਰਵੇਖਣ ਤੇ ਮੁੱਲਾਂਕਣ
- ਹ) ਪੰਜਾਬੀ ਦੇ ਪ੍ਰਮੁੱਖ ਲੋਕਧਾਰਾ ਸ਼ਾਸਤਰੀਆਂ ਦੇ ਯੋਗਦਾਨ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁੱਲਾਂਕਣ (ਕਰਨੈਲ ਸਿੰਘ ਬਿੰਦ, ਨਾਹਰ ਸਿੰਘ, ਕਰਮਜੀਤ ਸਿੰਘ ਅਤੇ ਜੋਗਿੰਦਰ ਸਿੰਘ ਕੈਰੋਂ)

ਯੂਨਿਟ ਚੌਥਾ

- ੳ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਸ਼ਾਸਤਰ : ਆਰੰਭ ਅਤੇ ਵਿਕਾਸ ਪੜਾਅ
- ਅ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ : ਇਤਿਹਾਸ ਰੇਖਾ
- ੲ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਸਮਕਾਲੀ ਗਲੋਬਲੀ ਪ੍ਰਸੰਗ : ਭਾਰਤੀ ਪ੍ਰਸੰਗ ਵਿਚ ਬਹੁ-ਸਭਿਆਚਾਰ, ਡਾਇਸਪੋਰਿਕ ਪ੍ਰਸੰਗ ਵਿਚ ਬਹੁ-ਸਭਿਆਚਾਰ)
- ਸ) ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ : ਵਰਤਮਾਨ ਅਤੇ ਭਵਿੱਖ
- ਹ) ਪੰਜਾਬੀ ਦੇ ਪ੍ਰਮੁੱਖ ਸਭਿਆਚਾਰ ਸ਼ਾਸਤਰੀਆਂ ਦੇ ਯੋਗਦਾਨ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁੱਲਾਂਕਣ (ਗੁਰਬਖ਼ਸ਼ ਸਿੰਘ ਫਰੈਂਕ, ਟੀ.ਆਰ.ਵਿਨੋਦ, ਜਸਵਿੰਦਰ ਸਿੰਘ, ਅਤੇ ਅਮਰਜੀਤ ਗਰੇਵਾਲ)

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ਕੁੱਲ ਅੰਕ : 100 (ਪੇਪਰ : 80, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 20) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

- ੳ) ਨਾਟਕੀ ਵਿਧੀ : ਸਿਧਾਂਤਕ ਪਰਿਪੇਖ
- ਅ) ਨਾਟਕੀ ਵਿਧੀ ਦੀਆਂ ਵਿਭਿੰਨ ਵਿਧਾਵਾਂ
- ੲ) ਪੱਛਮੀ ਅਤੇ ਸੰਸਕ੍ਰਿਤ ਨਾਟ ਸ਼ਾਸਤਰ ਪਰੰਪਰਾ : ਵਿਸ਼ਲੇਸ਼ਣ ਅਤੇ ਮੁੱਲਾਂਕਣ
- ਸ) ਨਾਟਕ ਅਤੇ ਰੰਗਮੰਚ
- ਹ) ਭਾਰਤੀ ਨਾਟਕ ਤੇ ਰੰਗਮੰਚ ਪਰੰਪਰਾ : ਵਿਸ਼ਲੇਸ਼ਣ ਅਤੇ ਮੁੱਲਾਂਕਣ

ਯੂਨਿਟ ਦੂਸਰਾ

- ੳ) ਪੰਜਾਬੀ ਨਾਟਕ : ਆਰੰਭ ਤੇ ਵਿਕਾਸ
- ਅ) ਪੰਜਾਬੀ ਇਕਾਂਗੀ : ਆਰੰਭ ਤੇ ਵਿਕਾਸ
- ੲ) ਪੰਜਾਬੀ ਨਾਟਕ ਅਤੇ ਇਕਾਂਗੀ : ਪ੍ਰਮੁਖ ਪ੍ਰਵਿਰਤੀਆਂ
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- ਹ) ਪੰਜਾਬੀ ਨਾਟਕ ਅਤੇ ਰੰਗਮੰਚ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਯੂਨਿਟ ਤੀਸਰਾ

- ੳ) ਵਾਰਤਕ ਦੀ ਵਿਧੀ : ਸਿਧਾਂਤਕ ਪਰਿਪੇਖ
- ਬ) ਵਾਰਤਕ ਦੀਆਂ ਵਿਧਾਵਾਂ : ਵਿਧਾਗਤ ਵਿਲੱਖਣਤਾਵਾਂ
- ੲ) ਪੁਰਾਤਨ ਅਤੇ ਆਧੁਨਿਕ ਵਾਰਤਕ : ਅੰਤਰ ਸਬੰਧ ਅਤੇ ਅੰਤਰ ਨਿਖੇੜ
- ਸ) ਪੱਛਮੀ ਵਾਰਤਕ ਪਰੰਪਰਾ ਦਾ ਸਰਵੇਖਣ ਤੇ ਮੁੱਲਾਂਕਣ
- ਹ) ਭਾਰਤੀ ਵਾਰਤਕ ਪਰੰਪਰਾ ਦਾ ਸਰਵੇਖਣ ਤੇ ਮੁੱਲਾਂਕਣ

ਯੂਨਿਟ ਚੌਬਾ

- ੳ) ਪੰਜਾਬੀ ਵਾਰਤਕ : ਆਰੰਭ ਤੇ ਵਿਕਾਸ
- ਅ) ਮੱਧਕਾਲੀ ਪੰਜਾਬੀ ਵਾਰਤਕ : ਸਰਵੇਖਣ ਤੇ ਮੁੱਲਾਂਕਣ
- ੲ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ : ਆਰੰਭ ਅਤੇ ਵਿਕਾਸ
- ਸ) ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਦੀਆਂ ਵਿਭਿੰਨ ਵਿਧਾਵਾਂ ਦੀਆਂ ਪ੍ਰਮੁੱਖ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ
- ਹ) ਪੰਜਾਬੀ ਵਾਰਤਕ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਸਮੀਖਿਆ ਦਾ ਅਧਿਐਨ

ਚੋਣਵੀਆਂ ਪੜ੍ਹਣਯੋਗ ਪੁਸਤਕਾਂ:

ਨਾਟਕ ਨਾਲ ਸਬੰਧਤ :

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ਪੇਪਰ ਤੀਸਰਾ

ਅਨੁਵਾਦ : ਸਿਧਾਂਤ ਅਤੇ ਵਿਹਾਰ

ਕੁੱਲ ਅੰਕ : 50 (ਪੇਪਰ : 40, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 10) ਸਮਾਂ : 3 ਘੰਟੇ

ਯੂਨਿਟ ਪਹਿਲਾ

- ੳ) ਅਨੁਵਾਦ : ਪਰਿਭਾਸ਼ਾ, ਸਰੂਪ ਅਤੇ ਪ੍ਰਕਾਰਜ
- ਅ) ਸਾਹਿਤਕ ਅਤੇ ਗ਼ੈਰ ਸਾਹਿਤਕ ਰਚਨਾਵਾਂ ਦਾ ਅਨੁਵਾਦ : ਲੋੜ, ਸਮੱਸਿਆਵਾਂ ਅਤੇ ਸਮਾਧਾਨ
- ੲ) ਅਨੁਵਾਦ ਚਿੰਤਨ ਦੇ ਸਕੂਲ : ਤੁਲਨਾਤਮਕ ਅਨੁਵਾਦ ਸਕੂਲ, ਵਰਣਾਤਮਕ ਅਨੁਵਾਦ ਸਕੂਲ ਅਤੇ ਸਕੋਪੋਸ ਅਨੁਵਾਦ ਸਕੂਲ

ਯੂਨਿਟ ਦੂਸਰਾ

- ੳ) ਅਨੁਵਾਦ ਦਾ ਲੇਖਕ ਅਤੇ ਰਚਨਾ ਨਾਲ ਸਬੰਧ
- ਅ) ਅਨੁਵਾਦ ਦੀਆਂ ਦ੍ਰਿਸ਼-ਸ਼੍ਵਣ (Audio-Visual) ਵਿਧੀਆਂ; ਉਪ-ਸ਼ੀਰਸ਼ਕ (Subtitling), ਡਬਿੰਗ, ਵਾਇਸ-ਓਵਰ, ਨਾਨ-ਪ੍ਰੋਫ਼ੈਸ਼ਨਲ।

ਯੂਨਿਟ ਤੀਸਰਾ

ਅੰਗਰੇਜ਼ੀ ਜਾਂ ਹਿੰਦੀ ਵਿਚ ਦਿੱਤੇ ਗਏ 300 ਸ਼ਬਦਾਂ ਦੇ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ।

ਯੂਨਿਟ ਚੌਥਾ

ਪੰਜਾਬੀ ਵਿਚ ਦਿੱਤੇ ਗਏ 300 ਸ਼ਬਦਾਂ ਦੇ ਪੈਰ੍ਹੇ ਦਾ ਅੰਗਰੇਜ਼ੀ ਜਾਂ ਹਿੰਦੀ ਵਿਚ ਅਨੁਵਾਦ।

ਚੋਣਵੀਆਂ ਪੜ੍ਹਣਯੋਗ ਪੁਸਤਕਾਂ:

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ਪੰਜਾਬੀ :

• ਸੁਸ਼ੀਲ, ਕੁਮਾਰ, ਅਨੁਵਾਦ ਦਾ ਸੰਵਾਦ, ਉਡਾਨ ਪਬਲੀਲੇਸ਼ਨ, ਮਾਨਸਾ, 2003.

Kurukshetra University, Kurukshetra

Post Graduate Diploma in Taxation (P G D T)

(w.e.f. Session 2018-19)

Paper Code	Nomenclature	Maximu	Total Marks	
		External	Internal	
PGDT-101	Income Tax Law & Practice	80	20	100
PGDT-102	Goods & Services Tax	80	20	100
PGDT-103	Computerized Accounting System	60	10	100
	Practical	30		
PGDT-104	Corporate Taxation	80	20	100
PGDT-105	Indian Customs Act	80	20	100
PGDT-106	Training Report +	50		100
	Viva-Voce	50		
	600			

SCHEME OF EXAMINATION
INCOME TAX LAW & PRACTICE

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: Paper setter will set nine questions in all. Question No. 1 comprising of five short types questions carrying four (4) marks each is compulsory. It covers the entire syllabus. Answer to each question should not be more than one page. Candidate is required to attempt four questions from the remaining eight questions carrying 15 marks each.

Introduction to income tax: concept of tax, person, income, agricultural income, casual income, previous year, financial year, assessment year, gross total income, total income; tax management: tax evasion, avoidance, and tax planning.

Basis of charges: Scope of total income, residential status and Incidence of tax, exempted income

Heads of income: income from salary, house property; profit and gains from business and profession, capital gains and other sources.

Clubbing and aggregation of income.

Provisions regarding set-off and carry forward of losses.

Deductions under section 80C to 80U in computing total income.

Computation from gross total income and tax liability of an individual, H.U.F. and Firm, AOP and BOI, Co-op. Society, Charitable and other trusts .

Return of Income, e-filing procedures

Assessment and re-assessment, search and seizures,

Deduction of tax at source; advance payment of tax.

Refund of Income Tax

Penalties and Prosecution under Income tax Act

Appeals and Revisions, Income Tax Authorities

- Gaur and Narang, Income Tax Law & Practice, Kalyani Publishers, Jalandhar.
- Girish Ahuja and Ravi Gupta, Systematic Approach, C.C.H. India Publications, New Delhi.
- Mehrotra H.C., Income Tax Law & Account, SahityaBhawan Publications, Agra.
- Prasad, Bhagwati, Income Tax Law & Practice, WishwanPrakashan, Bhopal.
- Singhania V.K., Student's Guide to Income Tax, Taxmann Publications Pvt. Ltd., New Delhi.

GOODS & SERVICES TAX

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: Paper setter will set nine questions in all. Question No. 1 comprising of five short types questions carrying four (4) marks each is compulsory. It covers the entire syllabus. Answer to each question should not be more than one page. Candidate is required to attempt four questions from the remaining eight questions carrying 15 marks each.

GST: Meaning, taxable person, registration: procedure and documents required.

Levy and collection of GST

Time and place of supply of goods and services, value of taxable supply

Reverse Charge under GST

Computation of input tax credit and transfer of input tax credit

Electronic Ledgers under GST

Tax invoice credit and debit note

Various returns to be filed under GST

Payment of tax including TDS, Interest Provisions on delayed payment

Offences and penalties & Administration under GST

- Basics of GST (2016), TAXMAN'S PUBLICATIONS
- GST Practice Manual, TAXMANN's PUBLICATIONS
- Ahuja Girish & Gupta Ravi, Practical approach to Income tax, Wealth Tax and Central sales tax (Problems and Solutions with Multiple choice questions); Bharat Law House Pvt.Ltd., New Delhi.
- Central Excise Act.
- Central Sales Tax Act.
- Customs Act.
- Goods and Services Tax Act.

COMPUTERIZED ACCOUNTING SYSTEM

External Marks: 60 Internal Marks: 10 Practical: 30 Time: 3 Hours

Note: Paper setter will set nine questions in all. Question No. 1 comprising of five short types questions carrying four (4) marks each is compulsory. It covers the entire syllabus. Answer to each question should not be more than one page. Candidate is required to attempt four questions from the remaining eight questions carrying 10 marks each.

Need of computerized accounting system, various software's for computerized accounting system. Tally ERP 9 – Installation, Licensing configurations – Tally Vault Password – Security Control in Tally, ERP9 – Splitting Company Data – Backup and Restore.

Accounting: translation, voucher entry, budget, cost center, balance sheet, profit and loss account, currency, debit note, credit note, interest calculation.

Inventory: stock item, sales order, purchase order, delivery note, rejection out.

Computerized Tax Liability Contribution and E-filing in respect of GST.

Payroll and Salary Accounting: Introduction to Payroll, Payroll Masters, Payroll Vouchers, Overtime Payment, Gratuity, Advanced Payroll Transactions Basic Salary, Overtime, Bonus, Gratuity, Loan, ESI, Provident Fund, Pension, Commission.

Practical: The candidates should be able to prepare journal, ledger, trial balance, balance sheet and other accounts using computerized accounting softwares such as Tally ERP (Latest Version).

- Ashok, K. Nadhavi, Kishor K. Nadhavi, ImplementaryTally 9, BPB Publications, New Delhi.
- A.K. Nadhavi, K.K. Nadhavi, Tally Instant Reference (Accounts. Inventory, Advanced), BPB Publications, New Delhi.
- Ashok K. Nadavi, Tally Training Guide (Financial Accounting, Invoicing & Inventory), BPB Publications, New Delhi.
- A.K. Nadhavi, Managing VAT with Tally 9 (Taxation), BPB Publications, New Delhi.
- A.K. Nadhavi, K.K. Nadhavi, Implementing Tally Payroll, BPB Publications, New Delhi.

CORPORATE TAXATION

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: Paper setter will set nine questions in all. Question No. 1 comprising of five short types questions carrying four (4) marks each is compulsory. It covers the entire syllabus. Answer to each question should not be more than one page. Candidate is required to attempt four questions from the remaining eight questions carrying 15 marks each.

Assessment of companies: concept of corporate taxation; residential status and incidence of tax; tax management: tax evasion, tax avoidance and tax planning.

Computation of gross total income of companies, permissible deductions; computation of tax liability.

Minimum Alternative Tax (MAT)

Dividend distribution tax : tax on Buy back of unlisted shares

Tax planning regarding new business: form of business organization, tax factors affecting choice of form of business organization, location of business and nature of business.

Tax planning and managerial decisions regarding own or lease, make or buy, shut down or continue decisions.

Tax planning regarding capital structure decisions; dividend policy; inter-corporate dividends and bonus shares.

Special tax provisions for units in Special Economic Zones / Export Oriented Units.

Taxation provisions for amalgamation of companies, merger & demerger.

Tax payment; tax deduction at source, tax collection at source, advance payment of tax.

Tax planning in respect of managerial remuneration.

- Singhania, Vinod k. and Singhania Monika, "Corporate Tax Planning and Business Tax Procedures", Taxmann publications Pvt. Ltd. New Delhi.
- Gaur V.P., Gaur Puja and Puri Rajeev, "Corporate Tax Law & Planning" Kalyani Publications.
- Sriniwas, E A, "Handbook of Corporate Tax Planning", Tata McGraw Hill.

PGDT-105 INDIAN CUSTOMS ACT

External Marks: 80 Internal Marks: 20 Time: 3 Hours

Note: Paper setter will set nine questions in all. Question No. 1 comprising of five short types questions carrying four (4) marks each is compulsory. It covers the entire syllabus. Answer to each question should not be more than one page. Candidate is required to attempt four questions from the remaining eight questions carrying 15 marks each.

Legal framework: Customs Act 1962 and Customs Tariff Act 1975, Recent Foreign Trade Policy

Customs duty- concept, scope, nature and types of customs duty, classification of customs tariffs in India

Valuation of customs duty- valuation of imports, valuation of import duty; inclusions in customs value, methods of valuation for customs; under valuation in customs value.

Customs clearance of export and import cargo- documentary requirements; Custom clearance for shipment through air, ship, ICDs, post parcel, and courier; EDI initiatives and customs clearance

Exemptions, remission, demand, recovery and refund in customs, export incentives under customs tax provisions, penalties and offences under customs tax rules.

Penalties and Offences under Customs Act.

Customs Tax Planning: An overview

- Datey, V. S.: "Indirect Taxes Law and Practice", Taxmann Publishers, New Delhi.
- Bare Act on Indirect Tax Laws (updated only)

PGDT-106 TRAINING REPORT + VIVA-VOCE

Project Report: 50Marks Viva-voce: 50 Marks

The candidate should have proper understanding about the complete tax system and administration in India. In order to add the practical exposure, the candidate has to join a Company / CA Firm for practical training 3-weeks during winter vacations. The candidate shall submit Training Report up to 31st March. The comprehensive Viva-voce will be conducted by an external examiner appointed by the University to evaluate the Training Report.

DEPARTMENT OF EDUCATION KURUKSHETRA UNIVERSITY KURUKSHETRA (Established by the State Legislature Act XII of 1956) ("A+" Grade, NAAC Accredited) (Ranked 8th amongst State Universities under category-1 as per UGC Regulation on Graded Autonomy)

Scheme of Examination for M. Phil Education (CBS) w.e.f. 2018-19

ANNUAL SYSTEM

Paper No.	Title	Credit	Max. Marks	End Semester Marks	Internal Assessment Marks	Time
MPEDU-101	Research Methods & Advanced Statistical	4	100	80	20	3 Hours
(Compulsory Paper)	Techniques					
The stude	ents may choose any one of th	e followi	ng elective/	optional paper	r. (MPEDU-1	02 to 107)
MPEDU-102	Comparative and International Systems of Education	4	100	80	20	3 Hours
MPEDU-103	Educational Technology	4	100	80	20	3 Hours
MPEDU-104	Educational Perspective of Special Needs	4	100	80	20	3 Hours
MPEDU-105	Advanced Educational Psychology	4	100	80	20	3 Hours
MPEDU-106	Educational Management: Nature & Perspective	4	100	80	20	3 Hours
MPEDU-107	Philosophy of Education	4	100	80	20	3 Hours
MPEDU-108	Seminar – I	2	50	Every Candidate shall deliver two seminars during the academic session		
MPEDU-109	Seminar – II	2	50		C	
	Dissertation		100	Dissertation & Viva-Voce would be assessed/ conducted by external examiner and would be awarded Grade as per M. Phil ordinance Clause 11(11)		

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-101) RESEARCH METHODS AND ADVANCED STATISTICAL TECHNIQUES

Time of Examination: 3 hours

Credit: 4 Max. Marks: 100 (Ext.-80, Int.-20)

Note: (1) Attempt 5 questions in all, selecting one question from each part.

- (2) Question no.1 is compulsory.
- (3) All questions carry equal marks.

Objectives:

The students will be able to-

- (i) Comprehend the role of research in theory and practice of education
- (ii) Develop inquisitive mind and spirit of inquiry
- (iii)Develop competence to design, execute and report research in education
- (iv)Apply research findings in education practices
- (v) Describe and apply the advance statistical techniques in data analysis.

<u>UNIT-I</u>

- 1. Nature Methods and steps of the following approaches for acquiring knowledge
 - Dialectical
 - Scientific
 - Developmental research
 - Ethnographic Research

1. Areas of Educational Research with respect to

- Content of Education
- Instruction Learning and Evaluation
- Economic and Political Situations
- Social and Cultural Needs
- Historical Context
- Priority areas of Educational Research
- 2. Ethical Issues in Educational Research

UNIT-II

- 3. Techniques of data collection and processing:
 - Attitude Scale
 - Sociometric Technique
 - Content analysis
 - Semantic differential techniques

4. Regression and Prediction

Concept, assumptions, uses, computation, and significance of following:-

- Linear Regression Equation
- Multiple Regression Equation

<u>UNIT-III</u>

- 5. Standardization of an Achievement Test.
 - Characteristics of a good Research tool.

- Construction and Steps of Standardization of an Achievement Test
- 6. Advanced Techniques of Correlation
 - Concept, assumptions, uses, computation, and significance of following:-
 - Partial correlation
 - Multiple correlation
 - Biserial correlation
 - Point biserial correlation
 - Phi
 - Tetrachoric

<u>UNIT-IV</u>

- 7. Methodological Issues in Educational Research with reference to the problems of:
 - Sampling
 - Data Collection
 - Interpretation of results
 - Factors Influencing Validity of Research and How to increase the validity of Research
- 8. Parametric Tests of Data Analysis

Concept, assumptions, uses, computation, and significance of following:-

- ANOVA One Way
- ANOVA Two Way with and without Replication
- 9. Non-Parametric Test
 - (i) Median Test

(ii) Chi square test

(iii)K-S-Test

BOOKS RECOMMENDED

- 1. Aggarwal, Y.P. (1998). *Statistical Methods*, New Delhi, Sterling Publishers.
- 2. Aggarwal, Y.P. (1998) the Science of Educational Research: A Source Book, Kurukshetra: Nirmal Book Depot.
- 3. Ary, D., Jacob, L.C & Sorensen, C.(2010). *Introduction to research in education*, 8th 5th International edition: USA. Wadsworth Cenage Leaning
- 4. Best, J. W. & Kahn J. V. (2005). Research in Education, New Delhi: Prentice Hall.
- 5. Burns, R.B. (1991) Introduction to Research in Education, New Delhi: Prentice Hall.
- 6. Ferguson, G.A. (1976) *Statistical Analysis in Psychology and Education*, New York McGraw Hill.
- 7. Garrett,H.E. (1973). *Statistics in Psychology and Education*, Bombay Vakils, Feffer and Simon.
- 8. Glass, G. & Hopkins, K.D. (1996). *Statistical Methods in Education and Psychology*, Needham Heights, A. Simon & Schuster Company.
- 9. Good, C.V. & Douglas, E. S. (1954). *Methods in Social Research*, New York: Mc Graw Hill.
- 10. Gravetter, F.J. & Wallnau, L.B. (2009). *Statistics for the behavioral sciences*. 5th International edition: USA. Wadsworth Cenage Leaning
- 11. Guilford, J.P. and Benjamin, F. (1973). Fundamental Statistics in Psychology and Education, McGraw Hill, New York
- 12. Kerlinger, F.N. (1973). *Foundation of Behavioral Research*, New York: Holt Rinehart and Winston.
- 13. Koul, L. (1988). *Methodology of Educational Research*, New Delhi, Vikas Publications.

- 14. Kurtz, A.K.& Mayo,S.T. (1980). Statistical Methods in Education and Psychology, New Delhi
- 15. McMillan, James, H.& Schumarcher, S. (1989). *Research on Education: A Conceptual Introduction*, New York: Harper and Collins.
- 16. Miller, D.C. & Salkind, N.J. (2002). *Handbook of Research Design and Social Measurement*, London: Sage Publications.
- 17. Minium, E.W., King B.M., & Bear, G. (1995). *Statistical Reasoning in Psychology & Education*, Canada: John Willy & Sons.
- 18. Mouly, A.J. (1963). The Science of Educational Research, New Delhi: Eurasia.
- 19. Neuman, W.L. (1997) *Social Research Methods: Qualitative and Quantitative Approaches*, Boston: Allyn and Bacon.
- 20. Ruane, J.M. (2004) *Essentials of Research Methods to Social Science Research*, Blackwell Publications.
- 21. Siegel, S. (1986) Non-Parametric Statistics, New York: McGraw Hill.
- 22. Travers, R.M.W. (1978). An introduction to Educational Research, New York: Mcmillan.
- 23. Van, D., D.B. (1962) Understanding Educational research, New York: Mc Graw Hill.
- 24. Cohen, L. & Lawrence, M. (1980). Research methods in education, London: Groom Helm
- 25. Fox, J. (1962). The Research Process in education New York: D. Van Nostrand
- Lehmann, J. & Mearens, W.A., (1979). Educational Research: readings in forces, IBH Publishing Co.

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-102) COMPARATIVE AND INTERNATIONAL SYSTEMS OF EDUCATION

Time of Examination: 3 hours

Credit: 4 Max. Marks: 100 (Ext.-80, Int.-20)

Note: (1) Attempt 5 questions in all, selecting one question from each unit.

- (2) Question no.1 is compulsory.
- (3) All questions carry equal marks.

Objectives: The students will be able to-

- Understand the concept and scope of comparative education.

- Make themselves aware of different factors which influence the educational systems of different

countries.

- Acquaint themselves with different approaches of comparative education.
- Illustrate the educational systems of countries like U.S.A., U.K., Japan and India.
- Make comparison between the educational systems of different countries at different levels.
- Acquaint themselves with the educational problems of different countries.

Unit-I

- Concept, Purpose, Importance & Scope of Comparative Education
- Factors affecting educational systems of different countries
- Approaches to the study of Comparative Education: Historical, Philosophical & Sociological
- New trends and significance of research in comparative education

Unit-II

- Study of the Educational System of U.K., U.S.A., & Japan with special reference to Primary Education & Secondary Education
- Primary Education in India, Universalisation of Elementary Education, DPEP, SSA, RTE-2009, Secondary Education in India, Vocationalisation of Secondary Education

Unit-III

- Study of the Educational System of U.K., U.S.A., & Japan with special reference to Higher Education
- Higher Education In India, Role of UGC, Problems of Higher Education in India

Unit-IV

- Distance Education in U.K., U.S.A., & Japan
- Educational Administration in U.K., U.S.A., & Japan
- Distance Education in India, Role of IGNOU in Distance Education & Problems of Distance Education in India

BOOKS RECOMMENDED

Arnove, Robert F. & Alberto, Torres Carlos. (2007). *Comparative Education: The Dialectic of the Global and Local*. U.S.A: Rowman and Little field Publisher. Bereday G.Z.F. (1967). *Comparative Methods in Education*, New Delhi: Oxford and IBH

Publishing Co.

Chaube, S.P. & Chaube, A. (2007). *Comparative Education*. Noida: Vikas Publishing House.

Chaubey S.P.(1969). *Comparative Education*, Agra: Ram Prasad and sons Publishers Cramer J.F. and Brown G.S., (1965). *Contemporary Education: A comparative study of National*

Systems. New York: Naracourt Brace and Co.

Edmund J. King (1968). *Comparative Studies and Educational Decisions*. London: Mathuen Educational Ltd.

Dent H.C., (1981). Educational Systems of England. London: George Allen

Gazette of India. (2009). *The Gazette of India – Right of Children to Free and Compulsory Education Act, 2009.* New Delhi: Ministry of Law and Justice.

Kandel I.L. (1963). Studies in Comparative Education. New York: George Harrap

Kubow, Patriva K., & Fossum, Paul R. (2007). Comparative Education: Exploring Issues in International Context. U. S. A.: Pearson/Merrill/Prentice Hall Publishers.

Mundy, Karen. ,Bickmore, Kothy. ,Hayhoe Ruth. ,Madden, Meggan. & Madjidi, Katherine. (2008). *Comparative and International Education: Issues for Teachers*. U.S.A.: Teacher College Press.

MHRD. (1995). DPEP Guidelines, New Delhi: Govt. of India.

MHRD. (2011). Sarva Shiksha Abhiyan – Frame Work for Implementation Based on Right of Children to Free and Compulsory Education Act, 2009. New Delhi : Govt. of India.

MHRD. (2012). Voices of Teachers and Teacher Educators. Vol. 1, issue 1, Jan. 2012.

MHRD, Govt. of India. Udaipur: Preparation of the Publication at Vidya Bhawan Society.

NCERT. (2012). Impact of In-Service Teacher Training on Class room Transaction in Haryana.

NUEPA. *Elementary Education in India- Where do we Stand?* New Delhi :State and District Report Cards (Yearly Publication)

Shrivastava, S.K. (2005). *Comparative Education*. New Delhi: Anmol Publications Pvt. Ltd. Sodhi,T.S. (2005). A Text Book of Comparative Education-Philosophy, Patterns and Problems of

National Systems, New Delhi. Vikas Publishing House Pvt. Ltd.

Sodhi, T.S. (2007). Textbook of Comparative Education. Noida: Vikas Publishing House. **Reddy R.S.** The methods of analysis and enquiry publisher, Ajay Verma, Common wealth publisher 4378/4B, Mutali Lal Street, Ansari Road, New Delhi.

Yadav, Rajender Singh (2006). Community Participation in Education: Role of Village Education Committee. Ambala Cantt: The Associated Publishers.

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-103) EDUCATIONAL TECHNOLOGY

Time of Examination: 3 hours

Credit: 4 Max. Marks: 100 (Ext.-80, Int.-20)

Note: (1) Attempt 5 questions in all, selecting one question from each part.

- (2) Question no.1 is compulsory.
- (3) All questions carry equal marks.

Objective:

The students will be able to-

- define the concept, origin, scope and characteristics of educational technology.
- illustrate the meaning of communication and different components of communication.
- explain the concept of teaching.
- describe different models of teaching.
- develop skill of designing instructional system.
- describe the different evaluation tools.
- write a critical note on the origin and concept of programmed learning.
- understand the principles of programming.
- understand different styles of programming.
- acquaint themselves with different stages of programme development.
- understand individualized learning techniques.

Unit-I

- Origin of Educational Technology
- Meaning, Characteristics & Scope of Educational Technology
- Components of Educational Technology
- Systems Approach, steps of systems approach and its characteristics.
- Media and Instructional technology

Unit-II

- Concept of Communication.
- Components of communication process: Sender, Media, Message, receiver & Feedback
- Principles of effective Communication
- Class-Room Communication
- Barriers coming in the way of effective communication
- Concept of teaching.
- Teaching as different from Indoctrination, instruction, conditioning and training
- Relationship between teaching and learning.

Unit-III

- Models of Teaching: Meaning & Concept
- Jurisprudential inquiry Model
- Synectics Model for enhancing creative thought
- Non-Directive teaching: the learner at the center
- Designing Instructional system: Writing objectives in behavioral terms, Task analysis, Development of evaluation Tools : Norm Referenced test and criterion Referenced Test

UNIT-IV

- Origin, Meaning & Principles of programmed Instruction
- Types of programming: Linear, Branching and Mathetics
- Development of programmed Instructional Material : Preparation Stage, Writing
- Stage, Try out & Evaluation stage
- Individualized learning techniques: Directed Study of material in text-books, Modular Approach, Self-Instruction via Audio-Visual Media, Computer Assisted Instruction,

E- Learning

- Application of Educational Technology in Distance Education

SUGGESTED READINGS

1. Davies, I.K. (1971) the Management of Learning, London: Mc Graw Hill

2. Dececco, J.P. (1998) the Psychology of Learning and Instruction, New Delhi: Prentice Hall

3. Joyee, B. & Weil. (1992) M. Models of caching, New Delhi Prentice Hall

4. Kukkarni, S.S. (1986), Introduction to Educational Technology, New Delhi: Oxford & IBH Publishing Company

5. Kumar, K.L. (1996), Educational Technology, New Delhi: New Age International Publishers

6. Locatis, C.N. & Atkinson, F.D., (1984) Media and Technology for Education and Training, London: charles E. Publishing Co.

7. Mavi, N.S., (1984) Programmed Learning- an Empirical approach, Kurukshetra: Vishal Publishers.

8. Mikhopadhayay, M. (Ed.), (1990) Educational Technology, New Dellhi: Sterling

9. Pandey S.K. (1997) Teaching Communication, New Delhi: Commonwealth Publishers

10. Pandey, K.P. (1980)A first Course in Instructional technology, Delhi: Amitash Parkashan

11. Pandey, K.P. (1983) Dynamics of Teaching Behavior, Gaziabad: Amitash Prakashan

12. Percival, F. & Ellington, H. (1988) a handbook of Educational Technology, New York: Konhgan Page

13. Skinner, B.F., "The technology of teaching ", New York; Appleton Century Crafts, 1968.

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-104) EDUCATIONAL PERSPECTIVE OF SPECIAL NEEDS

Time of Examination: 3 hours

Credit: 4

Max. Marks: 100 (Ext.-80, Int.-20)

Note: (1) Attempt 5 questions in all, selecting one question from each part.

- (2) Question no.1 is compulsory.
- (3) All questions carry equal marks.

Objective:

The students will be able to-

- define the concept of special needs
- describe educational provisions for children with special needs
- explain the recent trends in the education and rehabilitation of children with special needs
- describe critically the international and national declarations, proclamations and affirmations for special needs
- explain various issues in teacher preparation in special education
- describe national disability resources and technological resources for children with special needs

<u>UNIT-I</u>

Children with special needs: Concept and Classification. Educational Considerations for children with Special Needs (Special Education, Integrated Education, Inclusive Education).

Inclusive Education: Concept & indicators of inclusion:

An overview of special needs (Meaning, identification, characteristics etc.)

(a) Visual Impairment

(b) Hearing Impairment

(c) Physical Disability

(d) Intellectual Challenges

(e) Learning Disabilities

(f) Emotional & Behavioural Disorders

(h) Communication Disorders

(i) Attention - Deficit - Hyperactivity - Disorder

(j) Special Gifts and Talents

(k) Autism Spectrum Disorder

UNIT-II

Recent issues in the education and rehabilitation of children with special needs

(a) Least Restrictive Environment

(b) Early Identification and Intervention

(c) Community Based Rehabilitation

(d) Transition

- (e) Early Childhood Care and Education
- (f) I.E.P. Development
- (A) Recent Declarations, Proclamations and Affirmations (At International Level)
 - (a) UNESCAP (1992)
 - (b) UNESCO Salamanca Statement (1994)
 - (c) Dakar Framework for Action (The world Education Forum) (2000)
 - (d) Individual with Disabilities Education Improvement Act; USA (2004)
 - (e) Biwako Millennium Framework for Action towards inclusion, barrier free, rights based society
 - (f) UNCRPD
- (B) Recent Declarations, Proclamation and Affirmations (At National Level)
 - (a) National Policy on Education 1986; Revised Programme of Action (1992)
 - (b) Rehabilitation Council of India Act (1992)
 - (c) Persons with Disabilities Act (1995)
 - (d) National Trust for the Welfare of persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities (2000)
 - (e) National Policy for Persons with Disabilities (2006)

UNIT-III

Educational perspective of special needs:

- (a) Visual Impairment
- (b) Hearing Impairment
- (c) Physical Disabilities
- (d) Intellectual challenges
- (e) Learning Disabilities
- (f) Emotional & Behavioural Disorders
- (h) Communication Disorders
- (i) Attention Deficit Hyperactivity Disorder
- (j) Special Gifts and Talents

Teacher Preparation in Special Education – Teaching competencies, collaborative consultation and communication

UNIT-IV

National Disability Resources:

- (a) National Institute for the Visually Handicapped, Dehradun
- (b) National Institute for the Mentally Handicapped, Secunderabad
- (c) Ali Yavar Jung National Institute for the Hearing Handicapped, Mumbai
- (d) National Institute for the Orthopedically Handicapped, Kolkatta
- (e) National Institute for Rehabilitation, Training and Research, Cuttack
- (f) Institute for the Physically Handicapped, New Delhi
- (g) National Institute for the Empowerment of Multiple Handicapped, Chennai

Technological Resources – Information, Communication, Learning and Supportive Technology for children with special needs.

SUGGESTED READINGS

Berdine, W. H., & Blackhurst, A.K. (1985). An Introduction to Special Education, Boston: Harper Collins

Fernandez, G., Koenig, C., Mani, M.N. G., & Tesni, S. (1999). See with the blind: Trends in education of the visually impaired, Bangalore: CBM and Books for Change

Gearheart, B.R., Ruiter, J.A., & Sileo, T.W. (1988). Teaching Mildly and Moderately Handicapped Students. New Delhi: Prentice Hall of India

Giuliani, G. & Pierangelo , R. (2006). The Big Book of Special Education resources, CA: Corwin Press

Hallahan D. P., & Kauffman, J. M. (2000). Exceptional learners: An introduction to special Education, Boston: Allyn & Bacon

Hewett, F.M., & Forness S.R, (1984). Education of Exceptional Learner. MA: Allyn & Bacon

Kirk, S. A., & Gallagher, J.J. (2000). Education of Exceptional Children. Boston: Houghton Mifflin

Kundu, C.L., Singh, J. P., & Ahluwalia, H.P.S. (2005). Accredited institutions of Rehabilitation Council of India. New Delhi: RCI

Loreman, T., Deppler, J., & Harvey, D. (2005). Inclusive Education: A Practical Guide to Supporting Diversity in the classroom, NY: Routeledge Falmer

Oslon, J. L., & Platt, J. M. (1996). Teaching the Adolescence with Special Needs, NJ: Prentice Hall

Rao, I., Prahladrao, S., & Pramod, V. (2010). Moving away from Labels, Bangalore: CBR network (South Asia)

Singh, J. P., & Dash, M. K. (2005). Disability Development in India, New Delhi: RCI

WHO (1980). International Classification of Impairments. Disabilities and Handicaps, Geneva: WHO

WHO (2001). ICF: International Classification of Functioning, Disability and Health. Geneva: WHO

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-105) ADVANCED EDUCATIONAL PSYCHOLOGY

Time of Examination: 3 hours

Credit: 4 Max. Marks: 100

(Ext.-80, Int.-20)

- **Note**: (1) Attempt 5 questions in all, selecting one question from each part.
 - (2) Question no.1 is compulsory.
 - (3) All questions carry equal marks.

Objectives: The students will be able to:

- 1. Explain the main features of Hormic, Psychoanalysis, Behaviourism and Gestalt Schools of Thought and their educational significance.
- 2. Define the nature of motivation and different theories of motivation.
- 3. Identify the relevant attributes of individual differences.
- 4. Explain the characteristics of the academically gifted, creative and disadvantaged children and educational provisions for them.
- 5. Understand the nature of Ausubel, Bruner and Gagne theories of learning.
- 6. Understand the concept of attitude and theories of attitude change.
- 7. Explain the concept of Educational Technology and Programme Instruction.
- 8. Understand the concept and principles and teaching at memory, understanding and reflection level.

UNIT-I

- Contribution of schools of Psychology to Education
- Hormic school of Psychology
- Psychoanalysis school of Psychology
- Behaviourism school of Psychology
- Gestalt school of Psychology.
- Concept of Motivation
- Basic needs or Urges-Biological and Socio-psychological
- Theories of Motivation
- Teacher's Motivation functions
- Factors affecting Motivation

UNIT-II

- Concept of Individual Differences
- Sources of Individual Differences
- Areas of Individual Differences
- The Academically Gifted Children their characteristics and education
- Creative Children and their characteristics and education

- Concept of Disadvantaged child: Social conditions, Learning conditions, Programmes, Practice & Teachers.

UNIT-III

- Concept of Learning
- Nature of Learning
- Types / forms of Learning

- Ausubel's meaningful reception learning and advanced organizers
- Bruner's Theory of learning
- Gagne's hierarchy of learning types and conditions.
- Concept and Components of Attitudes
- Functions of Attitudes
- Development of Attitude
- Attitudes Change-Theories of Attitude Change. (Learning theories, Cognitive dissonance and Balance theory).

UNIT-IV

- Origin, Concept of Educational Technology
- Concept of Programmed Instruction and Principles
- Concept of Learning and Teaching
- Phases of Teaching
- Principles of Teaching at Memory, Understanding and Reflective Levels.

BOOKS RECOMMENDED

- 1. Aggarwal, J.C. (2009). *Essentials of educational psychology*. Vikas Publishing, New Delhi
- 2. Ausubel, D.P. (1967). *The psychology of meaningful verbal learning*: An Introduction to *School Learning*. Grune and Stratton, New York.
- 3. Ausubel D.P. and Floyd R.G. (1966).*Educational psychology*. New York, holt-Rinehart and Winston Inc.
- 4. Bohner, G. Wanke, M. (2008). *Attitudes and attitude change*. PrenticeHall, New York.
- 5. Brain, C. (2002). *Advanced psychology: application*. Issues and Perspectives, Nelson Thornes, U.K.
- 6. Dash, M. (2000). *Education of exceptional children*. Atlantic Publisher, New Delhi.
- 7. David G. Myers. (2007). Social psychology. Tata Mcgraw Hill, New Delhi.
- 8. Freeman, F.S. (1968). Theory and practice of psychological testing. Oxford, Calcutta
- 9. Hilgard, E.R. (1956). *Theories of learning*. Appleton Holt. New York.
- 10. Panda, B.B. (2009). *Fundamentals of educational psychology*. Sangeeta Printers, Cuttack.
- 11. Pandey, K.P. (1983). Dynamics of teaching behavior. Amitash Parkashan, Delhi.
- 12. Pandey, K.P. (1980). A first course in instructional technology. Amitash Parkashan, Delhi.
- 13. . Shelly E. Taylor et.al. (2000). Social psychology. Practice Hall, Ohio.
- 14. Smith, W.L. and Moore J.W. (1962). *Programmed learning: theory and research*. (Ed.) D. Van Nostrened Company, New York
- 15. Walloch, M.A. & Kogan, N. (1965). *Modes of thinking in young children; a study of creativity*. Oxford, Calcutta.

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-106) EDUCATIONAL MANAGEMENT: NATURE AND PERSPECTIVE

Time of Examination: 3 hours

Credit: 4 Max. Marks: 100 (Ext.-80, Int.-20)

Note: (1) Attempt 5 questions in all, selecting one question from each part.

- (2) Question no.1 is compulsory.
- (3) All questions carry equal marks.

Objectives:

The students will be able to-

- 1. develop a perspective for viewing education as an organization and analyse various dimensions of its functioning.
- 2. acquaint them with different view points of educational management and their feasibility in explaining actual functioning of educational organizations.
- 3. analyze critically the emerging issues in educational management.

<u>UNIT-I</u>

Educational Management

- Nature and scope of educational management.
- Educational management and educational administration varied views.
- Functions of educational management.

Efforts towards theorization of Educational Management.

- Existing viewpoint of educational management.
- Traditional versus modern views and their applicability to education.

UNIT-II

Leadership in Educational Management

- Meaning and scope
- Styles
- Approaches
- Assessment

Human Resource Development

- The concept
- Education and manpower planning.
- Education and economic development

UNIT-III

Communication in Organizational Behaviour (OB)

- Meaning and scope of communication
- Causes of communication breakdown
- Internal vs. external communication
- Achieving effective communication

Decision-making and decision in Organizational Behaviour

- Meaning and types of decision making
- Difficulties in decision making

- Determinants of decision making
- Decision-making as a process

UNIT-IV

Latest Trends in Educational Management

- Organizational commitment
- Organizational health
- Role performance
- Conflict management

Supervision

- Meaning, Nature & Functions
- Traditional and Modern concepts of supervision
- Planning, organizing & implementing Supervisory Programmes

BOOKS RECOMMENDED

- Ansari, M.M. (1987), Education and Economic development, New Delhi
- Davis. K. (1983) Human Behaviour at work, organization & behaviour, New York, Tata Mcgraw Hill
- Dhar Upinder, Santosh, case method in Management Education
- Michael B. Youngman: Analysis Social and educational research data, Mc Graw Hill Book Company, U.K. Ltd.
- Narbision, I.F. (1967), Educational planning and Human Recourses Development, Paris, Inese
- Narding . N., (1987), Management Appreciation, London Pitman publishing
- Ravishanker. S. and Mishra R.K. (1988), Human resource Development Bombay, Dhruv and Deep
- Spears. N. (1955), improving the supervision of instruction, New York, prentice Hall
- Thakur Brvender: Research Methodology in social science, Deep & Deep Publication Ltd., F-159, Rajouri Garden, New Delhi

MASTER OF PHILOSOPHY (EDUCATION) COURSE CODE: (MPEDU-107) PHILOSOPHY OF EDUCATION

Time of Examination: 3 hours

Credit: 4 Max. Marks: 100 (Ext.-80, Int.-20)

- Note: (1) Attempt 5 questions in all, selecting one question from each part.
 - (2) Question no.1 is compulsory.
 - (3) All questions carry equal marks.

Objectives:

The learner will be able to-

- Describes the functions and problems of Philosophy.
- Explain the Philosophy of Idealism; Realism, Pragmatism, Naturalism and Existentialism and their influence on education practices.
- Describe Indian schools of philosophy and their place in educational practices with reference to Sankhya, Vadanta, Buddhism, Jainism and Islamic traditions.
- Illustrate the educational thoughts of Indian philosophers with reference to Vivekanand, Gandhi, Tagore and Aurobindo.

UNIT-I

. Functions and Major Problems of Philosophy

- (a) (i) Speculative Functions
 - (ii) Analytical Functions
 - (iii) Prescriptive Functions
- (b) (iv) Ontological Problems–Truth, Reality, Existence

(v) Epistemological Problems–Sources of Knowledge and validity of knowledge.

(vi) Axiological Problems-Ethical, Aesthitic, Religious and Social values in life.

UNIT-II

Idealism, Realism, Pragmatism, naturalism and Existentialism with special reference to the concepts and knowledge, reality and values, their educational implications for aims, contents and methods of education.

<u>UNIT-III</u>

Contemporary Indian Philosophical thought and the Educational Process:

- i. Swami Vivekanand and Spiritual Renaissance
- ii. Gandhi's Philosophy of Basic Education
- iii. Tagore and Humanistic Education
- iv. Aurobindo's Educational Ideas.

<u>UNIT-IV</u>

National values as enshrined in the Indian Constitution and their educational implications

- Education & National Values
- Human Rights and Educational System
- Social Philosophy of education-Freedom, Equality, Democracy and Responsibilities.

BOOKS RECOMMENDED

- 1 Broudy, H.S. (1977) Building a Philosophy of Education, New York: Kriager.
- 2 Brubacher, J.S. ; Modern Philosophies of Education, Mc-Graw Hill Company, New York
- 3 Brubacher, John S.(1969) *Modern Philosophies of Education*, New Delhi:Tata McGraw Hill.
- 4 Chandra, S.S; Sharma, R.K (2004) *Principles of Education*, New Delhi: Atlantic Publishers and Distributors.
- 5 Dewey, John (1966) *Democracy and Education*, New York: McMillan.
- 6 Durpis, A.M. (1972) *Philosophy of Education in Historical Perspective*, New Delhi: Thomson Press.
- 7 Ellis, etal, Introduction to the Philosophy of Education, Prentice Hall, Eaglewood Chiffs, 1986.
- 8 Hiriyana,M(1995) *The Essentials of Indian Philosophy*, Delhi: Motilal Banarsidas Publishers Pvt.Ltd.
- 9 Kneller, G. F. (1978) Foundations of Education, John Willey and Sons.
- 10 Langford, G.S., "New essays in Philosophy of the Education ", Conner, D.J. routedge & Kegah Paul: London
- 11 Narvene, V.S. (1978) Modern Indian Thoughts, New York, Orient Longmans Ltd.
- 12 Nigel,L., Smeyers. P., Smith,R., & Standish,P., (2003) *The Blackwell Guide to the Philosophy of Education*, Blackwell Publishing Ltd.
- 13 Pandey, K.P. (1983) *Perspective in Social Foundations of Education*, Gaziabad :Amitash Prakashan.
- 14 Pandey, R.S. (1982) An Introduction to Major Philosophies of Education, Agra: Vinod Pustak Mandir.
- 15 Pandey, R.S. (1982) An Introduction to Major Philosophies of Education, Agra: Vinod Pustak Mandir.
- 16 Park J. (Ed) (1963) *Selected Readings in Philosophy of Education*, New York: The MacMillan Company
- 17 Rusk, Robert R. (1962) *Philosophical Bases of Education*, Warwick Square:University of London.
- 18 Saxena Swaroop, N.R. (2001) *Philosophical and Sociological Foundations of Education*, Meerut:Surya Publication.
- 19 Sodhi, T.S. & Suri, Aruna (1998) *Philosophical and Sociological Foundations of Education*, Patiala: Bawa Publication.
- 20 Taneja, V.R. (2002) *Foundations of Education*, Chandigarh: Mohindra Capital Publishers.

B.A.LL.B. (Hons.) 5-year Integrated Course

VI- Semester

Labour & Industrial Law-II

Internal Assessment:20 Marks

Theory: 80 Marks Total:100 Marks Time: 3 hours

Note:

Paper 605

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Employees' Compensation Act, 1923: Definitions of dependent, employee, Partial disablement and Total disablement. Employer's liability for compensation:-Scope of arising out of and in the course of employment. Doctrine of notional extension. When employer is not liable. Distribution of Compensation. Procedure in proceedings before Commissioner. Appeals.

Leading Case: - M. Mackenzie v. I. M. Issak AIR 1970 SC 1006

UNIT-II

The Factories Act, 1948: Concept of Factory, Manufacturing Process, Workers and Occupier. General duties of occupier. Measures to be taken in factories for health, safety and welfare of Workers. Working hours of adults. Employment of young person and children. Annual leave with wages. Additional provisions regulating employment of women in factory.

<u>Leading Case</u>: - Steel Authority of India Ltd. v. National Union Waterfront Worker, 2001 SCC (L&S) 1121

UNIT-III

Minimum Wages Act , 1948: Concept of minimum wage, fair wage, living wage and need based minimum wage.

10(492)

Theories of Wage. Procedure for fixation and revision of minimum wages. Fixation of minimum rates of wage by time rate or by piece rate. Procedure for hearing and deciding claims.

Leading Case: - Hydro (Engineers) Pvt. Ltd. v. The Workmen AIR 1969 SC182

UNIT-IV

The Child and Adolescent Labour (Prohibition and Regulation) Act, 1986: Aims and Objects of Act Definition of Child and Adolescent Prohibition of Employment of Children in any Occupation and Process Regulation of Conditions of Work of Adolescents Penalties

Bonded Labour System (Abolition) Act, 1976: Aims and Objects Concept of Bonded Labour, Bonded Labourer, Bonded Labour System and Bonded debt Abolition of Bonded Labour System Extinguishments of Liability to repay bonded debt Implementing Authorities

Leading Case: - M.C.Mehta v. State of Tamil Nadu AIR 1991 SC 417

Statutory Material

Employees Compensation Act, 1923: The Factories Act, 1948 Minimum Wages Act, 1948 The Child and Adolescent Labour (Prohibition and Regulation) Act, 1986 Bonded Labour System (Abolition) Act, 1976

Suggested Readings

Srivastava,S.C.	Labour and Industrial Laws
Goswami,V.G.	Labour and Industrial Laws
Mishra, S.N.	Labour and Industrial Law of India
Varandani, G.	Social Security for Industrial Workers in India
Paul Meenu	Labour and Industrial Laws

Kurukshetra University, Kurukshetra Course of Study for BBA.LL.B. (Hons) 5-Year Integrated Course (W.E.F. 2018-19) Third Year

Paper	Semester-V	Paper	Semester-VI		
Subject	Subject	Subject	Subject		
Code		Code			
501-A	Economics-II	601-A	Economics- III (Law & Economics)		
502-A	Principles of Insurance	602-A	Entrepreneurship Development		
503-A	Family Law-I	603-A	Family Law-II		
504-A	Law of Crimes-II(Code of Criminal Procedure,1973)	604-A	Law of Evidence		
505-A	Labour & Industrial Law-1	605-A	Labour & Industrial Law-II		
506-A	Company Law & Corporate Governance	606-A	Administrative Law and Right to Information		

Paper 501-A

BBA.LL.B.(Hons.) 5 –Year Integrated Course V-Semester Economics-II

Total Marks : 100 Internal Assessment Marks : 20 Theory Max. Marks : 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Introduction to Indian Economy: Basic Structure, National income and its sectoral distribution and measurement of National Income. Poverty: Nature, extent, causes and impact. Unemployment and Employment Generation Schemes.

Population problem: A review of major population control programmes.

UNIT-II

Planning for development: appraisal of development strategies and their impact through successive Five Year Plans. India's Agriculture Development: basic characteristics and problems of Agricultural Economy, trends in growth of Agricultural Production and Productivity, Green Revolution, Land Reforms.

UNIT-III

Industrial Development: Trends in Industrial Production and Productivity, Comparative role of public, private and joint sectors, Industrial Relations, New Economic Reforms, Liberalisation, Privatisation, Globaliasation and New Economic order (WTO).

UNIT-IV

External Sector, trends in volume, composition and direction, India's Foreign Trade, Policies for Export promotion and Import substitution, India's BOP structure and Measures to correct adverse BOP, Nature, working and functions of IMF and IBRD.

Suggested Readings

00 0	
Agarwal A.N.	:Indian Economy
Bhatia, H.L.	:Indian Economy-Issues and Policies
Chaudhary, P.K.	:The Indian Economy-Poverty and Development
Rath, N & Dandekar, B.M.	:Poverty in India
Datt, Rudder & Sunderam, KPM	:Indian Economy
Gauri Shankar V.	:Taming the Giants- Multinational Corporations in India
Ghosh, Alok	:Indian Economy
Jathar, J.B. & Ben, C.A.	:Indian Economic Problems
Kurian, C.T.	:Planning, Poverty and Social Transformation
Mahajan, V.S.	:Economic Development of India
Rangarajan, L.N	: Commodity Conflict- The Political Economy of
	International Commodity Negotiations

BBA.LL.B(HONS.) 5- Year Integrated Course

V- Semester

Paper 502-A

Principles of Insurance

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

(a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit -V.

(b)The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.

(c)The Candidate shall be required to attempt five questions in all, selecting one question from each Unit I-IV and question no. 9 in Unit-V shall be compulsory.

(d)Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit-V shall carry 20 Marks.

UNIT-I

Insurance-Concept, Nature, Classification-Life & Non-life, Functions, Importance and evolution of Insurance. Principles of Insurance.

Life Insurance –Concept; Public & Pvt. Sector companies in India – their products, schemes & plans; LIC Act 1956-An overview.

UNIT-II

General Insurance – Concept, Types; Public & Pvt. Sector companies in India – their products, schemes & plans. IRDA Act 1999 – Organization, guidelines for life & Non-life insurance.

UNIT-III

Distribution channel in Insurance-Introduction, Individual Agents-Appointment, functions, code of conduct and remuneration; Eligibility, functions, code of conduct and remuneration of corporate agents and brokers.

UNIT-IV

Life Insurance, Documentation in Life insurance contract, Claims settlement in Life Insurance, Documentation in General insurance contract, Claims settlement in General Insurance.

Suggested Readings:

- 1. Karampal, B.S.Bodla, and Mahesh Garg, 'Insurance Management-Principles and Practice', Deep & Deep Publication, 2006.
- 2. M.N.Mishra, 'Insurance-Principles and practice,' S. Chand and co. Ltd., 2003
- 3. Nalini Prave Tripathy, Prabir Pal, 'Insurance Theory and Practice' TMH 2007.
- 4. Neelam C. Gulati, 'Principles of Insurance Management', Excel Books, 2007

Paper 503-A

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Application of Hindu Law

Who are Hindus before and after Codification

Sources of Hindu Law : Ancient Sources, Modern Sources

Schools of Hindu Law : Mitakshara & Dayabhaga School, Difference between the two Schools Hindu Marriage Act, 1955 : Territorial application of Hindu Marriage Act, Nature of Marriage

Essential Conditions for Hindu Marriages : Monogamy, Mental Condition of parties,

Age Requirement, Sapinda Relationship, Prohibited Degree

Requirement of Solemnization of Marriage/ Registration of Marriage

Leading Case: - Shastri Yagnapurusdasji v. Muldas, AIR 1966 SC 1119.

UNIT-II

Hindu Marriage Act, 1955:

Nullity of Marriage: Void Marriages, Voidable Marriages, Distinction between Void & Voidable Marriages, Children of Void & Voidable Marriages

Restitution of Conjugal Rights, Judicial Separation, Difference between Judicial Separation & Divorce

Divorce:- Fault Grounds of Divorce, Adultery, Cruelty, Desertion, Conversion,

Insanity Leprosy, Venereal Disease, Renunciation of World, Presumption of Death

Wife's Special Grounds for Divorce, Breakdown Grounds of Divorce, Divorce by Mutual Consent, One year Bar to Divorce, Bar to Remarriage after Divorce

Ancillary Reliefs : Maintenance & Alimony, Maintenance Pendente Lite & Expenses of the Proceedings, Permanent Maintenance & Alimony, Custody of Children, Distribution of joint property

Leading Case:- Naveen Kohli v. Neelu Kohli, (2006) 4 SCC 558

UNIT- III

The Family Courts Act, 1984:

Nature and Scope, Composition of Family Court, Jurisdiction and procedure of adjudication, Civil Marriage Law especially the Special Marriage Act,1954. Hindu Adoptions & Maintenance Act, 1956: Meaning of Adoption, Who may take in Adoption, Restrictive Conditions of Adoption, Who mat give in Adoption, Who may be taken in Adoption, Ceremonies of Adoption, Giving & Taking in Adoption, Effects of Adoption

Leading Case : - Vijayalakshmamma v. B.T. Shankar AIR 2001 SC 1424

UNIT-IV

Muslim Law: Marriage: A Social Contract, Kinds of Marriage Classification of Marriage: Sahih Marriage (Valid), Fasid Marriage (Irregular), Batil Marriage (Void),

Formal Validity: Formalities, Registration of Marriage. Presumption of Marriage, Essential Incidents of Valid Muslim Marriage, Consequences of Valid Marriage, Dower, Gift. Guardianship: Classification of Guardians, Powers of Guardians, Custody.

Leading Case: - Syed Shah Ghulam Ghouse Mohiuddin v. Syed Shah Ahmed Mohiuddin Kamisul Quadri (1971) 1 SCC 597

Statutory Material:-

Family Courts Act, 1984 Hindu Marriage Act 1955 Hindu Adoption and Maintenance Act 1956 Muslim Personal Law (Shariat) Application Act, 1937 Special Marriage Act, 1954

Suggested Readings:-

1.	Aquil Ahmad	: Muslim Law
2.	Brinder K Sharma	: Hindu Law
3.	Derrett JDM	: An Introduction to Modern Hindu Law
4.	Fyzee A.A.A.	: Muslim Law
5.	Paras Diwan	: Muslim Law in Modern India
6.	Paras Diwan	: Modern Hindu Law

7. Qureshi, M. A. : Muslim Law

BBA.LL.B.(Hons.) 5 – Year Integrated Course

V- Semester

Paper 504-A

Law of Crimes-II

(Code of Criminal Procedure, 1973)

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Purpose and Importance of Criminal Procedure; Preliminary (Chapter-I), Classes and Powers of Criminal Courts (Chapter-II & Chapter-III), Arrest of Person (Chapter-V), Process to compel appearance of persons and production of things (Chapter VI, VII & VII-A), Security for keeping peace and for good behavior (Chapter VIII), Order for maintenance of Wives, Children and Parents (Chapter IX)

Leading Case: - Mohd. Ahmed Khan v. Shah Bano Begum, AIR 1985 SC 945.

UNIT-II

Maintenance of Public Order and Tranquility (Chapter-X), Preventive action of the police (Chapter-XI), Information to the Police and their powers to Investigate (Chapter-XII), Jurisdiction of Criminal Courts in Inquiries and Trials (Chapter XIII), Condition requisite for initiation of proceedings (Chapter XIV), Complaints to Magistrates (Chapter-XV& XVI)

Leading Case: - Rupan Deol Bajaj v. K.P.S.Gill & Anr., AIR 1996 SC 309

UNIT-III

The Charge (Chapter XVII), Trial before a court of session (Chapter XVIII), Trial of Warrant Cases and Summons Cases by Magistrate (Chapter XIX & XX), Summary Trial (Chapter -XXI) Plea Bargaining (Chapter XXI-A), Evidence in Inquiries and Trials (Chapter XXIII- XXIV) Leading Case: - State of Maharashtra v. Som Nath Thapa, (1996) Cr. L. J. 2448 (S.C.)

UNIT-IV

The Judgment (Chapter XXVII), Appeals, Reference and Revision (Chapter XXIX, XXX), Execution, Suspension, Remission and Commutation of sentences (Chapter XXXII), Provisions as to Bail and Bonds (Chapter XXXIII), Irregular Proceedings (Chapter XXXV), Limitation for taking Cognizance of certain offences (Chapter XXXVI)

Leading Case: - Gurubaksh Singh v. State of Punjab, AIR 1980 SC 1632

Statutory Material

The Code of Criminal Procedure, 1973

Suggested Readings

1. Kelkar, R.V. :

:

:

- **Outlines of Criminal Procedure**
- 2. Ratanlal Dhirajlal : The Code of Criminal Procedure, 1973
 - The Code of Criminal Procedure, 1973 :
 - The Code of Criminal Procedure, 1973 : Criminal Procedure Code
- 4. Mishra, S.N. 5. Tondon, M.P.
- 6. Basu, N.D.
- 7. Sarkar, S.C.

3. Tyagi, Shorvir

: 8. Batuk, Lal : Commentary on The Code of Criminal Procedure, 1973

Criminal Procedure

Code of Criminal Procedure, 1973

Paper 505-A

BBA.LL.B.(Hons.) 5 –Year Integrated Course V- Semester Labour & Industrial Law-1

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Industrial Disputes Act, 1947

(a)Concepts of Industry, workman, Industrial Dispute and Individual Dispute

(b)Arena of interaction and Participants– Industry, workman and employer

(c)Settlement of industrial dispute:

Works Committee

Conciliation Machinery

Court of Enquiry

Voluntary Arbitration

Adjudication – Labour Court, Tribunal and National Tribunal.

(d)Powers of the Appropriate Government under the Industrial Disputes Act, 1947 (e)Unfair Labour Practice

Leading Cases- Banglore Water Supply v. Rajappa AIR 1978 SC 548

UNIT-II

Instruments of Economic Coercion:

(a) Concept of strike, Types of strike, Rights to strike and Lock-out, General Prohibition of strikes and lock-outs, Prohibition of strikes and lock-outs in public utility services, Illegal strikes and lock-outs,

Justification of strikes and lock-outs, Penalties for illegal strikes and Lock-outs, Wages for strikes and lock-outs.

(b) Lay-off

Retrenchment

Transfer and Closure - Definition of lay-off and retrenchment compensation

Compensation to workmen in case of transfer of undertaking closure

Closure - Prevention and regulation

Conditions - precedent for retrenchment

Special provisions relating to lay-off, retrenchment and closure in certain establishments Procedure for retrenchment and re-employment of retrenched workmen and penalty (c)Disciplinary action and domestic enquiry (d)Management's prerogative during the pendency of proceedings (e)Notice of change

Leading Case- T.K.Rangarajan v. Government of Tamil Nadu 2003 SCC (L&S) 970

UNIT-III

Trade Unions and Collective Bargaining:

(a)Definition of trade union and trade dispute (b)Registration of trade unions: Legal status of registered trade union Mode of registration Powers and duties of Registrar Cancellation and dissolution of trade union (c) Disqualifications of office-bearers, Rights and duties of office-bearers and members (d) General and Political funds of trade union.

- (e) Civil and Criminal Immunities of Registered trade union.
- (f) Recognition of trade union.
- (g)Collective bargaining.

Leading Case:- Chairman S.B.I. and another v. AII Orissa State Bank Officer's Association and others, (2002) SCC(L&S) 805

Unit-IV

The Industrial Employment (Standing Order) Act,1946

(a) Concept and nature of standing orders

(b) Scope and coverage of the Industrial Employment (Standing Orders) Act, 1946

- (c) Certification process:
 - Procedure for certification Appeals against certification Condition for certification Date of operation of standing orders Building nature and effect of certified standing orders Posting of standing orders
- (d) Modification and temporary application of model Standing Orders
- (e) Interpretation and enforcement of Standing Orders
- (f) Penalties and procedure

Leading Case:- U.P. State Electricity Board v. Hari Shanker Jain (1978) 4 SCC 15 1

Statutory Material

Industrial Dispute Act, 1947 Trade Union Act, 1926 Industrial Employment (Standing Orders) Act, 1946

Suggested Readings

- 1. Srivastava, S.C. : Labour and Industrial Laws
- 2. Varandani, G. : Social Security for Industrial Workers in India
- 3. Mishra, S.K. : Labour and Industrial Law of India
- 4. Sabharwal, R.K.: Job Security for Industrial Workers etc.
- 5. Goswami, V. G.: Labour Industrial Laws
- 6. Meenu Paul : Labour and Industrial Laws

BBA.LL.B.(Hons.) 5 – Year Integrated Course

V- Semester

Paper 506-A

Company Law & Corporate Governance

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Company- Meaning and Nature of Company, Kinds of Company, Corporate personality, Lifting of corporate veil, Memorandum of Association, Doctrine of ultra vires; Article of Association- its relation with Memorandum of Association, Doctrine of Constructive Notice, Doctrine of Indoor Management with exceptions

.Leading Case- Saloman v. Saloman and Co. (1897) AC 22

UNIT-II

Prospectus- its contents, Prospectus and statement in lieu of prospectus, their importance; liability for mis-statement. Shares – Meaning, nature and scope, statutory restrictions, transfer & transmission of share and kinds of shares. Debentures-Meaning and Nature, Scope, kinds of debentures; charges & classification of charges.

Leading Case- LIC v. Escort Ltd. (1986) 1 SCC 264, (1986) 59 Comp. cas. 548.

UNIT-III

Share holder's Meetings and kinds of Meetings, Majority power and Minority rights –rule laid down in Foss v. Harbottle with exceptions Directors- Constitution of Board of Directors, Appointment of directors, qualification including Share qualification, Duties and Liabilities of Directors, Prevention of oppression and mismanagement

Leading Case- Shanti Prasad Jain v. Kalinga Tubes Ltd. AIR 1965 S.C. 1535

UNIT-IV

Winding up-Meaning, Scope and Kinds of winding up- voluntary winding up, Compulsory winding up by National Company Law Tribunal, Liquidator and official liquidator- Appointment and Powers. Leading Case- Sree Shan Sugar Mills v. Dharmaraja Nadar AIR 1970 Mad 203

Statutory Material

Companies Act, 1956, the Companies Act, 2013(as per the notification of ministry of corporate affairs, Government of India from time to time).
Suggested Readings

- 1. Singh, Avtar : Company Law
- 2. Gower, LCB : The Principles of Modern Company Law
- 3. Shah, S.M. : Lecturers on Company Law
- 4. Palmer : Company Law

BBA.LL.B.(Hons.) 5 – Year Integrated Course

VI- Semester

Paper 601-A

Economics- III (Law & Economics)

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Relationship between Economics & Law, Economics as a basis of social welfare & social justices, Economic systems: Capitalist, Socialist and Mixed Economic systems, Consumer Protection Act.

UNIT-II

Environmental Economics and Law: environment as a necessity and luxury, Population- Environment Linkage, Environment as a Public good, Prevention and Control of Pollution, Environmental Legislation, Sustainable Development.

UNIT-III

Economic Industrialization and Law: Meaning of Industrialization, Importance of Industrialization, State Policy and Industrialization, Factors affecting Industrialization, Development and Regulation of Industries- Industrial (Development and Regulation) Act, 1951-An overview

UNIT-IV

Meaning of Industrial relation; Industrial discipline, Industrial unrest, Trade Unionism, Worker's participation, Social Security Measures.

Protection: SEBI Act 1992 Basic Provisions and Guidelines regarding investors protection

Statutory Material

SEBI Act, 1992

Industries (Development and Regulation) Act, 1951

Suggested Readings

- 1. Jain T.R :Development and Environmental Economics and International Trade
- 2. Bhushan Y.K. : Fundamentals of Business organization and Management
- 3. Misra and Puri : Economics of Development and Planning
- 4. Misra and Puri : Indian Economy
- 4. Myneni : Indian Economy (of Law Course)
- 5. Gopal Krishnan K.C. :Legal Economics (Instructional Dimensions of Economics and Law)
- 6. Robert Coater, Thomus Ulen : Law and Economics
- 7. Datt. Rudder & Sundaram : Indian Economy

BBA.LL.B(HONS.) 5- Year Integrated Course

VI- Semester

Paper 602-A

Entrepreneurship Development

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

(a)Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.

(b)The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.

(c)The Candidate shall be required to attempt five questions in all, selecting one question from each Unit I-IV and question no. 9 in Unit-V shall be compulsory.

(d)Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit-V shall carry 20 Marks.

UNIT-I

Entrepreneurship- Meaning , Nature and Scope, Characteristics and Qualities of a Successful Entrepreneur. Relationship between Entrepreneurship Development and Economic Development.

UNIT-II

Entrepreneurship and Society. New Venture Development- Meaning and Stages. Sources of Financing Entrepreneurship.

UNIT-III

Evaluation of Role of Government and Non Government Agencies in Promoting Entrepreneurship in India.

UNIT-IV

Entrepreneurial Strategies and Business Plan. State Govt. schemes related Entrepreneurship Development, Future of Entrepreneurship in India.

Suggested Readings:

Dollinger, MJ, Entrepreneurship- Strategies and Resources, Pearson Education.
Slevenson, Roberts And Groasbeck, New Business Venture and Entrepreneurs.
Desai, Vasant, Entrepreneurship Development, Himalaya Publishing House.
Gupta, C.B. and Srinivasan, P., Entrepreneurship Development, Sultan Chand & Sons.
Charanthimath, P.M., Entrepreneurship Development and Small Business Enterprise, Pearson Education.

BBA.LL.B.(Hons.) 5 – Year Integrated Course VI-Semester Family Law-II

Paper 603-A

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Mitakshara Hindu Joint Family & Coparcenary system and Hindu Joint Family Property and its alienation.

Karta's power of alienation and Coparcener's power of alienation.

Hindu Adoptions & Maintenance Act, 1956:

Maintenance to Wife, Maintenance to Children, Maintenance to aged or infirm Parents,

Maintenance of Dependents, Maintenance to the members of the joint family.

Quantum of Maintenance.

Maintenance and Welfare of Parents & Senior Citizens Act, 2007-An overview.

Leading Case: - Rani v. Santa Bala Debnath AIR 1971 SC 1028

UNIT-II

Hindu Minority & Guardianship Act, 1956:

Guardianship of the person: Natural Guardianship, Testamentary Guardianship Guardianship appointed by the court Guardianship of Minor's property: Natural Guardianship's power, Testamentary Guardian's powers, Certificated Guardian's powers

Defacto Guardian, Removal of Guardians.

Leading Case:- Githa Hariharan v. Reserve Bank of India AIR 1999 SC 1149

UNIT-III

Hindu Succession Act, 1956:

Succession to the property of a Hindu Male : Devolution of Interest in Coparcenary Property, General Rules of Succession in case of males, Order of Succession among heirs in the Schedule, Distribution of property among heirs in Class I of the Schedule, Distribution of property among heirs in Class II of the Schedule,Order of Succession among Agnates & Cognates

Succession to the property of a Hindu Female : Nature of Female Hindu's Property, General Rules of Succession in case of Female Hindu, Order of Succession & Manner of Distribution among heirs of a female Hindu, Position Regarding Dwelling House, Disqualification to inheritance

Leading Case:- Gurupad v. Hira Bai AIR 1978 SC 1239

UNIT-IV

Muslim Law:-Sources of Muslim Law: Ancient Sources, Modern Sources Schools of Muslim Law: Ancient Schools, Modern Schools : Hanafi School, Maliki School, Shafi School, Hanabali School, Shia School. Divorce: Talaq and Dissolution of Muslim Marriage. Acknowledgement of legitimacy, Maintenance to Muslim Wife.

Leading Case:- Danial Latifi v. Union of India (2001) 7 SCC 740

Statutory Material

Hindu Adoptions & Maintenance Act, 1956

Hindu Minority & Gurdianship Act, 1956

Hindu Succession Act, 1956

Dissolution of Muslim Marriages Act, 1939

Muslim Women (Protection of Rights on Divorce) Act, 1986

Maintenance & Welfare of Parents and Senior Citizens Act, 2007

Suggested Readings

1. Aquil Ahmad	: Muslim Law
2. Birender Kr. Sharma	: Hindu Law
3. Derrett JDM	: An Introduction to Modern Hindu Law
4. Fyzee A.A.A.	: Muslim Law
5. Paras Diwan	: Modern Hindu Law.
6. Paras Diwan	: Muslim Law in Modern India.

BBA.LL.B.(Hons.) 5 – Year Integrated Course

VI- Semester

Paper 604-A

Law of Evidence

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT- I

Definitions – Evidence, Relevancy, Fact, Court (Section 3) May presume, shall presume and conclusive proof (Section 4) Relevant facts (Section 5-16) Admissions – (Sections 17-23 and 31)

Leading Case: Shiv Charan v. State of Haryana AIR 1987 SC I

UNIT- II

Confessions – (Sections 24-30) ;Distinction between admission and confession Statements by persons who cannot be called as witness (Section 32-33) Statements made under Special Circumstances (Sections 34-39) Judgments of Court of Justice When relevant (Section 40-44). Opinion of third person when relevant – (Section 45-51)

Leading Case: Pakala Narayan Swamy v. Emperor AIR 1939 PC 47

UNIT- III

Character when relevant (Sections 52-55) Oral Evidence (Sections 59- 60) Documentary Evidence (Sections 61-78) Presumption as to documents (Sections 79- 90-A) Exclusion of oral by documentary Evidence (Sections 91-100) Burden of Proof (Sections 101-111)

Leading Case: State of Bombay v. Kathi Kalu Oghad AIR 1961 SC 1808

UNIT- IV

Presumption on the certain offences (Sections 111A-114A) Estoppel (Sections 115-117) Privileged Communication (Sections 121-132) Accomplice (Section 133) Examination of Witnesses:- Examination-in-Chief, cross-examination, leading questions, Hostile witness, Impeaching the credit of a witness, Refreshing of memory (Sections 135-166)

Leading Case: Union of India v. Indo Afghan Agency Ltd. AIR 1968 SC 718

Statutory Material

Indian Evidence Act, 1872

Suggested Readings

- Field C.D.:Law of Evidence
- Pandey G.S. :Indian Evidence Act

Rattan Lal Dheeraj Lal :Law of Evidence

Batuk Lal :Law of Evidence

BBA.LL.B. (Hons.) 5-year Integrated Course

VI- Semester

Paper 605-A

Labour & Industrial Law-II

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Employees' Compensation Act, 1923:
Definitions of dependent, employee, Partial disablement and Total disablement.
Employer's liability for compensation:Scope of arising out of and in the course of employment.
Doctrine of notional extension.
When employer is not liable.
Distribution of Compensation.
Procedure in proceedings before Commissioner.
Appeals.
Leading Case: - M. Mackenzie v. I. M. Issak AIR 1970 SC 1006

UNIT-II

The Factories Act, 1948: Concept of Factory, Manufacturing Process, Workers and Occupier. General duties of occupier. Measures to be taken in factories for health, safety and welfare of Workers. Working hours of adults. Employment of young person and children. Annual leave with wages. Additional provisions regulating employment of women in factory.

<u>Leading Case</u>: - Steel Authority of India Ltd. v. National Union Waterfront Worker, 2001 SCC (L&S) 1121

UNIT-III

Minimum Wages Act , 1948: Concept of minimum wage, fair wage, living wage and need based minimum wage. Theories of Wage. Procedure for fixation and revision of minimum wages. Fixation of minimum rates of wage by time rate or by piece rate. Procedure for hearing and deciding claims.

UNIT-IV

The Child and Adolescent Labour (Prohibition and Regulation) Act, 1986: Aims and Objects of Act Definition of Child and Adolescent Prohibition of Employment of Children in any Occupation and Process Regulation of Conditions of Work of Adolescents Penalties

Bonded Labour System (Abolition) Act, 1976: Aims and Objects Concept of Bonded Labour, Bonded Labourer, Bonded Labour System and Bonded debt Abolition of Bonded Labour System Extinguishments of Liability to repay bonded debt Implementing Authorities

Leading Case: - M.C.Mehta v. State of Tamil Nadu AIR 1991 SC 417

Statutory Material

Employees Compensation Act, 1923: The Factories Act, 1948 Minimum Wages Act, 1948 The Child and Adolescent Labour (Prohibition and Regulation) Act, 1986 Bonded Labour System (Abolition) Act, 1976

Suggested Readings

Srivastava, S.C. Labour and Industrial Laws

- Goswami, V.G. Labour and Industrial Laws
- Mishra, S.N. Labour and Industrial Law of India
- Varandani, G. Social Security for Industrial Workers in India
- Paul Meenu Labour and Industrial Laws

BBA.LL.B. (Hons.) 5-year Integrated Course

VI-Semester

Administrative Law and Right to Information

Paper 606-A

Total Marks :100 Internal Assessment Marks : 20 Theory Max. Marks: 80 Time: 3 hours

Note:

- (a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in unit-V.
- (b) The compulsory question in unit-V shall consist of four parts, one from each Unit I-IV.
- (c) The Candidate shall be required to attempt <u>five</u> questions in all, selecting <u>one</u> question from each Unit I-IV and question no. 9 in Unit- V shall be compulsory.
- (d) Each question in Unit I-IV shall carry 15 marks and question no. 9 in Unit -V shall carry 20 Marks.

UNIT-I

Nature, Scope and Functions of Administrative Law; Doctrine of separation of powers. Rule of Law; Its Meaning, Scope and relevance under the Indian Constitution.

Delegated legislation: - Necessity, Scope, Forms, Constitutionality, sub-delegation, Conditional Legislation and Supervision of Delegated Legislation. Judicial Review of delegated Legislation.

Leading Case: Union of India v. Cynamide India Ltd AIR 1987 SC 1802.

UNIT-II

The concept of Natural Justice and Fair Hearing. Discretionary Powers-Failure to exercise a discretion. Prevention of Abuse of Discretion – The principle of reasonableness, scope of Wednessbury Principle. Doctrine of Proportionality.

Leading Case: Maneka Gandhi v. Union of India AIR 1978 SC 597

UNIT-III

Judicial Review of Administrative Actions through writs, Doctrine of Ultra Vires.Exclusion of Judicial Review.Judicial Control of Administrative Tribunals.Public Corporations-Liability and judicial control.Ombudsman - Lokpal and Lokayukta.

Leading Case: Shrilekha Vidyarthi v. State of UP, (1991) I SCC 228.

UNIT-IV

The Right to Information Act, 2005: Definitions, Nature and Scope of Right to Information Act. Right to Information and Obligations of Public Authorities. The Central and State Information Commission, its Powers and Functions. Appeal and Penalties.

Leading Case: The CPIO, Supreme Court Of India, v. Subhash Chandra Agarwal & Anr W.P.(C)288/2009, decided on 02-09-2009

Statutory Material

Constitution of India Right to Information Act, 2005

Suggested Readings

1.Jain & Jain	: Principles of Administrative Law.
2.Joshi, K.C.	: Administrative Law.
3.Massey, I.P.	: Administrative Law.
4.Sathe, S.P.	: Administrative Law.
5.Thakkar, C.K.	: Administrative Law.
6.Phillips, O.Hood.	: Constitutional and Administrative Law.
7.Wade & Philips	: Principles of Administrative Law.
8. Bhatia KL	: Judicial Review & Judicial Activism.
9. Das, C.K.	: Right to Information.
10.Acharya, N.K.	: Commentary on The Right to Information Act, 2005.

Post Graduate Diploma in Business Analytics

(PGDBA)

(w.e.f Session 2018-19)

Scheme of Examination

Paper Code	Nomenclature of Paper	Total	External	Internal	Time
		Marks			
PGDBA-101	Statistics For Analytics	100	80	20	3 Hrs
PGDBA-102	Financial Modeling and Analytics	100	80	20	3 Hrs
PGDBA-103	Marketing Research and Analytics	100	80	20	3 Hrs
PGDBA-104	HR Analytics	100	80	20	3 Hrs
PGDBA-105	Data Mining and Visualization	100	80	20	3 Hrs
PGDBA-106	Training Report and Comprehensive Viva-Voce	100	50+50	-	

Max. Marks: 100 External: 80 Internal: 20 Time 3 Hours

Note: Note: The paper setter is required to set nine questions in all. The first questions will be based on the entire syllabus and will be comprising of four short answer type questions of five marks each. Question no 2 to 9 shall carry 15 marks each. For the students the first question will be compulsory and four questions will be attempted from remaining questions.

Course Objective: After learning this course the learners will be able to understand the relevance of statistics in the functional areas of business- Accounting, Finance, Information systems, Marketing Management and gain knowledge on how to use excel spread sheets and focus on interpretation of results.

Course Contents:

Statistical Thinking and Definition of Statistics - Basic Statistical Terms – Variable Type and Data

Measurement Scales. Overview of Statistical Methods - Sampling and Sampling Methods -

Presenting, Data in Tables and Charts.

Measures of Central Tendency - Measures of Dispersion - Measures of Shape -

Examining Data Distribution, Types of Probability - Rules / Conditions of Probability -

Probability Distributions, The Normal Distribution - Normality check - Using Excel for Statistical Analysis -Using R for Descriptive Analysis

REFERENCES

 Levine, Stephan, Krehbiel and Berenson., "Statistics for Managers using Microsoft excel", PHI Learning Private Limited, 2010.
 Dr. Deepak Chawla, Dr. Neena Sondhi., "Research Methodology Concepts and Cases", Vikas Publishing House Private Limited, 2011.
 Gerald Keller., "Managerial Statistics", Cengage Learning, 2011.
 Arora P.N., "Managerial Statistics", S.Chand Limited, 2009.
 Dr. Srivastava T.N., "Statistics for Management", Tata McGraw Hill Publishing Company, 2008. PGDBA-102

Financial Modeling and Analytics

Max. Marks: 100 External: 80 Internal: 20 Time 3 Hours

Note: Note: The paper setter is required to set nine questions in all. The first questions will be based on the entire syllabus and will be comprising of four short answer type questions of five marks each. Question no 2 to 9 shall carry 15 marks each. For the students the first question will be compulsory and four questions will be attempted from remaining questions.

Course Objective: The objective of this course is to develop an understanding of financial modeling science techniques and their role in managerial decision—making.

Course Contents:

Corporate Financial Statements Spreadsheet skills: Organizing and creating spreadsheets; entering and formatting data values; entering expressions for calculating values; linking worksheets; splitting screens to facilitate working between several worksheets. Financial management skills: Understanding the three key financial statements (i.e., a company's income statement, balance sheet, and cash flow statement) and the relationships between the various items on them.

Analysis of Financial Statements Spreadsheet skills: Using logical IF statements; using conditional formatting to call attention to conditions that need correcting; pasting an Excel document into a Word document. Financial management skills: Analyzing the year-to-year changes in financial statements and various financial ratios; performing vertical analysis of financial statements; using financial ratios to benchmark a company's performance against competitors; inserting spreadsheet results into company reports.

Forecasting Annual Revenues Spreadsheet skills: Creating, validating, and using linear, quadratic, cubic, and exponential regression models to fit the trends of historical data; creating various types of charts (e.g., scatter diagrams, forecast charts, error patterns, and downside risk curves); estimating the accuracy of forecasts; expressing forecast accuracy in terms of confidence limits and downside risk curves. Financial management skills: Making forecasts; recognizing the difference between valid and invalid forecasting models; handling the risks inherent in forecasts; adjusting regression models for changes in trends.

Suggested Readings:

- 1. Day Alastair L. Mastering Financial Modelling in Microsoft Excel, Pearson 2nd edition
- 2. Benninga Simon, Financial Modelling.
- Pignataro Paul, Financial Modelling and Valuation: A Practical Guide to Investment Banking And Private Equity.
- 4. Rees Michael, Financial Modelling in Practice.

Marketing Research and Analytics

Max. Marks: 100 External: 80 Internal: 20 Time 3 Hours

Note: Note: The paper setter is required to set nine questions in all. The first questions will be based on the entire syllabus and will be comprising of four short answer type questions of five marks each. Question no 2 to 9 shall carry 15 marks each. For the students the first question will be compulsory and four questions will be attempted from remaining questions.

Course Objective: The objective of this course is to develop an understanding of marketing research techniques and their role in marketing business decision.

Course Contents:

Introduction to Marketing Research and Analytics - Meaning and Role of Research and Analytics in Marketing. Scope of Marketing Research and Analytics - Consumer Research and Analytics , Market Potential Research and Analytics , Image Research and Analytics, Product Research and Analytics, Pricing research and Analytics, Distribution Research and Analytics, Advertising Research and Analytics. Types of Marketing Research and Their Applications- Exploratory Research, Descriptive Research and Experimental Research.

Step by Step Execution of Research, Measurement and Scaling Techniques. Data Collection and Sampling Design

Big Data in Marketing and Marketing Intelligence.

SPSS based Marketing Analytics Techniques-

Conjoint Analysis, Cluster Analysis, Factor Analysis, Regression Analysis, Perceptual Maps Text Analytics.

Suggested Readings:

- 1. Cooper, Donald R and Pamela S Schindler, Marketing Research- Concepts and Cases, Tata McGraw Hill Publishing Company Limited, New Delhi.
- 2. Malhotra, Naresh K and S Dash, Marketing Research- An Applied Orientation, Pearson.
- 3. Boud, Harper W, Westfall, Ralph L and Stanley F Stasch, Marketing Research- Text and Cases, RD Irwin
- 4. Green, Paul E and Donald S Tull, Research for Marketing Decisions, PHI.
- 5. Beri, GC, Marketing Research, Tata McGraw Hill, New Delhi.

Lesson Plan

PGDBA 103- Marketing Research and Analytics

- Chapter 1- Marketing Research- Meaning, Role and Scope.
- chapter 2- Consumer Research
- chapter 3- Market Potential and Image Research
- chapter 4- Product and Pricing Research
- chapter 5- Distribution and Advertising Research
- chapter 6- Types of Marketing Research and Their Applications
- chapter 7- Marketing Research Process
- chapter 8- Measurement and Scaling Techniques
- chapter 9- Data Collection and Sampling Design
- chapter 10- Role of Analytics in Marketing Big Data and Marketing Intelligence
- chapter 11- Conjoint Analysis
- chapter 12- Cluster Analysis
- chapter 13- Factor Analysis
- chapter 14- Regression Analysis
- chapter 15- Perceptual Maps and Text Analytics

Max. Marks: 100 External: 80 Internal: 20 Time 3 Hours

Note: Note: The paper setter is required to set nine questions in all. The first questions will be based on the entire syllabus and will be comprising of four short answer type questions of five marks each. Question no 2 to 9 shall carry 15 marks each. For the students the first question will be compulsory and four questions will be attempted from remaining questions.

Course Objective: The objective of this course is to develop an understanding of the HR Practices techniques and their role in enchasing the competitiveness of the workforce.

Course Contents:

Introduction to HR Analytics: Concept, Perspectives, Evolution. Need of HR Analytics, Changing HR Dynamics. Analytic Capabilities, Analytic Value Chain, Application of HR Analytics. HR Metrics; HR Scorecard; HR Benchmarking.

Preparation for HR Analytics: Review existing HR Analytics Frameworks and HR Models, Identify the Purpose/Aims and Scope of Analytics, Devise Methodology for using it, preparing for an analytics Unit, Develop Analytics Culture

Requirements for HR Analytics: Engaging with Stakeholders, Work with Consultants and Coaches, Technological Know-how, Build Analytics Team, Involvement of Consultant and Coaches.

Understanding Data: Data Quality, Data Types, Data Governance, Resolving Data Issues: Efficiency Measures, Effectiveness Measures and Business Outcome Measures.

Developing Analytics Culture: Importance of Leadership; Overcoming Resistance to HR Analytics; Communicate with Storytelling and Visualisation.

Execution & Reporting: Determining the Key Performance Indicators; Analyse and Report the Data; Relationships, Optimisation and Predictive Analytics; Interpreting the Results,

Analysis for Insights: Use of Trend Analysis, Regression, Correlation, Benchmarking, Workforce Modelling, Structural Equation Modelling for predictive analysis.

Future of HR Analytics: New Opportunities & Challenges for HR in Future, Emerging Data Sources, Evolving Technology.

Suggested Readings:

- 1. Gene Pease, Boyce Byerly and Jac Fitz-enz, Human Capital Analytics: How to Harness the Potential of Your Organization's Greatest Asset, John Wiley & Sons.
- 2. HR Analytics: The What, Why and How, Tracey Smith. WILEY & SAS Business)
- 3. HR Analytics: Understanding Theories and Applications, Dipak Kumar Bhattacharyya

Lesson Plan

PGDBM- 104 HR Analytics

- 1. Introduction to HR Analytics: Concept, Perspectives, Evolution. Need of HR Analytics.
- 2. Changing HR Dynamics. Analytic Capabilities, Analytic Value Chain, Application of HR Analytics.
- 3. HR Metrics;
- 4. Balanced Scorecard and HR Scorecard;
- 5. HR Benchmarking.
- 6. HR Analytical Frameworks and HR Models,
- 7. Purpose/Aims and Scope of Analytics, Developing Methodology for using it, Preparing for an analytics Unit,
- 8. Engaging with Stakeholders, Consultants and Coaches,
- 9. Technological Know-how for HR Analytics
- 10. Development of Analytics Team.
- 11. Understanding Data: Data Quality, Data Types, Data Governance, Resolving
- 12.Data Issues: Efficiency Measures, Effectiveness Measures and Business Outcome Measures.
- 13.Developing Analytics Culture: Importance of Leadership; Overcoming Resistance to HR Analytics; Communicate with Storytelling and Visualisation.
- 14.Execution & Reporting: Determining the Key Performance Indicators; Analyse and Report the Data; Relationships, Optimisation and Predictive Analytics; Interpreting the Results,
- 15. Analytical Techniques for Insights: Use of Trend Analysis, Regression, Correlation, Benchmarking, Workforce Modelling, Structural Equation Modelling for Predictive analysis.
- 16.Future of HR Analytics: New Opportunities & Challenges for HR in Future, Emerging Data Sources, Evolving Technology.
- 17. Case Studies on Analytics

Data Mining and Visualization

Max. Marks: 100 External: 80 Internal: 20 Time 3 Hours

Note: Note: The paper setter is required to set nine questions in all. The first questions will be based on the entire syllabus and will be comprising of four short answer type questions of five marks each. Question no 2 to 9 shall carry 15 marks each. For the students the first question will be compulsory and four questions will be attempted from remaining questions.

Objectives: The Objective of the course is to familiarize the students with tools and techniques for Data Data Mining and visualization.

Course Contents:

Introduction to data mining (DM) :Kind of data, DM Functionalities, Classification of DM Systems, Issues in DM,. What is Data warehousing (DW)?

Multidimensional data model: Data cubes, Stars, snowflakes and fact constellations, Defining schemas, concept hierarchies, OLAP, Data Warehouse Architecture, Types of OLAP servers: ROLAP versus MOLAP versus HOLAP, Steps for design and construction, Three-tier Data

Data Warehouse Implementation: Efficient computation of Data cubes, Indexing OLAP Data and efficient processing of OLAP queries, Back-end tools and utilities

Data Mining Primitives, Languages and System Architectures: Task relevant data, Kind of Knowledge to be mined, DM Query languages: Syntax, Designing GUI, Architectures of DM Systems, Concept of Cluster Analysis. , Application and trends in Data mining, Data Mining for Financial data analysis, Data Mining for retail industry, Data mining for telecommunication industry

Data Visualization techniques (for measurement and categorical data)-Interactive visualization techniques-Common misuses of data visualization- Techniques for Statistical Inference – the 95% Confidence Interval-General principles involving test of statistical significance – Null Hypothesis, p-value and interpreting test outcomes. Data visualization; Association between variables; Insights from reports.

Suggested Readings:

1. Barry Devlin: Data Ware House: From Architecture to Implementation, AddissionWeslay.

2. Alex Berson, Stephen Smith, Kurt Threarling; Building Data Mining Applications for CRM Tata McGraw Hill.

3. Alex Berson, Stephen Smith; Data Warehousing, Data Mining and OLAP, Tata McGraw Hill.

4. Michael J.A.Berry, Data Mining Techniques for marketing sales and Customer Support, Gordon Linoff.

5. Han, Jiawei; Datamining: Concepts and techniques, Harcourt.

6. Pujari, ArunK, Data, Mining Techniques, Hyderabad University Press.

Total Marks 100 External Training Report: 50 Marks Viva-Voce: 50 Marks

Note: Every student would be required to undertake training of 3 to 4 weeks in a well established reputed company regarding use of Business Analytics in corporate decision making. The training report encompassing the learning during training would be submitted upto 30th April. Prior approval regarding topic of the training and company where training would be undertaken is must from the course coordinator.

Comprehensive Viva Voce will be conducted by an examiner appointed by the University.

Scheme of Examination of Master of Commerce (M.Com.) Choice Based Credit System (CBCS) under Semester System with Massive Open Online Courses (MOOC) to be implemented w.e.f. 2018-2019 in a phased manner. It will be initially applicable on the course run on KUK campus only i.e. Department of Commerce, KUK.

The complete course structure with grouping of subjects (Semester 1 to 4) will be applicable w.e.f. the batch 2018-2019.

COURSE STRUCTURE

Note:Each Compulsory and Elective paper, except MC-301, will carry 100 Marks (80 marks external paper and 20 marks internal assessment). There will be eight (8) questions in all. The first question is compulsory and consists of six (6) short-questions having four (4) marks each. Answer to these questions should not exceed 150 words. The candidate will be required to attempt any four questions out of remaining seven (7) questions and each question carries fourteen (14) marks each. Duration of each paper will be three (3) hours. The Viva Voce cum Case Study papers (MC 207 & MC 420) will carry 50 marks each.

Also, the students will have to study two Open Elective papers to be offered by other departments within the faculty only, one each in IInd and IIIrd Semester.However,Students will have also a choice of opting one MOOC Course offered on the SWAYAM Portal of Ministry of Human Resource Development in each of IInd and IIIrd semester in lieu of open elective paper(s). The MOOC course(s) will be decided/chosen by the Department out of list of MOOC courses notified on SWAYAM portal for respective semester.

	WI. COIII. 1 Semester									
Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits			
Code	OE		Marks	Marks	Marks		(L/T/P)			
MC-101	C	Organizational Behaviour	100	80	20	4	4			
MC-102	C	Business Environment	100	80	20	4	4			
MC-103	C	Managerial Economics	100	80	20	4	4			
MC-104	C	Company Law	100	80	20	4	4			
MC-105	C	Accounting for Managerial	100	80	20	4	4			
		Decisions								
MC-106	C	Marketing Management	100	80	20	4	4			
		Total	600	480	120		24			
M. Com. 2 nd Semester										
Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits			
Code	OE		Marks	Marks	Marks		(L/T/P)			
MC-201	C	Human Resource Management	100	80	20	4	4			
MC-202	C	International Business	100	80	20	4	4			
		Environment								
MC-203	C	Strategic Marketing	100	80	20	4	4			
MC-204	C	Financial Management &	100	80	20	4	4			
		Policy								
MC-205	C	Corporate Accounting	100	80	20	4	4			
MC-206	C	Business Statistics	100	80	20	4	4			
MC-207	С	Viva Voce-cum-Case Study	50	50			2			
		Open Elective/MOOC	50		50	2	2			
		Total	700	530	170		28			

Course Symbol: C denotes 'Compulsory', E 'Elective', OE 'Open Elective' and MOOC 'Massive Open Online Courses'

M.Com 3rd and 4th Semester

In each of the M.Com 3rd and 4th Semesters, a student will take one Core Paper (4 credits) and five Elective Papers (20 credits). Also in 3rd Semester, a student will have to study one open elective course to be offered by other departments within the Faculty or a MOOC Course.

The Elective papers will be chosen in the following manner:

- (i) The student will choose at least one paper (upto maximum three papers) of each Specialization: A, B and C as below:
 - A) Finance & Taxation
 - B) Marketing
 - C) HRM & General Management
- (ii) Each of the specializations comprises of two mutually exclusive Optional Groups (I & II) and the student has to choose only one Optional Group.
- (iii) If the student chooses more than one paper from same Specialization, it must be from within the three papers of the same Optional Group already chosen at (ii) above.

In 4th semester, in addition to above papers, MC-420 Viva Voce cum Case Study is a compulsory paper.

M. Com. 3 rd Semester									
Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits		
Code	OE		Marks	Marks	Marks		(L/T/P)		
Compulse	Compulsory Papers								
MC-301	С	Computer Applications in	100	50 Th.	20	5	4		
		Business		+30 Pr.			(3L+1P)		
		(50 Th.+30 Pr.+20 Int.)							
		Total	100	80	20	-	4		
Open Ele	ctive Pa	aper							
	OE	Open Elective/MOOC	50	-	50	2	2		

SPECIALIZATIONS

Specialization A: Finance & Taxation

Note:- Choose any one optional group

M. Com. 3 ^{ra} Semester								
Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits	
Code	OE		Marks	Marks	Marks		(L/T/P)	
Optional	Group-	I (Finance & Taxation)						
MC-302	Е	Advanced Financial	100	80	20	4	4	
		Management						
MC-303	Е	Security Analysis and	100	80	20	4	4	
		Investment Management						
MC-304	E	Financial Institutions and	100	80	20	4	4	
		Markets						

OR

Optional Group-II (Finance & Taxation)									
MC-305	Е	Fund Management in Banking	100	80	20	4	4		
		and Insurance Companies							
MC-306	Е	Merchant Banking and	100	80	20	4	4		
		Financial Services							
MC-307	Е	Advanced Tax Laws and	100	80	20	4	4		
		Practice							

Specialization B:Marketing Note:- Choose any one optional group

Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits
Code	OE		Marks	Marks	Marks		(L/T/P)
Optional Group-I (Marketing)							
MC-308	Е	Marketing Research	100	80	20	4	4
MC-309	Е	Advertising Management	100	80	20	4	4
MC-310	E	Applications of Statistical	100	80	20	4	4
		Methods in Business					

OR

Optional Group-II (Marketing)									
MC-311	Е	International Marketing	100	80	20	4	4		
MC-312	Е	Foreign Trade Policy & Procedures	100	80	20	4	4		
MC-313	Е	Retail Management	100	80	20	4	4		

Specialization C: HRM & General Management

Note:- Choose any one optional group

Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits	
Code	OE		Marks	Marks	Marks		(L/T/P)	
Optional Group-I (HRM & General Management)								
MC-314	Е	Entrepreneurship Development	100	80	20	4	4	
MC-315	Е	Business Ethics & Social	100	80	20	4	4	
		Responsibility						
MC-316	Е	Human Resource Development	100	80	20	4	4	

OR

Optional Group-II (Marketing)									
MC-317	Е	Management of Industrial	100	80	20	4	4		
		Relations							
MC-318	Е	Cross-Cultural and Global	100	80	20	4	4		
		Human Resource Management							
MC-319	Е	Compensation Management	100	80	20	4	4		

Total Marks/Hours/Credits for 3rd Semester

M. Com. 3 rd Semester								
Paper	C/E/	Number of courses	Total	Ext.	Int.	Hrs	Credits	
	OE		Marks	Marks	Marks		(L/T/P)	
Compulsory	C	01	100	50 Th.	20	5	4	
				+30 Pr.			(3L+1P)	
Elective	E	05	500	400	100	20	20	
Open	OE	01	50	-	50	2	2	
Elective								
Total		06	650	480	170	27	26	

M. Com. 4 th Semester												
Course	C/E/	C/E/Title of CourseTotalExt.Int.HrsCredit										
Code	OE		Marks	Marks	Marks		(L/T/P)					
Compulso	Compulsory Papers											
MC-401	-401 C IT and E-Commerce 100 80 20 4											
		Total	100	80	20		4					

SPECIALIZATIONS <u>Specialization A</u>: Finance & Taxation Note:- Choose any one optional group

M. Com. 4 th Semester											
Course	C/E/	Title of Course	Credits								
Code	OE		Marks	Marks	Marks		(L/T/P)				
Optional	Optional Group-I (Finance & Taxation)										
MC-402	E	Corporate Tax Planning and	100	80	20	4	4				
		Management									
MC-403	Е	Project Planning and Control	100	80	20	4	4				
MC-404	E	International Financial	100	80	20	4	4				
		Reporting Standards									

OR

Optional Group-II (Finance & Taxation)											
MC-405	Е	Portfolio Management	100	80	20	4	4				
MC-406	Е	Multinational Financial	100	80	20	4	4				
		Management									
MC-407	Е	Stock Market Operations	100	80	20	4	4				

Specialization B: Marketing Note:- Choose any one optional group

Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits
Code	OE		Marks	Marks	Marks		(L/T/P)
Optional	Group-	I (Marketing)					
MC-408	Е	Sales Management	100	80	20	4	4
MC-409	Е	Services Marketing	100	80	20	4	4
MC-410	E	Supply Chain Management	100	80	20	4	4

OR

Optional Group-II (Marketing)										
MC-411	Е	Consumer Behaviour	100	80	20	4	4			
MC-412	Е	Rural Marketing	100	80	20	4	4			
MC-413	E	International Economics	100	80	20	4	4			

Specialization C: HRM & General Management Note:- Choose any one optional group

Course	C/E/	Title of Course	Total	Ext.	Int.	Hrs	Credits					
Code	OE		Marks	Marks	Marks		(L/T/P)					
Optional	Group-	I (HRM & General Managemen	t)									
MC-414	Е	Corporate Governance	100	80	20	4	4					
MC-415	Е	International Human Resource	100	80	20	4	4					
		Management										
MC-416	Е	Event Management	100	80	20	4	4					

OR

Optional Group-II (Marketing)												
MC-417	Е	Organizational Change and 100 80 20 4 4										
		Interventions Strategies										
MC-418	Е	Strategic Management	100	80	20	4	4					
MC-419	Е	Corporate Level & Centre	100	80	20	4	4					
		Level Strategies										
Compulso	Compulsory											
MC-420	С	Viva-Voce Cum Case Study 50 50										

Total Marks/Hours/Credits for 4th Semester

M. Com. 4 th Semester													
Paper	C/E/ Number of courses Total Ext. Int. Hrs Cred												
	OE		Marks	Marks	Marks		(L/T/P)						
Compulsory	C	01	100	80	20	4	4						
Elective	Е	05	500	400	100	20	20						
Viva Voce	Viva Voce C 01 50 50 2												
Total		06	650	530	120	24	26						

B.Tech (Printing, Graphics & Packaging)

Credit based system Syllabus

Duration: Four year

w.e.f. Academic Session: 2017-2018

Institute of Mass Communication and Media Technology

KurukshetraUniversity

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SCHEME OF STUDIES & EXAMINATIONS 1st semester

B. Tech. (Printing, Graphic & Packaging)

Subje	Su	subject	Τe	each	ıir	ıg	Cre	Allotr	Allotments of Marks					
ct	bj	Title	Sc	hed	lu	le	dits	Maj	Min	Pract	Total	Of European (Line		
Code	ec t							Or Tost	Or	ical		Exams(Hrs		
	ar							rest	rest)		
	ea													
			L	Т	Ρ	Hour								
						s/we ek								
PGP	PC	PRINTING	4	1	0	4	4	60	40		100	3		
101		PROCESS -I												
PGP	Н		4		0	4	4	60	40		100	3		
102	S	ENGLISH												
PGP	AS	PHYSICS - I	3		0	3	3	60	40		100	3		
103	A.C.	CHEMISTED	4		0	4		(0	40		100	2		
PGP 104	AS	Y	4		U	4	4	60	40		100	3		
101														
PGP	AS	MATHEMATI	3	+	0	3	3	60	40		100	3		
105		CS-I												
PGP	CS	FUNDAMENT	3		0	3	3	60	40		100	3		
106	E	COMPUTER				l								
		LAB												
PGP	PC	PRINTING PROCESS-I			2	2	1		30	45	75	3		
111		LAB												
PGP	H	PHYSICS-I LAB			2	2	1		30	45	75	3		
112	5													
PGP	AS	CHEMISTER Y LAB			2	2	1		30	45	75	3		
113														
PGP	CS	FUNDAMENT ALS OF			2	2	1		30	45	75	3		
114	E	COMPUTER												
	+	Total	+		-	. <u></u>	25/	360	360					
							25							

PRINTING PROCESS(PGP 101)

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT –I

History of printing:Woodblock printing in East Asia, Europe, Movable type printing, printing Press. Origin of printing processes- Intaglio, Lithography, Offset press, Screen printing, Flexography, Photocopier, Printers, Digital press, Frescography, 3D printing.

Scope of Indian Printing IndustryBrief Introduction of scope of Printing Industry.Indian printing Industry- An emerging market, size of the industry, total contribution to the economy, employment opportunity, latest developments.

UNIT –II

Printing Processes: Introduction to conventional printing processes- Relief, Planography, Intaglio, Screen. With their basic principles, characteristics and identification. On Demand printing, Specialized printing. Basic operations in printing- Pre press, press and post press operations. Suitability & limitations and applications of various printing Processes.

UNIT –III

Screen Printing Process and machines:Introduction, Stencils - Their kinds and methods of preparation. Screen fabric –multifilament and mono filaments, stretching screen fabric to frame, Image transfer - The squeegee, Squeegee considerations, squeegee preparation, hardness categories of squeegee blades, Variety of blade, its shape and application. Method of halftone preparation for screen printing. Different types of inks an substrates used for screen printing,

Screen Printing Machines:Classification of Presses: Clamshell press, rotary screen printing press, carousal press. Manual, semiautomatic and fully automatic screen printing machines.Their operational and mechanical features.

UNIT –IV

Letterpress Printing Machines: Introduction to letter press printing machines, classification of letterpress printing machines, types of platen, cylinder and rotary machines; their mechanical and operational features and uses; merits and demerits of Letterpress printing machines.

Running Defects of different printing process: Common printing defects comes in various printing processes, causes and their remedies.

Recommended Book :

- 1. Letter Press Printing Part 1, 2, By C.S. Misra
- 2. Printing Technology By Adams, Faux, Rieber
- 3. Screen Printing Review ByBabett Magee
- 4. Screen Printing By John Stephens
- 5. Art and Print Production By N.N. Sarkar

PGP 102

Communicative English

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External:60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT -I

Language Main features of British, American and Indian English Introduction to Formal and Informal English

UNIT -II

Vocabulary

Word meanings and their usage, using a dictionary One word substitutes Synonyms& Antonyms Common errors in spellings and sentences

UNIT -III

Grammar

Active Voice and Passive Voice, Tag Questions Subject-Verb agreement Use of Articles and Prepositions Idioms& phrases

UNIT -IV

Composition

Resume Writing Letter writing (Formal and Informal Letters) Paragraph Writing

Dialogue Writing

Essentials of different types of conversation (telephonic, e-mail, public speech, group discussion)

REFERENCES:

1. Communicative English, Dr. Jimmy Sharma, ArihantParkashan Pvt. Ltd.

2. Strengthen Your English, Bhaskaran and Horsburgh, Oxford University Press

3. Basic Communication Skills for Technology, and area J Rutherfoord, Pearson Education Asia.

4. Murphy's English Grammar with CD, Murphy, Cambridge University Press

5. English Skills for Technical Students by Orient Longman

6. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.

PGP 103

PHYSICS-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 3 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT-I

PHYSICAL OPTICS

Interference: Division of wave front-Fresnel's biprism, Division of amplitude–Newton's rings, Michelson interferometer, applications.

Diffraction: Difference between Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a slit. Plane transmission diffraction grating, its dispersive and resolving powers.

Polarization: Polarised and un-polarized light, double refraction; Nicol prism, quarter and half wave plates, Polarimetry; Biquartz and Laurent's half-shade polarimeters, Simple concepts of photoelasticity.

UNIT-II

LASER: Spontaneous and stimulated emissions, Laser action, characteristics of laser beam-concepts of coherence, He-Ne and semiconductor lasers (simple ideas), applications.

FIBRE OPTICS: Propagation of light in fibres, numerical aperture, single mode and multi modefibers, applications.

UNIT-III

WAVE AND OSCILLATIONS: Simple concepts of Harmonic Oscillator, resonance, quality factor. E.M. wave theory-review of basic ideas, Maxwell's equations, simple plane wave equations, simple concepts of wave guides and co-axial cables, Poynting vector. **DIELECTRICS:** Molecular theory, polarization, displacement, susceptibility, dielectric coefficient, permittivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field. Behaviorof dielectrics in a.c. field-simple concepts, dielectric losses.

UNIT-IV

SPECIAL THEORY OF RELATIVITY: Michelson-Moreley experiment, Lorentz transformations, variation of mass with velocity, mass energy equivalence.

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NUCLEAR PHYSICS: Neutron Cross-section, Nuclear fission, Moderators, Nuclear reactors, Reactor criticality, Nuclear fusion. Interaction of radiation with matter-basic concepts, radiation detectors-ionisation chamber, G.M.Counter, Scintillation and solid state detectors, cloud chamber and bubble chamber.

TEXT BOOKS:

- 1. Physics of the Atom Wehr, Richards & Adair (Narosa)
- 2. Perspectives of Modern Physics Arthur Beiser (TMH)
- 3. Modern Engineering Physics A.S. Vasudeva (S. Chand)

REFERENCE BOOKS:

- 1. Electricity and Magnetism F.W. Sears (Narosa)
- 2. Physics Vol-I & II Resnick&Halliday (Wiley Eastern)
- 3. A Text Book of Optics BrijLal&Subramanyam

PGP 104

CHEMISTRY

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 3 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Unit-1

Thermodynamics - Second law, concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change, Chemical Potential, Gibb's Helmholtz equation, Clausius - Clapeyron equation, Related numerical problems with above topics. Phase-Rule - Terminology, Derivation of Gibb's Phase Rule Equation, One Component System (H₂O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

Unit-2

Water & its treatment : Part I – Sources of water, impurities in water, hardness of water and its determination, units of hardness, alkalinity of water and its determination, Related numerical problems, scale and sludge formation (composition properties and methods of prevention). Water and its treatment : Part II – Treatment of water for domestic use, coagulation, sedimentation, filtration and dis-infection, water softening, Ion-exchange process, mixed bed demineralisation, Desalination (reverse osmosis) (electro-dialysis).

Unit-3

Corrosion and its prevention - Galvanic & concentration cell, Dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, pitting corrosion, water-line corrosion, differential aeration corrosion, stress corrosion, factors affecting corrosion, Preventive measures (proper design, Cathodic protection, protective coatings).

Lubrication and Lubricants-Friction, mechanism of lubrication, classification and properties of lubricants, Additives for lubricants, synthetic lubricants, Greases – Preparation & properties (consistency, drop point) and uses.

Unit-4

Polymers and Polymerization-Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermo-plastics (PVC,PVA), thermosets (PF,UF), and elastomers (SBR,GR-N), Silicones, Introduction to polymeric compsites. Analytical methods; its needs and different methodes; Spectroscopy; its definition and scope; salient features of spectrophotometer, brief introduction of titrimetric methods, Elementary discussion on flame photometry

REFERENCE BOOKS:

1. Engineering Chemistry, P.C. Jain, Monica Jain (DhanpatRai& Co.).

2. Chemistry in Engineering & Tech., Vol.I& II, Rajaram, Kuriacose (TMH).

3. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).

4. Physical Chemistry, P.W. Atkin (ELBS, Oxford Press).

5. Physical Chemistry, W.J. Moore (Orient-Longman).
MATHEMATICS-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 3 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT-I

<u>Applications of Differentiation</u>: Taylor's &Maclaurin's series, Expansion by use of known series, Expansion by forming a differential equation, Asymptotes, Curvature, Radius of Curvature for Cartesian, Parametric & polar curves, Centre of curvature & chord of curvature, Tracing of Cartesian & polar curves (standard curves).

UNIT – II

<u>**Partial Differentiation & its Applications</u>**: Functions of two or more variables Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, change of variables.</u>

Homogeneous functions, Euler's theorem, Jacobian, Taylor's &Maclaurin's series for functions of two variables (without proof), Errors and approximations, Maxima-minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign.

UNIT – III

<u>Multiple Integrals and their Applications</u>: Double integral, change of order of integration Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

$\mathbf{UNIT}-\mathbf{IV}$

<u>Vector Calculus</u>: Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations, Del applied twice to point functions, Del applied to product of point functions.

Integration of vectors, line integral, surface integral, volume integral, Green's, Stoke's and Gauss divergence theorems (without proof), and their simple applications.

REFERENCE BOOKS:

- 1. Advanced Engineering Mathematics : F. Kreyszig.
- 2. Higher Engineering Mathematics : B.S. Grewal.
- 3. Engineering Mathematics Part-I : S.S. Sastry.
- 4. Differential and Integral Calculus : Piskunov.
- 5. Advanced Engineering Mathematics : R.K. Jain and S.R.K. Iyengar
- 6. Advanced Engg. Mathematics : Michael D. Greenberg

FUNDAMENTALS OF COMPUTER

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT – I

Computer function and components – Labeling standards – software applications, utilities, Applets, operating systems. Linking hardware and software, device interfaces, BIOS, device drivers. I/O ports, USB Buses, Bluetooth. Logic Gates- AND, OR, NOT, NOR, NAND, XOR.

UNIT – II

Motherboard components-nomenclature, tech., Microprocessor- basics, Memory – RAM, ROM, DRAM, EDO, SDRAM (only usage and speca basis) BIOS. BIOS compatibility, Flash memory, Expansion slots, parallel serial port power supply SMPS – specialization, Bus- AT bus, PCI, ISA bus.

UNIT – III

Mass storage technology – data organization – cache operation, FDD, HDD, SCSI driver their storage capacity drives, CD-ROM, CD-Recordable, CD-Rewritable, DVD-ROM, DVD-Video.

Display devices – CRT displays – display adapter CGA, VGA SVGA- Resolutions (application oriented discussion)

Input /Output devices Keyboard, mouse, Electronic Pen, scanners, printers, dot matrix, ink jet, laser, Thermal printer, CCD Camera, Digital Camera.

$\mathbf{UNIT} - \mathbf{IV}$

Introduction to DTP, trends in printing technology, usage of computers in printing. DTP printing technology, Introduction to DTP softwares, Use of Text tool Adobe Photoshop, Corel Draw, Quark Express, DTP hardware, Cost estimation of DTP.

Working with graphics: using different graphic tools, importing graphics, working with colour, table editing. Electronic Image, BMP, TIFF, GIF, PNG, PDF, JPEG file formats. Image compression-Lossy and Lossless technique

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Recommended Books :

- 1. Hardware Bible : Winn IL RochTechmedia.
- 2. Desk Top Typography :Qukarkx Press
- 3. Page Maker 6.0 : BPB Publication.

PRINTING PROCESS - I LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

- 1. Identification of different tools & equipment used in letterpress.
- 2. Schematic diagram of different Printing Processes.
- 3. Printing of line & half tone block in single & multi color.
- 4. Operational and mechanical features of different letter press Printing Machines.
- 5. Study of Running & printing faults on letter press machine.
- 6. Identification of different printing processes.

PGP 112 PHYSICS-I LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

The experiments in Ist semester will be based mainly upon optics, electrostatics, wave and oscillations which are the parts of the theory syllabus of Ist semester.

- 1. To find the wavelength of sodium light by Newton's rings experiment.
- 2. To find the wavelength of sodium light by Fresnel's biprism experiment.
- 3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
- 4. To verify Newton's formula and hence to find the focal length of convex lens
- 5. To find the wavelength of sodium light by Michelson interferometer.
- 6. To find the resolving power of a telescope.
- 7. To find the specific rotation of sugar solution by using a polarimeter.
- 8. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.

RECOMMENDED BOOKS:

- 1. Advanced Practical Physics B.L. Worshnop and H.T. Flint (KPH)
- 2. Practical Physics S.L.Gupta&V.Kumar (PragatiPrakashan).
- 3. Advanced Practical Physics Vol.I& II Chauhan&Singh (PragatiPrakashan).

PGP 113 CHEMISTRY LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

- 1. Determination of Ca^{++} and Mg^{++} hardness of water using EDTA solution.
- 2. Determination of alkalinity of water sample.
- 3. Determination of dissolved oxygen (DO) in the given water sample.
- 4. To find the melting & eutectic point for two component system by using method of cooling curve.
- 5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
- 6. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
- 7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.

SUGGESTED BOOKS :

- 1. A Text Book on Experimental and Calculation Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
- 2. Essential of Experimental Engineering Chemistry, ShashiChawla, DhanpatRai Publishing Company.
- 3. Theory & Practice Applied Chemistry O.P. Virmani, A.K. Narula (New Age)

FUNDAMENTALS OF COMPUTER LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

- 1. Introduction to Computer Terminologies.
- 2. Use of different Hardware devices.
- 3. Word-Processing Softwares.
- 4. DTP and its features.
- 5. Softwares used in Printing.
- 6. Page set-up with different sizes and margins.
- 7. Different kinds of Scanners, their working and uses.
- 8. Image and Text merging.
- 9. Modifications and Editing of Illustrations and Text.
- 10. Working of Printers.

SCHEME OF STUDIES & EXAMINATIONS 2nd semester

B. Tech. (Printing, Graphic & Packaging)

Subje	Su	subject Title	Teaching				Credit	A	Duration			
ct Code	bj ec t ar ea		Schedule		S	Major Test	Mi nor Tes t	Pract ical	Total	of Exams(Hrs)		
			L	T	P	Ho urs /W eek						
PGP 201	PC	FUNDAMENT AL OF PACKAGING	4		0	4	4	60	40		100	3
PGP 202	HS	SCIENCE OF COMMUNICA TION	4		0	4	4	60	40		100	3
PGP 203	CS E	GRAPHICS	3		0	3	3	60	40		100	3
PGP 204	AS	PHYSICS - II	3		0	3	3	60	40		100	3
PGP 205	AS	MATHEMATIC S -I I	3		0	3	3	60	40		100	3
PGP 206	M E	ENGINEERING DRAWING	4		0	4	4	60	40		100	3
		LAB										
PGP 211	PC	FUNDAMENT ALS OF P ACKAGING			2	2	1		30	45	75	3
		(LAB)										
PGP 212	HS	SCIENCE OF COMMUNICA TION- LAB			2	2	1		30	45	75	3
PGP 213	CS E	GRAPHICS LAB			2	2	1		30	45	75	3
PGP 214	AS	PHYSICS-II LAB			2	2	1		30	45	75	3
		TOTAL			•		25/25	360	360			

FUNDAMENTALS OF PACKAGING

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 70 Internal: 30 Time Allowed: 3 Hrs. Marks: 100

Unit - I

Basics of Packaging:

Introduction, Function of a package, Factors influencing design of a package, Computer Aided Package Design, Packaging Cycle, Product Package Relationship, Product life curve, Elements of Package Design. Classification of Packaging - Flexible package type, Rigid package types. Hazards on package - Mechanical, Climatic, Biological and other hazards.Markings on package - Handling marks, routing marks, information marks. Tests on Package- Mechanical test - Drop test, Vibration test, Compression test, Inclined impact test, Rolling test, Climatic tests -Rain test, Sand and dust test, Salt spray test, Fungus resistance test. Shelf life, Cushioning Materials - Functions, properties. Classifications - space fillers, resilient cushioning materials, non-resilient cushioning materials.

Unit - II

Packaging Media:

Effect of moisture on wood, preservation of wood, advantages.Boards-types, paper-types. Glass properties, advantages, types, basic approaches to designing a bottle, thermal shock test, pressure test, impact test, density test. Plastics-BOPP, HDPE, LDPE, LLDPE, PVC, PP, PET, Polyolefin, Cellulosic, Polyimides, advantages, functions & applications.Tests on plastics, Metals - functions, uses. Aluminium foils - Manufacturing of foil, properties, applications, methods of laminating foil to film or paper.

Unit - III

Carton Production & Innovative Packaging Techniques/Processes:

Carton styles.Folding cartons - Production steps, types. Corrugated containers - classifications, components in a corrugated board, flutes, stages in preparation in corrugated boards. Plastic corrugated boards - features & advantages.

Gas packaging - MAP & CAP, Vacuum packaging, shrink packaging, stretch wrapping, blister packaging, skin packaging, strip packaging, Aerosol packaging container, working principle. Injection Blow Moulding, Extrusion blow Moulding, Extrusion. Injection Moulding, Compression moulding, Thermo forming. Vacuum forming, Pressure forming, Matched mould forming.

Unit -I V

Future Trends:

Futuristic trends in packaging. Advancements in food packaging.Environmental implications of packaging - recycling, Legal aspects in packaging.Designing-Cans, metal tubes, Plastic tubes. Closures-Screw caps, Snap-on caps, Plug closures, Lids, Threaded closures, Crowns. Adhesive tapes - Fabric tapes, Paper tapes, Film tapes, Foil tapes, Foam tapes, Two faced tapes. Labels - Basic elements of correct labelling, Purpose, Types. Ancillary Materials : Sealing tapes Strapping and strapping labels and labelling, Adhesives and packaging.

Recommended Books:

Packaging design and performance - Frank Paine

Advances in plastic packaging technology - John Briston.

Packaging design an introduction - Laszlo Roth.

Packaging Technology - Volume I, II, III - IIP

SCIENCE OF COMMUNICATION

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 70 Internal: 30 Time Allowed: 3 Hrs. Marks: 100

UNIT –I

Definition, Nature and Scope of Communication.

Function of Communication,

Elements and Process of Communication.

UNIT –II

Essentials in Language and Communication of good communication,

Barriers in Language and Communication.

UNIT –III

Forms of Communication: Verbal and Non verbal, Intra Personal, Interpersonal, Group Public and Mass Communication

UNIT –IV

Introduction to Print Media: News papers- Magazines Introduction to Electronic Media: Radio -Television Introduction to New Media: Interment and Mobile Telephony Convergence of Information, Communication and Telecom technologies.

GRAPHICS

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 3 Max. External: 70 Internal: 30 Time Allowed: 3 Hrs. Marks: 100

UNIT –I

Introduction to "Graphic Design" : What is design, Graphic design, printer's design.

Fundamentals of design : line, tone , value, weight, texture, shape, size, space, etc. Principles of design- balances, proportion, rhythm, unity, contrast, simplicity, fitness.

UNIT –II

Color theory: dimension of color, color schemes, color symbolism, emotional effects of color. Division of design: natural, conventional, decorative, geometrical and abstract.

UNIT –III

Type: Methods of type arrangement, classification of typeface of font designing.

Printing planning: rough layout, comprehensive, artwork, type of originals, sizing, mashing and cropping.

UNIT –IV

Design management: Definitions in advertising art, modern art abstract art, applied art, advertising, publicity, public relations, sale promotion, sales manager

Design with D.T.P.: Various softwares used for designing.

Recommended Books :-

- 1. The Designer's Handbook by Alistair Campbell
- 2. Design & Technology by Van No strand
- 3. Handbook of Advertising Art Production by schelmmer.
- 4. Art & Production by Sarkar.
- 5. Advertising, Art & Production by J. Nath.
- 6. A.C. Book (C.D.) so hick, Fundamental of copy and layout ,Crair Book.

PHYSICS-II

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 3 Max. External: 70 Internal: 30 Time Allowed: 3 Hrs. Marks: 100

UNIT-I

CRYSTAL STRUCTURE: Space Lattice, unit cell and translation vectors, Miller indices, simple crystal structure, Bonding in solids, Experimental X-ray diffraction method, Laue method, Powder Method, Point defects in solids, Elementary idea of quarks and gluons.

UNIT-II

QUANTUM PHYSICS: Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant, Group velocity and phase velocity, Schrodinger wave equations - time dependent and time independent Schrodinger equations, Elementary ideas of quantum statistics.

FREE ELECTION THEORY: Elements of classical free electron theory and its limitations, Drude's Theory of Conduction, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

UNIT-III

BAND THEORY OF SOLIDS: Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature. Hall effect and its Applications.

UNIT-IV

PHOTOCONDUCTIVITY AND PHOTOVOLTAICS: Photoconductivity in insulating crystals, variation with illumination, effect of traps, applications of photoconductivity, photovoltaic cells and their characteristics.

MAGNETIC PROPERTIES OF SOLIDS: Atomic magnetic moments, orbital diamagnetism, Classical theory of paramagnetism, ferro magnetism - molecular fields and domains.

SUPER CONDUCTIVITY: Introduction (experimental survey), Meissner effect, London equation.

TEXT BOOKS:

- 1. Introduction to Solid State Physics (VII Ed.) Charles Kittel (John Wiley).
- 2. Quantum Mechanics Powell and Crasemann (Oxford & IBH)
- 3. Fundamentals of Solid State Physics B.S.Saxena, R.C.Gupta and P.N.Saxena (PragatiPrakashan).

REFERENCE BOOKS:

- 1. Sold State Physics Pillai (New Age).
- 2. A text book of Engg. Physics Avadhanulu and Kshirsagar (S.Chand)
- 3. Quantum Mechanics Ghatak&Loknathan.

MATHEMATICS-II

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 3 Max. External: 70 Internal: 30 Time Allowed: 3 Hrs., Marks: 100

<u>UNIT-I</u>

<u>Matrices & its Applications</u> : Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and in dependence of vectors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley - Hamilton theorem and its applications.

<u>UNIT-II</u>

<u>Ordinary Differential Equations & its Applications</u> : Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legender's linear equations, simultaneous linear equations with constant co-efficient. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

<u>UNIT-III</u>

<u>Laplace Transforms and its Applications</u> : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivaties, transforms of integrals, multiplication by t^n , division by t. Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

UNIT-IV

<u>Partial Differential Equations and Its Applications</u> : Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

REFERENCE BOOKS :

- 1. Differential Equations H.T.H. Piaggio.
- 2. Elements of Partial Differential Equations I.N. Sneddon.
- 3. Advanced Engineering Mathematics R.K. Jain, S.R.K.Iyengar.

PGP206 ENGINEERING DRAWING

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 70 Internal: 30 Time Allowed: 3 Hrs., Marks: 100

Unit I

Introduction to Engineering Graphics and Drawing

Importance of engineering graphics and drawing, introduction to drawing instruments, types of lines, dimensioning, lettering, types of projections, theory of orthographic projections, first angle and third angle projections, projection of points.

Unit II

Projection of Lines and Planes

Projection of lines parallel to one or both planes, contained by one or both planes, perpendicular to a plane, inclined to one and parallel to the other, inclined to both the planes, true length of the line and its inclinations to the reference planes, Traces of line.

Introduction, types of planes, Projection of planes by change of position method only, projection of plane perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane and inclined to the other plane

Unit III

Projection of Solids and Their Development

Types of solids, polyhedra and solids of revolution, projection of solids with axis perpendicular to a plane(Solids in simple position), axis parallel to both the planes, axis parallel to one and inclined to the other

Development of surface of various simple solids such as cubes, cylinders, prisms, pyramids etc.

Unit IV

Isometric Projection

Introduction, isometric scale, Isometric views of plane figures, prisms, pyramids and cylinders. Orthographic drawings of Bolts and Nuts, Bolted Joints, Screw threads.

Reference Books

- 1. Engineering Graphics using AUTOCAD 2000, T. Jeyapoovan, First Edition 2002, Vikas publishing House.
- 2. Engineering Drawing : Plane and Solid Geometry : N.D. Bhatt and V.M.Panchal, Forty-Fourth Edition 2002, Charotar Publishing House.
- 3. Engineering Graphics and Drafting : P.S. Gill, Millennium Edition, S.K. Kataria and Sons.
- 4. A Text Book of Engineering Drawing : S.B. Mathur, Second Revised and Enlarged Edition 2000, Vikas Publishing House.
 - 5. A Primer on Computer aided Engineering Drawing-2006, published by VTU, Belgaum

PGP211 FUNDAMENTALS OF PACKAGING (LAB)

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs.,Marks: 75

LIST OF EXPERIMENTS

- 1. Designing and preparation of various flexible packages.
- 2. Designing and preparation of various rigid packages.
- 3. Preparation of Jigged die & unit die for a package design.
- 4. Study and operation of various packaging machines.
- 5. Manufacturing of various types of corrugated boards.
- 6. Cutting, creasing and building up corrugated boxes.
- 7. Designing & preparation of various designs of paper bags.
- 8. Testing of raw materials like wood, paper, plastic.
- 9. Test conducted on Cartons, Corrugated packages, wooden packages.
- 10. Drop test, Vibrationtest, Inclined impact test, Compression test.

PGP212

SCIENCE OF COMMUNICATION LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs.,Marks: 75

LIST OF EXPERIMENTS

1. Public speeches

- 2. Power point presentations
- 3. Group discussions
- 4. Interviews
- 5 .Designing poster

6. Designing pamphlets

GRAPHICS LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. ,Marks: 75

LIST OF EXPERIMENTS

- 1. Stationary and small scales literature.
- 2. Folders -
- 3. Sticker
- 4. Label designing
- 5. Introduction to computers, various softwares used for designing purpose Demonstration (Manipulation of same design)
- 6. Logo designing
- 7. Color wheel
- 8. Designing of visiting card. Letterhead, Envelop, Bill form, Receipt, Invitation card, Posters, Title page of a Book, Magazine Cover page.

PHYSICS-II LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs.

Marks: 75 LIST OF EXPERIMENTS

The experiments in Second semester will be based upon electricity, Magnetism, Modern Physics and Solid State Physics, which are the parts of theory syllabus.

- 1. To study He Ne laser
- 2. Tofind the frequency of ultrasonic waves by piezoeletric methods
- 3. To find the value of e/m for electrons by Helical method.
- 4. To find the ionisation potential of Argon/Mercury using a thyratron tube.
- 5. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
- 6. To find the band gap of intrinsic semi-conductor using four probe method.
- 7. To calculate the hysteresis loss by tracing a B-H curve.

RECOMMENDED BOOKS :

- 1. Advanced Practical Physics B.L. Worshnop and H.T. Flint (KPH)
- 2. Practical Physics S.L. Gupta & V. Kumar (PragatiPrakashan).
- 3. Advanced Practical Physics Vol. I & II Chauhan& Singh (PragatiPrakashan).

SCHEME OF STUDIES & EXAMINATIONS B. Tech. (Printing, Graphic & Packaging) 3rd Sem

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		Total			25/ 25	360	360			

TYPOGRAPHY & TYPESETTING

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Unit - I

Typography - definition, concept and scope

Printing type - TwoDimensional and Three-Dimensional structure their characteristics.Printers Measurement and Systems: Point System, other units of measurements and application. Design features and principles of printing types, fundamental and finishing strokes of types.

Unit – II

- . Classification of printing types based on serifs, point sizes, cases, faces, series, families etc.Type font and sorts, principles of size and design identification.
- . Suitability of different types for different processes and publications.
- . Type setting Calculations relating to type sizes and dimensions of printing pages.

Unit – III

- Work and role of the type-setting department with in a printing press. Photo Type setting. House Style, Good and bad copy; casting off; methods of copy mark-up and copy preparation procedures, Proofing and Proofing Reader's marks; word breaks; proofing stages.
 - Composing Tools and Equipment, Basic composing tools for hand composition, spacing material; locking- up devices; proofing presses, kinds of rules.

Unit –IV

Imposition, Sheet work, Half-sheet work, Work and tumble & Work and twist. The regular schemes up to 32 pages (upright and landscape).

Planning of composition department, Floor plan and arrangement of equipment.

Paper and its calculation.

Recommended Books :

1	Theory & practice of composition -	By A.C. Goel
2	Composing &typographny Today -	By B.D. Mehandirutta.
3.	Letter Press Printing Part I, II -	By C.S. Mishra
4.	Printing Technology	By Adams,Faux,Riber
5.	Art & Production	By N.N. Sarka

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PACKAGING MACHINERY LOGISTIC AND REGULATIONS

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100 Iking two from each unit. The students are

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

<u>Unit-I</u>

Packaging Machinery

Study of special packages and machines for Aerosols, easy opening device, carry home packs, Strip, Shrink, Blister, Skin, Stretch

packaging, Cartons, pouch, Controlled Atmosphere(CAP), Modified Atmosphere(MAP) and Aseptic packaging system

Filling of Dry and Liquid Products, Filling of carbonated , Liquids and other Packaging techniques, Labeling and Thermoforming.

<u>Unit-II</u>

Packaging Laws and Regulations

Standards and standardization, Quality Standards

Standards for packaging material - rigid, non-rigid, and ancillary material.

Standards for export packages-labeling and marketing regulations.

Packaging quality control criteria.

Sampling, variables and attributes, AQL

Implication of ISO-9000.

Eco packaging and regulation.

Recycling and disposal of packaging waste.

Packaging Laws and regulations- legal requirements

Weights and measure/ Packaged Commodities Act and Regulations

Prevention of Food Adulteration (PFA) Act

FPO, FDA Rules and other related regulations

UN certificate code for packaging of Dangerous goods

<u>Unit-III</u>

Advance Package Printing

Advance Printing Processes used in special products and its packaging, Advance non impact printing technique for printing on

regular as well as irregular shape packages. Composition of printing and ink transfer media, use of special papers and inks, Securityapplications, Holography and hologram stickers.

<u>Unit-IV</u>

Logistics and Physical Distribution

Physical distribution and material handling methods.

Handling and transportation.

Unit load system.

Palletisation: Skids and pallets – Principles, construction and application.

Conveyer: Loading and unloading and other mechanical handling application.

Recommended Books:

Packaging design and performance - Frank Paine

Advances in plastic packaging technology - John Briston.

Packaging design an introduction - Laszlo Roth.

Packaging Technology - Volume I, II, III - IIP

IMAGE DESIGN

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit - I

Introduction:

Importance of a good design. Impact of a design on various target audience. Relationship between design and sale of a product. Graphic designer and his role. Elements and Principles of design.

Basic design and letter forms:

Visual ingredients of graphic design, point, line, graphic space, shape, texture, color, scale, balance and contrast. Use of computers in designing. Introduction to some designing softwares. Suitability of a design for printing technique and paper surface. Legibility and readability, Monograms and trademarks.

Unit - II

Images in design:

The relationship between type, illustration and Photography. Types of images. Selection and assessment of originals, photographs, sketches, paintings. Factors to be considered for preparation of a design.

Design management:

Relationship of a design studio with production and sales departments of a press. Control and checking of artwork at all stages, employment of free-lance artists, designers and photographers. The advertising agency, its structure and its services.

Unit - III

Design process:

Methods of preparing a design in various stages. Design for books, magazines, newspapers, catalogues, cartons and commercial stationery. Materials and tools used in preparing layouts and artwork. Copy preparation. Casting-off and marking-up.

Unit - IV

Production planning:

Selection and co-ordination of production processes. Consideration of composition methods. Limitations of binding, finishing and ancillary processes affecting design. Selection and specification of ink, paper and other materials in relation to design specifications and to the production process.

Reference Books :

Fundamentals of Copy & Layout - A. C. Book(Ac) Sohick(Cd)

Production for the Graphic Designer. – Craig.

How to brief designs & buy print. - Muray(Ray).

Lithographic Press Work. - A. S. Porter.

Principle of CAD.- Rooney J. & Steadman P.

Advertisement Management. - David A. Akar& John G. Myers.

Elements of Cartography. - Arthur Robinson, Randall Sale & J. K. Morrison.

Analysis of Electronic Circuit - Jal Baker.

Copy Preparation. - Leon O Chus& Pen Min Lin C. A.

DIGITAL ELECTRONICS

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT-I

Introduction to digital electronics in the field of printing.

Logic Gates and Boolean Algebra:

Boolean constant and variable, OR, AND, NOT, NAND, and NOR gates, truth tables, Boolean expressions, Boolean algebra. De Morgan's theorems.Realisation of Boolean expressions using universal gates.

Combinational Logic Circuits:

Simplification of Boolean expression and realization using logic gates, sum of products and product of sums, Karnaugh map & variable, minimization of Boolean expressions using Karnaugh map, don't care conditions, variable entered mapping, minimization using variable entered maps.

UNIT-II

Numbering Systems & Binary Arithmetic:

Introduction. Symbolic number systems, Positional number system, Integer Binary numbers -Binary digital computers, Binary number system, Conversions between decimal and binary numbers, Hexadecimal numbers, Conversion between Hexadecimal, Binary & Decimal numbers. Fractional binary numbers - Converting binary fractions to decimal, Converting Hexadecimal

fractions to decimal, Converting decimal fractions to Binary and Hexadecimal. Number System Notation.Binary Addition andSubtraction - Signed binary numbers,Complementary numbers, Two's complement mathematics. Binary multiplication & division. Binary codes - Character codes, Numeric codes, other binary codes, Error correction & detection codes.

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UNIT-III

Arithmetic & Data Processing Circuits:

EXOR and EXNOR gates, half adder, full adder, full subtractor, adder-subtractor, look ahead and carry.Multiplexers, demultiplexers, decoders, BCD to decimal decoder, seven segment decoder, encoders, decimal to BCD encoder,

parity generators and checkers.

Flip-Flops & Sequential Logic Circuits:

NAND gate latch, NOR gate latch, SR flip-flop, D flip-flop, JK flip-flop and T flip-flop, clocked flipflops, edge-triggered flip-flops,

flip-flop conversions.Comparison between combinational and sequential logic circuits, shift registers, SISO,SIPO, PISO and PIPO shift registers,

ring counter, Jhonson counter.

UNIT-IV

Counters, D/A and A/D Converters:

Ripple counters, up counter, down counter, up-down counter, synchronous counters, mod number, mod-3, mod-5 and mod-10 counters, shift counters.

Variable-Resistor network, binary ladder, D/A converter. D/A accuracy and resolution, A/D converters- simultaneous conversion,

counter method, continuous conversion, successive approximation method, single slope and dual slope A/D converters. Digital Camera and Digital Scanner.

Recommended Books :

- 1. Digital Electronics Malvino.
- 2. Digital Electronics Gothman.
- 3. Digital Principles and Applications Donald P Leach, Albert Paul Malvino.
- 4. Digital Systems-Principles and Applications Ronald J.Tocci.
- 5. Digital Fundamentals Floyd.
- 6. An Engineering approach to digital design Fletcher.

Reproduction Technology

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

UNIT – I

Basic principles of reproduction photography: line photography; Basic density range of line original Basic line exposure for computerized camera with on-line or off-line densitometer, equipments and accessories.

Contact photography – Spreads and chokes, Line separation from black and white art work, Evaluation of line negative.

UNIT – II

Halftone photography – Introduction to the concepts, Theories of dot formation, Selection of screen ruling, Introduction to different halftone screens, glass screen (brief study), contact screens – Grey and magenta Contact screen manufacture, Density gradient of contact screens, Negative, Positive, standard or universal contact screen. Pre-screened emulsion.

Half tone exposure: Special features of half tone exposure. Factors affecting the halftone exposure. Basic halftone exposure setting on ordinary and computerized camera with off-line and on-line densitometer.

Unit-III

Contrast control: Contrast with glass screen: S.D. variation, multiple stop system (brief study) Contrast control with contact screens Determining B.D.R. and main exposure of the contact screen, Highlight compensation, Use of CC filters with magenta contact screen determining CC filters and exposure calculations.

Auxiliary or supplementary exposures: Contrast control with supplementary exposures. Flash exposure-Deciding the basic flash exposure, for contact screens Exposure calculations. No screen exposure-calculations.

Line and halftone combination, Evaluation of halftone negative.

Unit-IV

Color Reproduction: Definition and concepts Introduction to Corpuscular and Wave nature of light. The visual spectrum, Additive Synthesis and subtractive synthesis, Additive and subtractive combination for graphic for reproduction and practical interpretation of color-theories.

Mechanism of vision and theory of color-vision, colorimetric Properties, Color and appearance measurement. Introduction to Colorimeter and Spectrometer.

Recommended Books:

Line photography- Karl Davis Robinson Halftone Photography – Erwin Jaffe Small Offset Preparation & Process- Les Crawhurst Printing Technology- Adams, Faux, Rieber. Reproduction Systems- V.S. Raman Digital Photography- Anthony Hamber, Phill Green.

306 SHEET FED OFFSET TECHNOLOGY-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Unit – I

Basic principles in planographic printing:

Offset Printing Process – History, Principle, Advantages, Limitations, Types and their uses, Press configurations. Auxiliary various elements.

Unit - II

Infeed unit -

Pile Table, Pile Height, Air Blast Nozzles, Suckers - forwarding pickup sucker & pickup suckers, Separator - brushes & fingers. Types of feed board sheet control devices - conveyor assemblies, conveyor tape, hold down rods. Sheet feeding types – According to Sheet separation system friction, pneumatic. According to forwarding system - successive sheet feeder, stream feeder. Sheet register - Front lay & Side lay. Double Sheet detectors - mechanical types, electrical types, Early and late sheet detectors.

Unit - III

Inking system:

Function of inking system, Parts of inking system- Fountain section, Distribution section, Form roller section. Types of inking system – Central drum system with four form rollers, Central drum system with three form rollers, Multi roll system, Underneath inking system, Drum inking system Roller setting-Setting form roller to oscillator, setting form roller to plate, setting the duct roller. Roller covering. Roller maintenance - roller removal, replacement, roller storage, roller hardness.

Unit - IV

Dampening system:

Function of dampening system, Types of dampening system- Conventional dampening system, Continuous flow dampening system, Brush system for metering. Air knife dampening system. Fountain solution and its components. pH of dampening solution. Conductivity of dampening system. Damper setting. Roller covers - molleton fabric cover, stockinette cover, paper damper cover, synthetic damper cover. Damper cleaning machine.

Recommended Books :-

Manual For Lithographic Press Operation - A. S. Porter

Modern Lithography Introduction to Printing Technology - Hugh M Speirs.

Sheetfed Press Operation-GATF.

Offset Technology – C.S.Mishra.

Lithographers Manual Lithographic Technology - Erwin A Dennis, OlusegunOdesina
TYPOGRAPHY & TYPESETTING LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

- 1. Block Lettering & Numbering (Normal Types).
- 2. Italics Types (75 Degree Angle) Lettering & Numbering.
- 3. Four-line Principle (Drawing).
- 4. Physical (Features) parts of the type (Structural Diagram).
- 5. Fundamental strokes.
- 6. Finishing strokes & their identification.
- 7. Introduction to various fonts & their drawing characteristics.
- 8. Newspaper/Magazine clippings of different point sizes.

(Paste them on Practical Note-book & draw the same).

- 9. Draw different cases, faces, series & families etc.
- 10. Draw types with different X heights, contrasts, serifs, Beak & Terminals

312

PACKAGING MACHINERY LOGISTIC AND REGULATIONS

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

- 1. Operation and study of Aerosol, Strip, Blister, Packaging
- 2. Operations of the filling dry and liquid products.
- 3. Study of the recycling and disposal of packaging waste
- 4. Preparation of the regular as level as irregular shop packages
- 5. Study of how to print the holography and photograph strikers
- 6. Study the palletisation
- 7. Study of the loading and unloading process of the package

313

Image Reproduction Technology- LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

- 1. Setting of camera.
- 2. Line negative and positive preparation
- 3. Halftone negative and positive preparation
- 4. Bromide positive preparations.
- 5. Exposing difficult line originals, Use of filters
- 6. Finding B.D.R. and main exposure time of contact screen .
- 7. S.D. calculations and S.D. setting and contrast control with glass screen
- 8. Study of densitometer .

314

SHEET FED OFFSET TECHNOLOGY-I LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

- 1. Study of various controls and operations.
- 2. Study of the various mechanisms.
- 3. Study of the lubrication system.
- 4. Setting the feeder, feed board, lays and delivery.
- 5. Setting the water and ink rollers and fixing the plate.
- 6. Single colour printing.
- 7. Identification of printing faults in the given samples-reasons and remedial actions.
- 8. Mixing of process inks to the shade for a given colour patch-effect of paper and ink filmthickness.

SCHEME OF STUDIES & EXAMINATIONS 4th semester

B. Tech. (Printing, Graphic & Packaging)

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PGP	PC	PRINTERS	4		0	4	4	60	40		100	3
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PGP	PC	SHEET FED	4		0	4	4	60	40		100	3
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403		PRINTING										
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PGP	CS	COMPUTER	3		0	3	3	60	40		100	3
406	E	GRAPHICS			Ũ	C						
		LAB										
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411		OFFSET			_	-						
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412		RING										
		LAB										
PGP	AS	ELECTRICAL			2	2	1		30	45	75	3
413		PRINTING										
		MACHINES										
		LAB										
PGP	20	COMPUTER			2	2	1		30	45	75	3
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PACKAGING MATERIALS TECHNOLOGY

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit-I

Introduction to Packaging:Introduction, Components, Permeability, Mechanisms of Spoilage, Corrosion and Prevention of Corrosion, Package Evaluation, Ecological Aspects, Bar-Coding Application in Packaging.

Paper & Board Packaging:Cellulosic Materials, Processes in Cellulose Industries, Paper and Board Manufacture, Testing of Cellulose and Paper Materials, Specialty Papers Folding Cartons, Multiwall Paper Sacks, Composite Containers.

Unit-II

Fiberboard and Glass Technology:Fiberboard Cartons, Drugs, Glass Containers : Manufacture, Properties, Applications and Testing

Plastics Technology:Polymer Chemistry, Classification of Polymers, Properties, Processing of Plastics, Special Plastics and Their applications. Seals, Coatings, Laminates, Adhesives, Reinforcements

Unit-III

Metal containers:Metal containers : Tins, Cans, Formed Containers, Steel Drums.CushioningMechanism, Fragility Assessment, Cushion Design, Testing, Wooden Containers, Textile bags, Containerization and Cargo Marking.

Foods, Pharmaceuticals, Cosmetics & Chemicals: Introduction to Food Preservation/ Packaging Technology, Method of storage, Packaging of foods, Pharmaceuticals, Cosmetics and Chemicals.Filling of Dry and Liquid Products, Filling of Carbonated Liquids and other Packaging Techniques, Cartoning, Labeling, Thermoforming.

Unit-IV

Acts and Regulations :Loss Prevention, Weights and Measures Act/ Packaged Commodities Act, Eco Regulations, Recyclability of Packaging Media and Technologies, Pollution Control, FPO, PFA, FDA, Rules and Regulations, ISO-9000.

Moulds and Tooling : Introduction to Design of Moulds and Tooling: Injection Moulds, Blow Moulds, Extrusion dies, Product Design, Designing for Packaging Application

References:

- 1. Packaging design and performance Frank Paine.
- 2. Advances in Plastic Packaging Technology John Bristool
- 3. Packaging Design an Introduction Laszlo Roth
- 4. Packaging Technology Vol. I, II, III IIP

PRINTER SCIENCE

402

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit -I

Colloids :

Characteristics, Proportion, application in Printing Industry.

Theory of Electro deposition, Printing equipments, factors affecting nature of Electrodeposits, chromium Plating, Anodizing of metal.

Introduction to Organic compounds, Carbon compound, Aromatic compound Diazo compound, Organic Solvents with specific name used in printing Science mainly.

Unit -II

Humidity - Relative humidity, measurement, control by air conditioning.

Surface characteristics in printing - Surface tension, contact angles, capillary action, interfacial tension, measurement of contact angle, Hydrochloric and hydrophilic surface, water and ink interaction.

pH : pH colorimetric method of determining pH; method of determining pH, pH of paper, ink, pH application in Printing.

Unit –III

VISCOSITYViscosity and coefficient of viscosity - streamline and turbulent flow -Reynold's number - Poiseuille's equation - Stoke's law and terminal velocity experimental determination of n Basic visco-elasticity - effect of temperature measurement - visco-elastic flow - Newtonian and non-Newtonian fluids. Basic physical principles of ink-jet printer - ink droplet - ink gun (principles).

Photometry -

Introduction, solid angle, definitions of luminous flux, luminous intensity, illumination power, intensity of illumination of a surface, brightness or luminance of a surface, laws of

illumination - inverse square law and Lambert's cosine law, types of photometers, photovoltaic photometer.

Unit -IV

Optical Instruments –

- Photographic cameras, Depth of Focus, Telephoto Lens, Visual Angle, Angular Magnification, Magnifying Glass, Simple Microscope, Reflection, Transmission, Opacity, Density, Introduction to Densitometer and its types.
- . **Effect of light :** different plate and film coatings, adhesives & Ink -films, Light fastness and print characteristics.
- . Introduction and brief study of process cameras, contact printer and safe light and process chemicals.

RECOMMENDED BOOKS :

- 1. Optics by BrijLal and Subrahmaniam
- 2. Optics by Ajay Ghatak
- 3. Engineering Chemistry by Jain and Jain

403 SHEET FED OFFSET TECHNOLOGY-II

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit - I

Delivery unit-

Gripper Types - spring gripper, pin type gripper, compression spring, tension spring. tumbler gripper, rotary gripper. Sheet transfer section - chain transfer, single drum transfer, three drum transfer. Skeleton Wheels. Sheet de curler. Sheet guiding device blow downs. Slow down mechanisms. Anti set-off spray equipments. Metered powder supply. Extended deep pile delivery & Continuous delivery. Electrostatic system.

Unit - II

Printing unit:

Introduction. Cylinder gears - spur gear, helical gear, bevel gear. Plate cylinder design - cylinder driving, cylinder body, cylinder gap, plate clamping, plate punching & mounting, bearer contact cylinder, bearer gap cylinder. Determining packing requirements, Packing material, problems due to improper packing. Blanket cylinder - Introduction, functions, manufacture, Types of blanket. Blanket squaring. Blanket punching & mounting, Recovering from blanket smash. Use of slightly damaged blanket. Care of blanket, blanket cleaning device. Impression cylinder.

Unit - III

Process of printing operation:

Pre make ready, & make ready operations, inspection of press sheets, control of press function during press run - maintaining the inking system, maintaining the dampening system, the feeder, the delivery. Colour sequence in two colour and multicolour operations. Printability &runnability. Wet-on-wet printing & Wet-on-dry printing. Direct imaging presses. Quality control during the press run - Densitometry, colour control bars, press room lighting and standard viewing conditions, plate scanner. Printing unit problems. Proofing and its requirement.

Unit - IV

Requirements and Needs Of Machine Room Conditions:

Machine room temperature ,Relative humidity, Sources of light ,ventilation, Space, and other requirements

Recommended Books :-

Manual For Lithographic Press Operation - A. S. Porter

Modern Lithography Introduction to Printing Technology - Hugh M Speirs.

Sheetfed Press Operation-GATF.

Offset Technology – C.S.Mishra.

Lithographers Manual Lithographic Technology -

Erwin A Dennis, OlusegunOdesina.

404

MANUFACTURING PROCESS

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit-I

Introduction: Introduction to Manufacturing Processes and their Classification. Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, First Aid.

Engineering Materials: General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron.

Unit-II

Foundry: Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern Allowances, Risers, Runners, Gates, Moulding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies.

Unit-III

Cold Working (Sheet Metal Work): Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining Advantages and Limitations.

Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing. Plant Layout, Objectives of Layout, Types of Plant Layout and their Advantages.

Unit-IV

Introduction to Machine Tools: Specifications and Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear. Mechanics of Chips Formations, Type of Chips, Use of Coolants in machining.

Welding: Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding; Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing.

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REFERENCE BOOKS:

- 1. Workshop Technology Vol. I &II Hazra&Chaudhary, Asian Book Comp., New Delhi.
- 2. Process and Materials of Manufacture-Lindberg, R.A. Prentice Hall of India, New Delhi.
- 3. Principles of Manufacturing Materials and Processes- Campbell, J.S.- McGraw- Hill.
- 4. Manufacturing Science-AmitabhaGhosh& Ashok Kumar Malik, East-West Press.
- 5. Manufacturing Process and Systems Ostwald, Munoz , John Wiley.
- 6. Workshop Technology, Vol. 1, 2 & 3 Chapman, WAJ, Edward Arnold.

ELECTRICAL SYSTEMS IN PRINTING MACHINES

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

UNIT I

D.C. Circuits: Ohm's Law, junction & node, circuit elements classification, KVL, KCL, Loop analysis of resistive circuit in the context of dc voltages & currents, Node-voltage analysis of resistive circuit in the context of dc voltages & currents.Star-Delta transformation for set of pure resistors.

.A.C. Circuits: Behavior of various components fed by A.C. source. (steady state response of pure R, pure L, pure C, RL, RC, RLC series with waveforms of instantaneous voltage, current & power on simultaneous real axis scale and corresponding phasor diagrams), P.F. active, reactive & apparent power.

Unit-II

Balanced Three Phase Systems: Necessity & advantage of three phase system, mode of generation of 3 phase supply. Phase and line voltages & currents, power. Measurement of 3-phase power by two wattmeter method for star & delta connected balanced loads including phasor diagrams at various power factors.

Electromagnetism & Magnetic circuits: Laws of EMI, statically & dynamically induced emf, self & mutual induction, RH Screw rule, Fleming's RH & LH rules. MMF, Relation between magnetic flux, m.m.f. and reluctance, Hysteresis & Eddy current losses & their minimization

Single Phase Transformer: Principle, construction &emf equation. Phasor diagram for ideal case and at no load. Winding resistance & leakage reactance. Losses & Efficiency, condition of maximum efficiency, regulation. Concept of auto transformer.

Unit-III

D.C. Machines: Principle, general construction & working. Split ring /Commutator working in DC generator & motor, generated emf equation, Torque Equation. Types of DC Machines, speed control of DC Shunt motor.
A.C. Machines: Single Phase Induction Motor, 3-phase Induction motor: Concept of rotating magnetic field, principle, types, general construction and working. Concept of slip & its significance.

Unit-IV

Special Machines: Stepper Motor, Servomotor, Universal Motorand their construction, principles and applications **Illumination:** Definition –Laws of Illumination, Lamps: Incandescent Lamp, Sodium Vapour Lamp, Fluorescent Lamp, CFL and LED. Requirement of Good Lighting Scheme – Types, Design and Calculation of Illumination

Text:

1. Basic Electrical Engg: A complete Solution by Vijay Kumar Garg, Wiley India Ltd.

2. Electrical Engg. Fundamentals by Rajendra Prasad, PHI Pub.

Reference:

1. Basic Electrical Engg.by S.K. Sahdev, Pearson Education

2. Basic Electrical Engg. By PV Prasad, Sivangaraju, Cengage Learning Pub.

3. Electrical Engg. Fundamentals: by Bobrow, Oxford Univ. Press

4. Basic Electrical Engg. By Kulshreshtha, McGraw Hill Pub.

406

COMPUTER GRAPHICS

Total Credit: 4 Max. External: 60 Internal: 40 Time Allowed: 3 Hrs. Marks: 100 Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

UNIT-1

Basic Concept:

Introduction, The origin of computer graphics, Working of interactive - graphics display, New display devices, General purpose graphics software, The user-interface, Display of solid objects, Line drawing displays - Display devices and controllers, Display devices,

UNIT-II

The CRT-

Electron guns, Deflection system, Phosphors, Beam penetration CRT, Shadow mask CRT. Inherentmemory, devices - Direct view storage tube, Plasma panel, Laser-scan display, The storage-tube display, The refresh line - drawing display. Two dimensional transformations, Transformation principles, CAD, Animation, Simulation. Techniques for achieving realism

UNIT-III

Fundamental concepts of digital image processing - introduction, objectives, visual perception - structure of human eye, image formation in the eye, brightness adaptation and discrimination.Digital image representation, basic steps of image processing, elements of image processing system - image acquisition, storage, processing, communication, display.

UNIT-IV

Fundamental concepts of digital image processing - introduction, objectives, visual perception - structure of human eye, image formation in the eye, brightness adaptation and discrimination.

Recommended Books:

Computer graphics principles & practice 2nd edition - Van Dam, Foley, Fiener Hughes.

Principle of Interactive Computer Graphics 2nd edition - William N. Newman, Robert S.Sproull.

Computer graphics - Hearn & Backer.

Procedural elements for computer graphics - David F. Rogers. Digital imaging techniques (Block I)

Digital Imaging techniques (Block II)

Digital image processing - Gonzalez, Woods, Chanda,

Digital image processing and analysis -Majumdar

Digital image processing and computing- Schalkoff

411 SHEET FED OFFSET TECHNOLOGY (LAB)-II

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

LIST OF EXPERIMENTS

- 1. Two colour printing.
- 2. Four colour printing.
- 3. Study of densitometer used in color correction..
- 4. Effect of impression pressure on print quality-use of feeder gauge.
- 5. Effect on colour sequence on print quality-transparency and opacity of inks.
- 6. Ink trapping and back trapping- effect of tack, printing speed, ink film thickness.
- 7. Printing a second colour on a printed sheet problems involved and overcoming them, adjustment of lays, change of packing etc.

412 MANUFATURING PROCESS (LAB)

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

- 1. To study different types of measuring tools used in metrology and determine least counts of verniercalipers, micrometers and vernier height gauges.
- 2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)
- 3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
- 4. To study different types of fitting tools and marking tools used in fitting practice.
- 5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
- 6. To prepare joints for welding suitable for butt welding and lap welding.
- 7. To perform pipe welding.

- 8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
- 9. To prepare simple engineering components/ shapes by forging.
- 10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.

413

ELECTRICAL SYSTEMS IN PRINTING MACHINES- LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

- 1. To study constructional parts of DC Machines.
- 2. To study magnetization characteristics of DC Generator.
- 3. To study speed control of DC motor by armature control method and field control method.
- 4. To measure three phase power by two watt meter method.
- 5. To study constructional parts of three phase induction motor.
- 6. To study torque –slip characteristics of three phase induction motor.
- 7. To study various types electric welding.

COMPUTER GRAPHICS LAB

Total Credit: 1 Max. External: 45 Internal: 30 Time Allowed: 3 Hrs. Marks: 75

- 1. Introduction to computer graphics, scope and limitations.
- 2. CorelDraw, different facilities available, working in CorelDraw environment.
- 3. Introduction to illustrator-simple lines, stylish lines, drawing and filling of images, gradation tools, blenders pattern with a difference, filling rectangular and non rectangular shapes of pallets and colour, system matrices, justifying text and application of path finder's.
- 4. Introduction to Photoshop-how you can differentiate it from illustrator, different types of the formats, their compatibility to different software, introduction of tool box, uses of different filters, masking and working on images, creating a presentation using software.
- 5. Quark express: PageMaker up, formatting and editing in the software.
- 6. Flash: Introduction of 2-D animations, study of tool box, menu bar, how you can use them in your industry, how you can create different effects like moving on selected path, masking of images etc

STUDIES & EXAMINATIONS 5thsemester

B. Tech. (Printing, Graphic & Packaging)

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502		TECHNOLOG									
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512		OFFSET									
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SCHEME OF STUDIES & EXAMINATIONS 6th semester

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PGP	PC.	SECURITY AND	4		0	4	4	60	40		100	3
602		STATIONARY			0			00	10		100	0
DCD	DC	PRINTING Food Packaging	2		0	3	3	60	40		100	3
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PGP	PC	NEWSPAPER	4		0	4	4	60	40		100	3
604		PUBLISHING			-							
PGP		a. SALES AND	3		0	3	3	60	40		100	3
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		C)PLANNING										
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PGP	PC	COSTING AND	3		0	3	3	60	40		100	3
606		ESTIMATING										
		LAB										
PGP	PC	PRINTING			2	2	1		30	45	75	3
611		LAB										
PGP		ELECTRONIC			2	2	1		30	45	75	3
612		LAB										
PGP	PC	Newspaper			2	2	1		30	45	75	3
613		Publishing										
PGP	PC	SECURITY AND			2	2	1		30	45	75	3
614		PRINTINGLAB										
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B. Tech. (Printing, Graphic & Packaging)

A Special Paper of Environment Studies will be the part of 6th semester curriculum

SCHEME OF STUDIES & EXAMINATIONS 7th semester

B. Tech. (Printing, Graphic & Packaging)

Subje	Su	subject	Te	achi	ng	Cre	Allotr	nents c		Duration	
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PGP	PC	GRAVURE	3	0) 3	3	60	40		100	3
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705	10	FINISHING	5		, ,	5	00	40		100	5
DCD	DC		2	0	2	2	60	40		100	2
706	FC	CONTROL IN	3		5	3	00	40		100	5
700		PRINTING &									
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PGP	PC	TECHNOLOG		4	2	1		30	45	75	3
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		LAB									-
PGP	PC	PRINTING		2	2 2	1		30	45	75	3
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		LAB									
PGP	PC	FINISHING		2	2 2	1		30	45	75	3
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714											
		PACKAGING									
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		Total				25/	360	360			
						25					

SCHEME OF STUDIES & EXAMINATIONS 8th semester

B. Tech. (Printing, Graphic & Packaging)

Subje	Su	subject	Те	achi	ng	Cre	cre Allotments of Marks				Duration
ct	bj	Title	Sc	hedu	ıle	dits	Maj	Min	Pract	Total	of
Code	ec						or	or	ical		Exams(Hrs
	t						Test	Test)
	ar										
	ea										
			L	ΤP	Hour						
					s/We						
					ek						
PGP	PC	PRINTING	4	0	4	4	60	40		100	3
801		MACHINERY		Ŭ		1.	00	10		100	0
001		MAINTENAN									
DCD	DC		4	0	4	4	(0	40		100	2
PGP	PC	PRINTING	4	U	4	4	60	40		100	3
802						0	(0	10		100	_
PGP	Н		3	U	3	3	60	40		100	3
803	5	PROCESS									
PGP	PC	BOOK	4	0	4	4	60	40		100	3
804		PUBLISHING									
PGP	PC	Corrugation	3	0	3	3	60	40		100	3
805		Box	5	Ŭ	5	J	00	-10		100	5
005		Packaging									
PGP	PC	a.)ADVANCE	3	0	3	3	60	40		100	3
806		b). ADVANCE									
		GRAPHICS									
		c).ADVANCE									
		PACKAGING			-	-					
	D 0								45	75	
PGP	PC	PRINTING		2	2	1		30	45	/5	3
811		MAINTENAN									
		CE									
		LAB									
PGP	PC			2	2	1		30	45	75	3
812		LAB									
PGP	PC	BOOK		2	2	1		30	45	75	3
813											
PGP	PC	Corrugation		2	2	1		30	45	75	3
814	-	Box									
		Packaging-									
		Total				257	360	360			
						25/	500	500			
1			1		1	20	1	1	1	1	1

New Scheme and Syllabus For Bachelor of Technology First Year in 1. Biotechnology (BT), 2. Computer Science & Engineering (CSE), 3. Electronics & Communication Engineering (ECE) and 4. Mechanical Engineering (ME) branches to be implemented from session 2018- 2019 in UIET, KUK (Credit - based system) as per Model Curriculum Provided by AICTE

Course Code and Definition for First Year Scheme

Course Code	Definitions
BS	Basic Science
ES	Engineering Science
HM	Humanities and Social Sciences including Management

Bachelor of Technology (Biotechnology), UIET, KUK Credit-Based (2018-19 Onwards)

S.No	Course No./	Subject	L:T:P	Hours/	Credits	Exa	mination Sch	edule (Marks	5)	Duration
	Code			Week		Major Test	Minor Test	Practical	Total	of exam (Hours)
1A	BS-111	Applied Physics	3:1:0	4	4	75	25	0	100	3
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3
3	BS-131	Applied Mathematics-I	3:1:0	4	4	75	25	0	100	3
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3
6A	BS-113L	Applied Physics Lab	0:0:3	3	1.5		20	30	50	3
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3
		Total	12:5:8/	25/25	21.0/	375/	185/	90/	650A/	
			12:3:10		20.0	300	200	150	650B	

Note: A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester. Induction Program (Three weeks duration) is a part of scheme of first year in I st semester for all branches.

Bachelor of Technology (Biotechnology), UIET, KUK Credit-Based (2018-19 Onwards in Phased manner) SCHEME OF STUDIES/EXAMINATIONS (Semester -II)

S .	Course No./	Subject	L:T:P	Hours/	Credits	Exa	mination Sch	edule (Marks)	Duration
No.	Code			Week		Major Test	Minor Test	Practical	Total	of exam
							-			(nours)
1A	BS-111	Applied Physics	3:1:0	4	4	75	25	0	100	3
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3
3	BS-132	Applied Mathematics-II	3:1:0	4	4	75	25	0	100	3
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3
6A	BS-113L	Applied Physics Lab	0:0:3	3	1.5		20	30	50	3
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3
		Total	12:5:8/	25/	21.0/	375/	185/200	90/150	650A/	
			12:3:10	25	20.0	300			650B	

Note: (1) A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester.

(2) All students have to undertake the industrial training for 4 to 6 weeks after 2nd semester which will be evaluated in 3rd semester.

Bachelor of Technology (Computer Science & Engineering), UIET, KUK Credit-Based (2018-19 Onwards)

SCHEME OF STUDIES/EXAMINATIONS (Semester - I)

S .	Course No./	Subject	L:T:P	Hours/	Credits	E	(s)	Duration		
No.	Code			Week		Major Test	Minor Test	Practical	Total	of exam (Hours)
1A	BS-115	Semiconductor Physics	3:1:0	4	4	75	25	0	100	3
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3
3	BS-133	Calculus & Linear Algebra	3:1:0	4	4	75	25	0	100	3
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3
6A	BS-117L	Semiconductor Physics Lab	0:0:3	3	1.5		20	30	50	3
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3
		Total	12:5:8/	25/25	21.0/	375/	185/	90/	650A/	
			12:3:10		20.0	300	200	150	650B	

Note: A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester. Induction Program (Three weeks duration) is a part of scheme of first year in 1st semester for all branches.

Bachelor of Technology (Computer Science & Engineering), UIET, KUK Credit-Based (2018-19 Onwards)

SCHEME OF STUDIES/EXAMINATIONS (Semester -II)

S.	Course No./	Subject	L:T:P	Hours/	Credits	E	xamination S	ks)	Duration	
N.	Code			Week		Major	Minor	Practical	Total	of exam
						Test	Test			(Hours)
1A	BS-115	Semiconductor Physics	3:1:0	4	4	75	25	0	100	3
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3
3	BS-134	Probability & Statistics	3:1:0	4	4	75	25	0	100	3
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3
6A	BS-117L	Semiconductor Physics Lab	0:0:3	3	1.5		20	30	50	3
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3
		Total	12:5:8/	25/25	21.0/	375/	185/	90/	650A/	
			12:3:10		20.0	300	200	150	650B	

Note: (1) A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester.

(2) All students have to undertake the industrial training for 4 to 6 weeks after 2nd semester which will be evaluated in 3rd semester.

Bachelor of Technology (Electronics & Communication Engineering), UIET, KUK Credit-Based (2018-19 Onwards)

SCHEME OF STUDIES/EXAMINATIONS (Semester - I)

S .	Course No./	Subject	L:T:P	Hours/	Credits	E	(S)	Duration		
No.	Code			Week		Major	Minor	Practical	Total	of exam
						Test	Test			(Hours)
1A	BS-119	Introduction to Electromagnetic Theory	3:1:0	4	4	75	25	0	100	3
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3
3	BS-135	Multivariable Calculus & Linear Algebra	3:1:0	4	4	75	25	0	100	3
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3
6A	BS-121L	Electromagnetics Lab	0:0:3	3	1.5		20	30	50	3
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3
		Total	12:5:8/	25/25	21.0/	375/	185/	90/	650A/	
			12:3:10		20.0	300	200	150	650B	

Note: A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester. Induction Program (Three weeks duration) is a part of scheme of first year in 1st semester for all branches.

Bachelor of Technology (Electronics & Communication Engineering), UIET, KUK Credit-Based (2018-19 Onwards in Phased manner)

SCHEME OF STUDIES/EXAMINATIONS (Semester -II)

S.	Course No./	Subject	L:T:P	Hours/	Credits	E	Examination Schedule (Marks)			
No.	Code			Week		Major Test	Minor Test	Practical	Total	of exam (Hours)
1A	BS-119	Introduction to Electromagnetic theory	3:1:0	4	4	75	25	0	100	3
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3
3	BS-136	Calculus & Ordinary Differential Equations	3:1:0	4	4	75	25	0	100	3
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3
6A	BS-121L	Electromagnetics Lab	0:0:3	3	1.5		20	30	50	3
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3
		Total	12:5:8/	25/	21.0/	375/	185/200	90/150	650A/	
			12:3:10	25	20.0	300			650B	

Note: (1) A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester.

(2) All students have to undertake the industrial training for 4 to 6 weeks after 2nd semester which will be evaluated in 3rd semester.

Bachelor of Technology (Mechanical Engineering), UIET, KUK Credit-Based (2018-19 Onwards)

SCHEME OF STUDIES/EXAMINATIONS (Semester - I)

S.	Course No./	Subject	L:T:P	Hours/	Credits		Examination Schedule (Marks)				
No.	Code			Week		Major	Minor Test	Practical	Total	of exam	
						Test				(Hours)	
1A	BS-119	Introduction to Electromagnetic Theory	3:1:0	4	4	75	25	0	100	3	
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3	
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3	
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3	
3	BS-135	Multivariable Calculus & Linear Algebra	3:1:0	4	4	75	25	0	100	3	
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3	
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3	
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3	
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3	
6A	BS-121L	Electromagnetics Lab	0:0:3	3	1.5		20	30	50	3	
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3	
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3	
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3	
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3	
8B	HM-103L	Language Lab	0:0:2	2	1		20	30	50	3	
		Total	12:5:8/	25/25	21.0/	375/	185/	90/	650A/		
			12:3:10		20.0	300	200	150	650B		

Note: A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester. Induction Program (Three weeks duration) is a part of scheme of first year in 1st semester for all branches.

Bachelor of Technology (Mechanical Engineering), UIET, KUK Credit-Based (2018-19 Onwards)

SCHEME OF STUDIES/EXAMINATIONS	(Semester -II)
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S.	Course No./	Subject	L:T:P	Hours/	Credits	E	Examination Schedule (Marks)				
No.	Code			Week		Major	Minor Test	Practical	Total	of exam	
						Test				(Hours)	
1A	BS-119	Introduction to Electromagnetic theory	3:1:0	4	4	75	25	0	100	3	
1B	BS-101	Chemistry	3:1:0	4	4	75	25	0	100	3	
2A	ES-105	Programming for Problem Solving	3:0:0	3	3	75	25	0	100	3	
2B	HM-101	English	2:0:0	2	2	75	25	0	100	3	
3	BS-136	Calculus & Ordinary Differential Equations	3:1:0	4	4	75	25	0	100	3	
4A	ES-109	Engineering Graphics & Design	1:2:0	3	3	75	25	0	100	3	
4B	ES-111L	Manufacturing Processes Workshop	0:0:3	3	1.5	-	40	60	100	3	
5A	BS-141	Biology	2:1:0	3	3	75	25	0	100	3	
5B	ES-101	Basic Electrical Engineering	4:1:0	5	5	75	25	0	100	3	
6A	BS-121L	Electromagnetics Lab	0:0:3	3	1.5		20	30	50	3	
6B	BS-103L	Chemistry Lab	0:0:3	3	1.5		20	30	50	3	
7A	ES-107L	Programming for Problem Solving Lab	0:0:2	2	1		20	30	50	3	
7B	ES-103L	Basic Electrical Engineering Lab	0:0:2	2	1		20	30	50	3	
8A	ES-113L	Engineering Graphics & Design Practice	0:0:3	3	1.5		20	30	50	3	
8B	HM-103L	English Lab	0:0:2	2	1		20	30	50	3	
		Total	12:5:8/	25/	21.0/	375/	185/200	90/150	650A/		
			12:3:10	25	20.0	300			650B		

Note: (1) A branch will study either the subjects corresponding to Sr. No. Marked A or corresponding to Sr. No. Marked B in one particular semester.

(2) All students have to undertake the industrial training for 4 to 6 weeks after 2nd semester which will be evaluated in 3rd semester.

Induction Program

(Duration - Three weeks)

Date	9:00-10:00 AM	10:00-11:00 AM	11:00-12:00 AM	12:00-1:00 PM	2:00-4:00 PM
1/8/2018	Yoga	Student address by Director	Interaction with students branch wise	Interaction with students continued	Communication skill classes
2/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
3/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
4/8/2018	-	Holiday	-	-	-
5/8/2018	-	Holiday	-	-	-
6/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
7/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
8/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
92/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
10/8/2018	Yoga	Group discussion, quiz activities etc.	Hobby classes	hobby classes contd.	Communication skill classes
11/8/2018	-	Holiday	-	-	
12/8/2018	-	Holiday	-	-	
13/8/2018	Yoga	Art of living workshop	Hobby classes	hobby classes contd.	Communication skill classes
14/8/2018	Yoga	Art of living workshop	Hobby classes	hobby classes contd.	Communication skill classes
15/8/2018	-	-	-	-	-
16/8/2018	Yoga	first aid training	Lecture on gender sensitization	Workshop/lecture on skill development	Communication skill classes
17/8/2018	Yoga	Librarian lecture	Lecture on Moral values	Workshop/lecture on skill development	Communication skill classes
18/8/2018	-	Holiday	-	-	
19/8/2018	-	Holiday	-	-	
20/8/2018	Yoga	Lecture on stress management	Self-defence training for girls	Self-defence training for girls	Communication skill classes
21/8/2018	Yoga	Lecture on ragging issues	Self-defence training for girls	Self-defence training for girls	Local visit for hostelers

Note: 1. The schedule prepared is tentative and is designed for implementing in UIET, KUK for session 2018-2019 and may further be modified as per feedback for future sessions.

2. This induction program is mandatory (non- credit) for 1st year students in 1st semester.

BS-111		Applied Physics										
L	Т	Р	Credit	Major	Minor Test	Total	Time					
				Test								
3	1	-	4	75	25	100	3h					
Purpose	Purpose To introduce the basics of physics			e students i	for application	s in Engin	eering field.					
			Cours	e Outcomes	5							
CO 1	Introduce the	fundamentals o	f interfere	nce and diff	raction and the	eir applica	tions.					
CO 2	To make the students aware of the importance of polarization and Laser in technology.											
CO 3	Applications of optical fiber and ultrasonics in various fields.											
CO 4	CO 4 Introduce the nuclear radiations and its biological effects.											

Unit - I

Interference: Principle of Superposition, Conditions for interference, Division of wave-front: Fresnel's Biprism and Applications, Division of amplitude: Wedge-shaped film, Newton's rings, Michelson Interferometer and Applications. **Diffraction:** Types of diffraction, Fraunhofer diffraction at a single slit, Plane transmission diffraction grating: theory, secondary maxima and minima, width of principal maxima, absent spectra, overlapping of spectral lines, determination of wavelength; Dispersive power and resolving power of diffraction grating.

Unit – II

Polarization: Polarization of transverse waves, Plane of polarization, Polarization by reflection, Double refraction, Nicol Prism, Quarter and half wave plate, Specific Rotation, Laurent 's half shade polarimeter, Biquartzpolarimeter. **Laser:** Introduction, Stimulated Absorption, Spontaneous and Stimulated Emission; Einstein's Coefficients and its derivation, Population Inversion, Direct and Indirect pumping, Pumping schemes, Main components of Laser, He-Ne Laser, Semiconductor Laser, Characteristics of Laser, Applications of Laser.

Unit – III

Optical Fiber: Introduction, Principle of propagation of light waves in optical fibers: total internal reflection, acceptance angle, numerical aperture, V- number; Modes of propagation, Types of optical fibers: single mode fiber, multimode fibers; Fiber optics communication system, Advantages of optical fiber communication, Applications of optical fibers.

Ultrasonics: Ultrasonic waves, Properties of ultrasonic waves, Production of ultrasonic waves: Magnetostriction and Piezoelectric methods, Detection of ultrasonic waves, Measurement of velocity of ultrasonic waves, Applications of ultrasonic waves.

Unit – IV

Nuclear radiations and its Biological Effects: Classification of nuclear radiations, Interaction of charged particle (light and heavy) and gamma radiations with matter (basic concepts), Dosimetric units, Relative Biological Effectiveness (RBE), Typical doses from commons sources in the environment, Biological Effects, Maximum Permissible Dose, (MPD), Shielding, Radiation safety in the nuclear radiation laboratory.

Biomaterials: Introduction, Classification of biomaterials, Applications.

Suggested Books:

- 1. Applied Physics for Engineers, Wiley India Pvt. Ltd.
- 2. Concepts of Modern Physics (5th edition), Tata McGraw-Hill Publishing Company Limited.
- 3. A Textbook of Optics, S. Chand & Company Ltd.
- 4. Techniques for Nuclear and Particle Physics Experiments: A How-to Approach, Springer-Verlag.
- 5. Introduction to Nuclear and Particle Physics, PHI Learning Private Limited.
- 6. Biomaterials: The intersection of Biology and Materials Science, Pearson, New Delhi.

Note: The paper setter will set the paper as per the question paper templates provided.

BS-113L		Applied Physics Lab									
L	Т	Р	Credit Practical Minor Tes		Minor Test	Total	Time				
-	-	3	1.5	30 20		50	3h				
Purpose Give the knowledge of basic practicals of Physics in Engineering.											
			Course Out	tcomes							
CO1	To make the st	tudents familia	ar with the exper	iments related	with optics.						
CO2	O2 To give the knowledge of handling of the experiments related with resistance using different										
	methods.										

Note: Student will be required to perform at least 10 experiments out of the following list.

- 1. To verify Newton's formula and hence to find the focal length of the given convex lens.
- 2. To find the frequency of A.C. mains by using Sonometer and horse shoe magnet.
- 3. To find the resistance of a galvanometer by post office box.
- 4. To find low resistance by Carrey-Foster bridge.
- 5. To find the value of high resistance by substitution method.
- 6. To compare the capacitances of two capacitors by De-Sauty's bridge and hence to find the dielectric constant of a medium.
- 7. To convert a galvanometer into an ammeter of desired range and verify the same.
- 8. To find the wavelength of monochromatic light by Newton's ring experiment.
- 9. To find the wavelength of sodium light by Michelson's interferometer.
- 10. To find the resolving power of telescope.
- 11. To find the wavelength of sodium light using Fresnel bi-prism.
- 12. To find the wavelength of various colours of white light with the help of plane transmission diffraction grating.
- 13. To find the specific rotation of sugar solution by using a Polarimeter.

Suggested Books:

- 1. C.L.Arora, B. Sc. Practical Physics, S. Chand.
- 2. B.L. Worshnop and H, T, Flint, Advanced Practical Physics, KPH.
- 3. S.L. Gupta & V. Kumar, Practical Physics, Pragati Prakashan.

BS-115		Semiconductor Physics										
L		Т	Р	Credit	Major	Minor Test	Total	Time				
					Test							
3		1	-	4	75	25	100	3h				
Purpose	Purpose To introduce the fundamentals of solid state physics and				and its applica	ations to t	he students.					
				Course Ou	itcomes							
CO1	To ma	ake the stud	lents aware of ba	asic termin	ology of c	rystal structu	re.					
CO 2	Introd	duce the el	ementary quant	tum mecha	anics, wh	ich will be u	seful in t	understanding the				
	concepts of solid state physics.											
CO 3 Discussion of classical free electron theory, quantum theory and Band t					and theory	/ of solids.						
CO 4 Basics and applie			cations of semic	onductors.	,							

Unit - I

Crystal Structure: Crystalline and Amorphous solids, Crystal Structure: lattice translation vector, symmetry operations, space lattice, basis; Unit cell and Primitive cell, Fundamental types of lattices: two-dimensional and three dimensional Bravais lattices; Characteristics of Unit cells: Simple Cubic (SC), Body Centred Cubic (BCC), Face Centred Cubic (FCC), Hexagonal Close Packed (HCP) structure; Simple crystal structures: Sodium Chloride, Cesium Chloride, Diamond, Cubic Zinc Sulfide; Miller Indices, Bonding in Solids, Point defects in crystals: Schottky and Frenkel defects.

Unit – II

Quantum Theory: Need and origin of Quantum concept, Wave-particle duality, Phase velocity and group velocity, Uncertainty Principle and Applications; Schrodinger's wave equation: time-dependent and time –independent; Physical Significance of wave function ψ .

Unit – III

Free Electron Theory: Classical free electron theory: electrical conductivity in metals, thermal conductivity in metals, Wiedemann-Franz law, success and drawbacks of free electron theory; Quantum free electron theory: wave function, eigen values; Fermi-Dirac distribution function, Density of states, Fermi energy and its importance, Thermionic Emission (qualitative).

Band theory of Solids: Bloch theorem, Kronig-Penney Model (qualitative), E versus k diagram, Brillouin Zones, Concept of effective mass of electron, Energy levels and energy bands, Distinction between metals, insulators and semiconductors, Hall effect and its Applications.

Unit –IV

Semiconductors: Conduction in Semiconductors, Intrinsic Semiconductors: Conductivity of charge carriers, Carrier concentration in intrinsic semiconductors; Extrinsic Semiconductors: n-type semiconductors, p-type semiconductors, charge carrier concentration in extrinsic semiconductors.

Semiconductor Devices: The p-n junction, Current-voltage characteristics of p-n junction; The Transistor: Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), Metal-Semiconductor Junction (Ohmic and Schottky); Semiconductor Laser.

Suggested Books:

- 1. Applied Physics for Engineers, Wiley India Pvt. Ltd.
- 2. Introduction to Solid State Physics, John Wiley & Sons. .
- 3. Concepts of Modern Physics (5th edition), Tata McGraw-Hill Publishing Company Limited.
- 4. Solid State Physics, New Age International (P) Limited.
- 5. A Textbook of Quantum Mechanics, McGraw Hill Education (India) Private Limited. Introduction to Nanotechnology, John Wiley & Sons.

Note: The paper setter will set the paper as per the question paper templates provided.

BS-117L		Semiconductor Physics Lab									
L		Т	Р	Credit	Practical	Minor Test	Total	Time			
-		-	3	1.5	30	20	50	3h			
Purpos	e	To give th	e practical	knowledge	of handling the	sophisticated in	nstruments.				
	Course Outcomes										
C0	To make the students familiar with the experiments related with Semiconductor Physics.										

Note: Student will be required to perform at least 10 experiments out of the following list.

- 1. To study the V-I characteristics of a p-n diode.
- 2. To find the flashing and quenching potential of Argon and to find the capacitance of unknown capacitor.
- 3. To find the value of Planck's constant by using photoelectric cell.
- 4. To find the temperature coefficient of resistance by using Pt resistance thermometer by post office box.
- 5. To find the ionization potential of Argon/Mercury using a thyratron tube.
- 6. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
- 7. To study the characteristics of (Cu-Fe, Cu-Constantan) thermocouple.
- 8. To find the value of Hall Coefficient of semiconductor.
- 9. To find the value of e/m for electrons by Helical method.
- 10. To find the band gap of intrinsic semiconductor using four probe method.
- 11. To calculate the hysteresis loss by tracing a B-H curve.
- 12. To find the frequency of ultrasonic waves by piezoelectric methods.
- 13. To verify Richerdson thermionic equation.

Suggested Books:

- 1. C.L.Arora, B. Sc. Practical Physics, S. Chand.
- 2. B.L. Worshnop and H, T, Flint, Advanced Practical Physics, KPH.
- 3. S.L. Gupta & V. Kumar, Practical Physics, PragatiPrakashan.
| BS-119 | | Introduction to Electromagnetic Theory | | | | | | | |
|---------|---|--|-------------|--------------|------------|-------|------|--|--|
| L | Т | Р | Credit | Major | Minor Test | Total | Time | | |
| | | | | Test | | | | | |
| 3 | 1 - 4 75 | | | | 25 | 100 | 3h | | |
| Purpose | To introduce t | introduce the fundamentals of electromagnetic theory to the students for applications in | | | | | | | |
| | Engineering fie | Engineering field. | | | | | | | |
| | | | Course C |)utcomes | | | | | |
| CO 1 | Introduce the b | asic concepts o | of Electros | tatics in va | icuum. | | | | |
| CO 2 | Introduce the basic concepts of Magnetostatics in vacuum. | | | | | | | | |
| CO 3 | Discuss electro | Discuss electrostatics and magnetostatics in linear dielectric medium. | | | | | | | |
| CO 4 | Basics of Maxw | asics of Maxwell's equations and electromagnetic waves. | | | | | | | |

Unit - I

Electrostatics in Vacuum: Calculation of Electric Field: Coulomb's law, Continuous charge distribution; Divergence and Curl of Electrostatic Fields: Field lines, flux, Gauss's law, Applications of Gauss's law; Electrostatic Potential: Comments on potential, Poisson's and Laplace's Equation, the potential of a localized charge distribution; Electrostatic Boundary Conditions; Work and Energy in Electrostatics: the work done to move a charge, the energy of a point and continuous charge distribution.

Unit - II

Electrostatics in a Linear Dielectric Medium: Polarization:dielectrics, induced dipoles, alignments of polar molecules; The field of a Polarized Object: bound charges and its physical interpretation; The Filed Inside a Dielectric; The Electric Displacement: Gauss's law in the presence of dielectrics, A deceptive parallel, Boundary conditions; Linear Dielectrics: Susceptibility, Permittivity, dielectric constant, Boundary value problems with linear dielectrics, Energy in dielectric systems, Forces in dielectrics.

Unit - III

Magnetostatics: The Lorentz Force Law: magnetic fields, magnetic forces, currents; Biot- Savart law, Divergence and Curl of magnetic filed, Magnetic Vector Potential: vector potential, magnetostatic boundary conditions, multiple expansion of vector potential.

Magnetostatics in a linear magnetic: Magnetization: Effect of magnetic field on atomic orbits; The Field of a Magnetized Object: Bound currents, Physical interpretation of bound currents; The Auxiliary Magnetic Field: Ampere's law in magnetized materials, A deceptive parallel, Boundary conditions; Linear and Nonlinear Media: magnetic susceptibility and permeability, ferromagnetism.

Unit - IV

Faraday's law: Electromotive Force: Ohm's law, Motional emf; Electromagnetic Induction: Faraday's law, The induced electric field, inductance, energy in magnetic fields.

Maxwell's Equations: Electrodynamics before Maxwell, How Maxwell fixed Ampere's law, Maxwell's equations, Maxwell's equations in matter.

Electromagnetic Waves: Electromagnetic Waves in Vacuum: the wave equation for electric and magnetic field; Electromagnetic Waves in Matter: propagation in linear media.

Suggested Books:

- 1. David J. Griffiths, Introduction to Electrodynamics, Pearson Education.
- 2. Halliday and Resnick, Physics
- 3. W. Saslow, Electricity, Magnetism and Light

BS-121L		Electromagnetics Lab								
L	Т	T P Credit Practical Minor Test Total Ti								
-	3 1.5				20	50	3h			
Purpose	ose To give the practical knowledge of handling the instruments.									
	Course Outcomes									
CO To make the students familiar with the experiments related with Electromagnetic Theory.							ory.			

Note: Student will be required to perform at least 10 experiments out of the following list.

- 1. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
- 2. To study induced e.m.f. as a function of velocity of magnet.
- 3. To study the growth and decay of current in a LR circuit using magnetic core inductor.
- 4. To find the coefficient of self-inductance by Rayleigh's method.
- 5. To find the coefficient of mutual inductance of two coils.
- 6. To determine the magnetic induction field between the pole pieces of an electromagnet.
- 7. To study Bio-Savart's law.
- 8. To study the dependency of magnetic field on coil diameter and number of turns.
- 9. To investigate the equipotential liens of electric fields.
- 10. To draw the equipotential lines of bar electrode.
- 11. To draw the equipotential lines for ring electrode.
- 12. Verification of Farady and Lenz's law of induction by measuring the induced voltage as function of time.
- 13. Measurement of induced voltage impulse as a function of the velocity of magnet.
- 14. To determine the dielectric constant of different dielectric materials.
- 15. To measure the spatial distribution of the magnetic field between a pair of identical coils in Helmholtz arrangement.
- 16. To investigate the spacing between coils at which magnetic field is uniform and to measure its spatial distribution.

Suggested Books:

- 1. C.L.Arora, B. Sc. Practical Physics, S. Chand.
- 2. B.L. Worshnop and H, T, Flint, Advanced Practical Physics, KPH.
- 3. S.L. Gupta & V. Kumar, Practical Physics, PragatiPrakashan.

BS-101		Chemistry								
L	T	Р	Credit	Major Test	Minor Test	Total	Time			
3	1	1 - 4 75 25 100 3h								
Purpose	To fam	To familiarize the students with basic and applied concept in chemistry								
CO1	An insi	ght into the ator	nic and mole	cular struct	ure					
CO2	Analyti	ical techniques u	used in identi	fication of n	nolecules					
CO3	To understand Periodic properties									
CO4	To und	To understand the spatial arrangement of molecules								

UNIT - I

Atomic and molecular structure (10 lectures)

Molecular orbitals of diatomic molecules (N_2 , O_2 , CO) Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and energy level diagrams of [Co(NH₃)₆], [Ni(CO)₄], [PtCl₂(NH₃)₂] and magnetic properties of metal complexes. Band structure of solids and the role of doping on band structures.

UNIT - II

Spectroscopic techniques and applications (8 lectures)

Principles of spectroscopy and selection rules. Electronic spectroscopy(basic concept). Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Basic concepts of Nuclear magnetic resonance and magnetic resonance imaging, Diffraction and scattering.

UNIT - III

Use of free energy in chemical equilibria (4 lectures)

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

Periodic properties (4 Lectures)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries (H₂O, NH₃, PCl₅, SF₆, CCl4, Pt(NH₃)₂Cl₂

UNIT - IV

Stereochemistry (6 lectures)

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis.

Organic reactions and synthesis of a drug molecule (4 lectures)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule(paracetamol and Aspirin)

Suggested Books:

1) University chemistry, by B. M. Mahan, Pearson Education

2) Chemistry: Principles and Applications, byM. J. SienkoandR. A. Plane

3) Fundamentals of Molecular Spectroscopy, by C. N. Banwell

4) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S.Krishnan

5) Physical Chemistry, by P. W. Atkins

6)Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore,5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

BS-103L		Chemistry Lab							
L	Т	Р	Credit	Practical	Minor Test	Total	Time		
-	-	3	1.5	30	20	50	3h		

LIST OF EXPERIMENTS

- 1. To Determine the surface tension of a given liquid
- 2. To determine the relative viscosity of a given liquid using Ostwald's viscometer
- 3. To identify the number of components present in a given organic mixture by thin layer chromatography
- 4. To determine the alkalinity of a given water sample
- 5. Determination of the strength of a given HCl solution by titrating it with standard NaOH solution using conductometer
- 6. Synthesis of a drug (paracetamol/Aspirin)
- 7. Determination of chloride content of a given water sample
- 8. To determine the calcium & magnesium or temporary & permanent hardness of a given water sample by EDTA method
- 9. To determine the total iron content present in a given iron ore solution by redox titration
- 10. Determination of the partition coefficient of a substance between two immiscible liquids
- 11. To find out the content of sodium, potassium in a given salt solution by Flame Photometer
- 12. To find out the λ max and concentration of unknown solution by a spectrophotometer
- 13. To find out the flash point and fire point of the given oil sample by Pensky Martin apparatus
- 14. To determine the amount of dissolved oxygen present in a given water sample
- 15. To find out the pour point and cloud point of a lubricating oil
- 16. Determination of the strength of a given HCI solution by titrating it with standard NaOH solution using pH meter
- 17. Using Redwood Viscometer find out the viscosity of an oil sample

Note: Atleast 9 experiments to be performed from the list.

ES-105		Programming for Problem Solving								
L	Т	Р	Credit	Major	Minor	Total	Time			
				Test	Test					
3	-	-	3	75	25	100	3h			
Purpose	To fa	To familiarize the students with the basics of Computer System and C Programming								
			Co	urse Outcom	es					
CO 1	Describe th	e overview o	of Computer S	System and I	_evels of Pro	gramming La	anguages.			
CO 2	Learn to tra	nslate the al	gorithms to p	programs (in	C language)					
CO 3	Learn description and applications of conditional branching, iteration and recursion.									
CO 4	To use arra	ys, pointers	and structure	es to formula	te algorithms	s and progra	ms.			

UNIT – I

Overview of Computers: Block diagram and its description, Number systems, Arithmetic of number systems, Computer Hardware: Printers, Keyboard and Mouse, Storage Devices.

Introduction to programming language: Different levels of PL: High Level language, Assembly language, Machine language; Introduction to Compiler, Interpreter, Debugger, Linker, Loader, Assembler.

Problem Analysis: Problem solving techniques, Algorithms and Flowchart representation.

UNIT – II

Overview of C: Elements of C, Data types; Storage classes in C; Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators, precedence & associativity of operators.

Input/output: Unformatted & formatted I/O function in C.

Control statements: if statement, switch statement; Repetition: for, while, and do-while loop; break, continue, goto statements.

UNIT – III

Arrays: Definition, types, initialization, processing an array, String handling.

Functions: Definition, prototype, parameters passing techniques, recursion, built-in functions, passing arrays to functions, returning arrays from functions.

UNIT – IV

Pointers: Declaration, operations on pointers, pointers and arrays, dynamic memory allocation, pointers and functions, pointers and strings.

Structure & Union: Definition, processing, passing structures to functions, use of union.

Data files: Opening and closing a file, I/O operations on files.

Suggested Books:

1.Brian W. Kernighan Dennis Ritchie, "C Programming Language" Pearson Education India.

2.Subrata Saha, Subhodip Mukherjee: Basic Computation & Programming with 'C'-Cambridge University Press.

3. Ajay Mittal, "Programming in C - A Practical Approach", Pearson.

4.E Balagurusamy : Programming in ANSI C, TMH Education.

5. Pradip Dey and ManasGhose, "Computer Fundamental and Programming in C", Oxford Pub.

6.ForouzanBehrouz, "Computer Science: A Structured Programming Approach Using C", Cengage Learning.

7.Ashok Kamthane, "Programming in C, 3e", Pearson Education India..

8.Yashwant Kanetker, "Let us C", BPB Publications.

9.A K Sharma, "Fundamentals of Computers & Programming" DhanpatRai Publications

10. Rajaraman V., "Computer Basic and C Programming", Prentice Hall of India Learning.

ES-107L		Programming for Problem Solving Lab								
L	Т	Р	Credit	Practical	Minor	Total	Time			
					Test					
-	-	2	1	30	20	50	3h			
Purpose	To Introduce students with problem solving using C Programming language									
			Cou	rse Outcome	S					
CO 1	To formulate	the algorithr	ns for simpl	e problems						
CO 2	Implementati	on of arrays	s and function	ons.						
CO 3	Implementation of pointers and user defined data types.									
CO 4	Write individu	ual and grou	p reports: pi	resent object	ives, describ	e test proce	dures and results.			

LIST OF PROGRAMS

- 1. Write a program to find the sum of individual digits of a positive integer.
- 2. Write a program to generate the first n terms of the Fibonacci sequence.
- 3. Write a program to generate all the prime numbers between 1 and n, where n is the input value given by the user.
- 4. Write a program to find the roots of a quadratic equation.
- 5. Write a function to generate Pascal's triangle.
- 6. Write a program for addition of Two Matrices
- 7. Write a program for calculating transpose of a matrix.
- 8. Write a program for Matrix multiplication by checking compatibility
- 9. Write programs to find the factorial of a given integer by using both recursive and non-recursive functions.
- 10. Write a function that uses functions to perform the count the lines, words and characters in a given text.
- 11. Write a program to explores the use of structures, union and other user defined variables
- 12. Write a program to print the element of array using pointers
- 13. Write a program to implement call by reference
- 14. Write a program to print the elements of a structure using pointers
- 15. Write a program to read a string and write it in reverse order
- 16. Write a program to concatenate two strings
- 17. Write a program to check that the input string is a palindrome or not.
- 18. Write a program which copies one file to another.
- 19. Write a program to reverse the first n characters in a file.

Note: At least 10 programs are to be performed & executed from the above list.

HM-101		English									
L	Т	T P		Major	Minor Test	Total	Time				
				Test							
2	-	-	2	75	25	100	3h				
			Cours	e Outcomes			·				
CO 1	CO 1 Building up the vocabulary										
CO 2	Students will acquire basic proficiency in English including writing skills										

UNIT- 1

Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root words from foreign languages and their use in English
- 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
- 1.4 Synonyms, antonyms, and standard abbreviations.

UNIT-2

Basic Writing Skills

- 2.1 Sentence Structures
- 2.2 Use of phrases and clauses in sentences
- 2.3 Importance of proper punctuation
- 2.4 Creating coherence
- 2.5 Organizing principles of paragraphs in documents
- 2.6 Techniques for writing precisely

UNIT-3

Identifying Common Errors in Writing

- 3.1 Subject-verb agreement
- 3.2 Noun-pronoun agreement
- 3.3 Misplaced modifiers
- 3.4 Articles
- 3.5 Prepositions
- 3.6 Redundancies
- 3.7 Clichés

UNIT-4

Nature and Style of sensible Writing

- 4.1 Describing
- 4.2 Defining
- 4.3 Classifying
- 4.4 Providing examples or evidence
- 4.5 Writing introduction and conclusion
- 4.6 Comprehension
- 4.7 Précis Writing
- 4.8 Essay Writing

Suggested Books:

- (i) Practical English Usage. Michael Swan. OUP. 1995.
- (ii) Remedial English Grammar. F.T. Wood. Macmillan.2007
- (iii)On Writing Well. William Zinsser. Harper Resource Book. 2001
- (iv) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- (v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

HM-103L		Language Lab								
L	Т	Р	Credit	Practical	Minor Test	Total	Time			
-	-	2	1	30	20	50	3h			

OBJECTIVES

- 1.
- 2.
- Listening Comprehension Pronunciation, Intonation, Stress and Rhythm Common Everyday Situations: Conversations and Dialogues Communication at Workplace 3.
- 4.
- 5. Interviews
- 6. **Formal Presentations**

BS-131			ŀ	APPLIED M	ATHEMATICS	5-1			
L	Т	Р	Credit	Major	Minor	Total	Time		
				Test	Test				
3	1	-	4	75	25	100	3 h		
Purpose	The object	ive of this	course is t	o familiarize	e the prospe	ctive Biotec	hnology Engineers with		
	techniques	techniques in Limit, Continuity, Differential & Integral Calculus and Complex Numbers. It aims to							
	equip the s	equip the students with standard concepts and tools at a beginner to intermediate and then at							
	advanced l	advanced level that will serve them well towards tackling more advanced level of mathematics and							
	applications	applications that they would find useful in their disciplines. More precisely, the objectives are as							
	under:	under:							
			Cou	irse Outcon	nes				
CO1	To introduce	the idea of	f sets, relation	ons, functio	ns, trigonome	etric function	s, inverse trigonometric		
	functions, the	se concepts	are prerequis	site to learn t	he concepts of	of differentiati	on and integration.		
CO 2	To introduce	the Complex	k numbers w	hich is fund	amental to so	olve any kind	l of quadratic equations,		
	Limit is precor	ndition to und	derstand the o	concept of ra	ate of change	and derivativ	е.		
CO 3	To develop the	ne essential	tool of Con	tinuity and	Differentiability	y needed in	evaluating higher order		
	derivatives of	functions.							
CO 4	To introduce t	he tools of I	ndefinite and	Definite inte	egrals of funct	ions in a con	nprehensive manner that		
	are used in va	rious technio	ques dealing	engineering	problems.				

UNIT-I

Г

Sets, Relations, Functions

Sets and its types: Operations on sets, complement of a set, Cartesian Product of sets, relations, functions, types of functions, Trigonometric functions: Introduction, Angles, Trigonometric functions, Trigonometric functions of sum and difference of two angles, Trigonometric equations, Inverse Trigonometric functions: Introduction, basic concepts and its properties.

UNIT-II

Pre-Calculus

Complex Numbers: Introduction, Algebra of Complex Numbers, Modulus and the conjugate of a complex number, guadratic equations, Limits and Derivatives: Introduction, Limits, Limits of Trigonometric Functions, Derivatives (single variable).

UNIT-III

Differential Calculus

Continuity and Differentiability: Introduction, Continuity, Differentiability, Exponential and Logarithmic functions, Logarithmic differentiation, Derivatives of functions in parametric forms, second order derivatives, Application of **Derivatives (single variable):** Increasing and decreasing functions, Maxima and Minima.

UNIT-IV

Integral Calculus

Integrals: Introduction, Integration as an Inverse process of Differentiation, Method of Integration, Integration by Partial Fractions, Integration by Parts, Definite Integrals: Fundamental theorem of Calculus, Evaluation of Definite Integrals by Substitution, properties of Definite Integrals.

Suggested Books:

- 1. G. B. Thomas, R. L. Finney: Calculus and Analytic Geometry, Pearson Education.
- 2. Mathematics Textbook for Class 11th & 12th by NCERT.
- 3. Howard Anton: Calculus, Wiley Publication.
- 4. E. Kreyszig: Advanced Engineering Mathematics, Wiley India.

Note: The paper setter will set the paper as per the question paper templates provided.

(12 hrs)

(12 hrs)

(12 hrs)

(12 hrs)

R2-122				aiculus and	Linear Aigei	ora		
L	Т	Р	Credit	Major	Minor	Total	Time	
				Test	Test			
3	1	-	4	75	25	100	3 h	
Purpose	Tto familia	arize the pro	ospective er	ngineers wi	th technique	es in calculu	us, sequence & series,	
	multivarial	ble calculus	, and linear a	algebra.				
			Cou	irse Outcor	nes			
CO1	To introduce the idea of applying differential and integral calculus to notions of improper							
	integrals. Ap	oart from so	ome applica	tions it giv	ves a basic	introduction	on Beta and Gamma	
	functions.			_				
CO 2	To introduce	the fallouts	s of Rolle's	Theorem th	nat is fundan	nental to ap	plication of analysis to	
	Engineering	problems.						
CO 3	To develop the essential tool of matrices and linear algebra in a comprehensive manner.							
CO 4	To familiariz	To familiarize the student with vector space as an essential tool in most branches of						
	engineering.							
UNIT-I					(12 hi	rs)		

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A 1

UNIT-I

Calculus:

DC 400

Evaluation of definite and improper integrals: Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Rolle's Theorem, Mean value theorems, Indeterminate forms and L'Hospital's rule.

UNIT-II

Matrices

Matrices, vectors: addition and scalar multiplication, matrix multiplication; Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

UNIT-III

Vector spaces

Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank nullity theorem, composition of linear maps. **UNIT-IV** (10 hrs)

Vector spaces

Eigenvalues, eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, eigenbases. Diagonalization; Inner product spaces.

Suggested Books:

1.ErwinKreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

- 2. Erwin Kreyszig and SanjeevAhuja, Applied Mathematics- I, Wiley India Publication, Reprint 2015.
- 3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

6. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

7. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

8. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

9. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.

10. S. Lipschutz and M. Lipson, Schaum's outline of Linear Algebra, McGraw Hill Education; 3 edition (1 July 17).

Note: The paper setter will set the paper as per the question paper templates provided.

(10 hrs)

(8 hrs)

BS-135			Multivari	iable Calcu	Multivariable Calculus and Linear Algebra							
L	Т	Р	Credit	Major	Minor	Total	Time					
				Test	Test							
3	1	-	4	75	25	100	3 h					
Purpose	To familia	rize the pro	spective er	ngineers wi	th technique	es in calculu	is, sequence & series,					
	multivaria	ble calculus	, and linear	algebra.								
			Col	Irse Outcor	nes							
CO1	To introduce	e the idea of	of applying	differential	and integra	il calculus t	o notions of improper					
	integrals. Ap	part from so	ome applica	itions it give	les a basic	introduction	on Beta and Gamma					
00.0	tunctions.	the fellents		Th			-lisetion of eachering to					
CO 2		e the fallouts	s of Rolle's	i neorem ti	hat is tundar	nental to ap	plication of analysis to					
<u> </u>	Engineering	problems.	nowar cari	o and Fau	riar carias f	or loorning	advanced Engineering					
CU 3	To develop	ine loor of	power serie	es and Fou	iner series i	or learning	advanced Engineering					
<u> </u>	To familiariz	http://www.ctudon	t with funct	ions of sou	oral variablo	e that is ass	ntial in most branchos					
CU 4	of engineerin					5 liidi 15 0350						
CO 5		iy. ha accortial	tool of moti	iaaa and lin	oor algabra	in a aamnrak						
	To develop ti	ne essential			lear aigebra	in a compren	iensive manner.					
	aluation of dot	finito and imr	ronor intogr	ale: Rota an	(1211) d Camma fur	 IS) and the 	oir proportios: Applications					
of definite inte	arials to evalu	ato surfaco a	roas and vol	umos of rovi	alutions		ieli properties, Applications					
Rolle's Theor	em Mean valu	ale suitace a le theorems	Indeterminat	e forms and	l l 'Hosnital's r	nle						
UNIT-II			muctormina		1 21103pital 31 (12 hr	() ()						
Sequence ar	nd Series: Co	nvergence of	f sequence a	and series. t	ests for conv	eraence (Cor	nparison test. D'Alembert's					
Ratio test, Lo	garithmic test,	Cauchy root	test, Raabe'	s test); Pow	er series.		· · · · · · · · · · · · · · · · · · ·					
Fourier series	: Introduction,	Fourier-Eule	er Formula, [Dirichlet's co	onditions, Cha	inge of interva	als, Fourier series for even					
and odd funct	ions, Half rand	ge sine and c	osine series.			5						
UNIT-III		,			(09 hrs	S)						
Multivariable	Calculus (c	lifferentiatio	n): Taylor's	series (for	one and m	ore variables	s), series for exponential,					
trigonometric	and logarithm	functions.										
Partial deriva	tives, Total dif	ferential, Cha	in rule for di	fferentiation	, Homogeneo	us functions,	Euler's theorem, Jacobian,					
Maxima, mini	ma and saddle	e points; Meth	nod of Lagrar	nge multiplie	rs.							
UNIT-IV					(07 hi	rs)						
Matrices: Ra	nk of a matrix,	elementary t	ransformatio	ons, element	ary matrices,	Gauss Jordo	n method to find inverse					
using elemen	tary transform	ations, norma	al form of a m	natrix, linear	dependence	and independ	lence of vectors,					
consistency o	f linear system	n of equations	s, linear and	orthogonal t	ransformation	is, eigenvalue	es and eigenvectors,					
properties of	eigenvalues, C	ayley – Ham	ilton theoren	n and its app	lications.							
Suggested B	OOKS:	F	Mathana Par									
1.ErwinKreys	zig, Advanced	Engineering	Mathematics	s, 9th Edition	n, John Wiley	& Sons, 2006).					
2. Erwin Krey	szig and Sanje	evanuja, ap	plied Mather	natics- I, Wii tia maamaatm	ey India Publi	Ication, Repri	NI 2015.					
3. G.B. Thom	as and R.L. Fi	nney, Calcult	us and Analy	lic geometry	, 910 Eallion,	Pearson, Rep	orini, 2002.					
4. veerarajan	I., Engineerir	iy wanemati	thomatica T	ai, i ala IVIC		W Delfil, 2008). + 2010					
D Doolo J	inoar Algobra	A Modern In	troduction 2	ald IVICGIAW		п, тт. керпп 2005	ιι, 2010.					
7 ND Polio	inedi Alyeura:		n ouuclion, 2 ok of Engine	nu Eulliuii, I oring Matha	natics Lave	2000. i Dublications	Doprint 2000					
1. IN.P. Dall al		yai, A lexi DO	UK UI EIIYIIIE	ening watte	maucs, Laxin	i r'unications	, replin, 2000.					

8. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Part	ial derivatives, Total differential, Chain rule for differentiation, Partial derivatives of higher orders, Homogeneous
func	tions, Euler's theorem on homogeneous functions, differentiation of an implicit function, Jacobian, Maxima and
mini	ma of a function of two variables, Lagrange's method of undetermined multipliers.
Sug	gested Books:
1.	G. B. Thomas, R. L. Finney: Calculus and Analytic Geometry, Pearson Education.
2.	H. Anton, Irl C Bivens, Stephen Davis: Calculus 10th Edition, John Wiley & Sons.
3.	E. Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4.	E. Kreyszig and S. Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint 2015.

- E. Kreyszig: Advanced Engine 3. 4. E. Kreyszig and S. Ahuja, Appli 015.
- Srimanta Pal and Subodh C. Bhunia, Engineering Mathematics, Oxford University Press. 5.
- Mathematics Textbook for Class 11th& 12th by NCERT. 6.

Note: The paper setter will set the paper as per the question paper templates provided.

UNIT-IV

and Bernoulli's equations, Euler's equations.

to variable separable form, exact differential equation, and equations reducible to exact differential equations, linear

Multivariable Calculus:

Ordinary differential equations: Introduction, order and degree of the differential equation, Formation of differential equation, Solution of the

UNIT-III differential equation, Solution of the differential equation with variables separable and differential equations reducible

geometric or power curve of the form $y = ax^{b}$, fitting of an exponential curve of the form $y = ab^{x}$. (10 hrs)

of equations.

Curve Fitting: Introduction, Fitting of a straight line, fitting of second degree curve, fitting of a polynomial of degree m, fitting of a

Introduction, formation of equations, Relation between roots and coefficients, Reciprocal Equations, Transformation

BS-132

L

3

Purpose

C01

CO 2

CO 3

Т

1

Ρ

Credit

4.5

equations. UNIT-II Theory of Equations:

large system of linear equations.

UNIT-I (10 Hrs) Linear Algebra:

Introduction to matrices, its types, algebraic operations, transpose, determinant, minors and adjoint of a matrix. Elementary transformations, Inverse of a square matrix: Cramer's rule, Rank of a matrix, elementary matrices, Gauss Jordon method to find inverse using elementary transformations.

System of Linear equations: General representation, Homogeneous and Non-homogeneous system of linear equations, Consistency of linear system of equations, Gauss Elimination method to solve the system of linear

APPLIED MATHEMATICS-II

The objective of this course is to familiarize the prospective Biotechnology Engineers with techniques in essential tool of linear algebra, how to solve a differential equation, utility of higher order derivatives in engineering domain, and fitting of a curve to given data. It aims to equip the students with standard concepts and tools at a beginner to intermediate and then at advanced level that will serve them well towards tackling more advanced level of mathematics and applications that

To introduce the essential tool of matrices and linear algebra in a comprehensive manner to solve the

To introduce the statistical process used for estimating the parameters of a given curve or function to

Minor Test

25

Total

100

Time

3 h

Major Test

75

they would find useful in their disciplines. More precisely, the objectives are as under: **Course Outcomes**

fit to a given data set using various degrees and types of curve fitting techniques.

To introduce effective mathematical tools for the solutions of differential equations that model physical processes. CO 4 To extend some concept of differential calculus for more than one variables.

(08 hrs)

(12 Hrs)

BS-136		Calculus & Ordinary Differential Equations							
L	Т	Р	Credit	Major	Minor	Total	Time		
				Test	Test				
3	1	-	4	75	25	100	3 h		
Purpose	To familia	To familiarize the prospective engineers with techniques inmultivariate integration, ordinary							
	and partial differential equations and complex variables.								
Course Outcomes									
CO1	To introduce effective mathematical tools for the solutions of differential equations that model								
	physical pro	cesses.							
CO 2	To acquaint	the student	with mathe	ematical to	ols needed ir	n evaluating	multiple integrals and		
	their usage.								
CO 3	To introduce the tools of differentiation and integration of functions of complex variable								
	thatare used in various techniques dealing engineering problems.								
UNIT-I		(10 hrs)							

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree:equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Ordinary differential equations of higher orders:

Second order linear differential equations with constant coefficients, method of variation of parameters, Cauchy and Legendre's linear differential equations.

UNIT-II

(10 hrs)

Multivariable Calculus (Integration): Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar)

Applications: areas and volumes; Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

UNIT-III

(10hrs)

(10 hrs)

Vector Calculus: Introduction, Scalar and Vector point functions, Gradient, divergence & Curl and their properties, Directional derivative.

Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

UNIT-IV

Complex Variable – Differentiation: Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, findingharmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties;

Complex Variable – Integration:Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (withoutproof), Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof).

Suggested Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3. Erwin kreyszig and SanjeevAhuja, Applied Mathematics- II, Wiley India Publication, 2015.

4. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary ValueProblems, 9th Edn., Wiley India, 2009.

5. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

6. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice HallIndia, 1995.

7. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

8. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.

9. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

10. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

L		Т	Р	Credit	Major Test	Minor Test	Total	Time		
3		1 - 4.5 7		75	25	100	3 h			
Purpos	se	To familiarize	e the prospect	ive students w	ith techniques of	probabilty and st	tatistics.			
	Course Outcomes									
C01	Probability theory provides models of probability distributions(theoretical models of the observable reality involving chance effects) to be tested by statistical methods which has various engineering applications, for instance, in testing materials, control of production processes, robotics, and automatization in general, production planning and so on.									
CO 2	To develop the essential tool of statistics in a comprehensive manner.									
CO 3	To fa enum	To familiarize the student with the problem of discussing universe of which they in which complete enumeration is impractical, tests of significance plays a vital role in their hypothesis testing.								
UNIT-I	(10 Hrs)									

Probability & Statistics

BS-134

Basic Probability: Introduction, additive law of probability, Conditional Probability, Independent Events, Bayes' Theorem.

Random Variables: Discrete random variables, probability distribution, Probability mass function and distribution function, Expectation, Moments, Variance and standard deviation of discrete random variables.

(10 Hrs)

(10 hrs)

(10 hrs)

UNIT-II

Continuous Probability distribution:

Continuous random variables, probability distribution, Probability density function and distribution function, Expectation, Moments, Variance and standard deviation of Continuous random variables.

Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions.

UNIT-III

Basic Statistics:

Measures of Central tendency: Mean, median, quartiles, mode, Geometric mean, Harmonic mean, Measures of dispersion: Range, Quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments, Skewness and Kurtosis, Correlation, Coefficient of correlation, methods of calculations, Lines of regression, Rank correlation.

UNIT-IV

Applied Statistics:

Curve fitting by the method of least squares: Introduction, Fitting of a straight line, fitting of second degree curve, fitting of a polynomial of degree m, fitting of a geometric or power curve of the form $y = ax^{b}$, fitting of an exponential

curve of the form $y = ab^x$.

Test of significance: Basic terminology, Large sample test for single proportion, difference of proportions, single mean, difference of means, Small samples test for single mean, difference of means, Chi-square test for goodness of fit.

Suggested Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).

3. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.

5. N.P. Bali and and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

6. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

8. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

Course code	ES-109							
Coursetitle	Engi	Engineering Graphics& Design						
Scheme and Credits	L	Т	Ρ	Credits	Major	Minor	Total	Time
					Test	Test		
	1	2	0	3	75	25	100	3h

Course Outcomes

Objective-	Objective- To expose students to the basics of Engineering Drawing , graphics and Projections.							
CO-1	To learn about construction of various types of curves and scales.							
CO-2	To learn about orthographic projections of points, lines and planes.							
CO-3	To Learn about the sectional views and development of Right regular solids							
CO-4	To Learn about the construction of Isometric Projections and conversion of Isometric views to Orthographic views and vice-versa.							

UNIT - I

IntroductiontoEngineeringDrawing:

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

UNIT - II

Orthographic Projections:

Principles of Orthographic Projections-Conventions-Projections of Points and lines inclined to both planes; Projections of planes inclined to one principal Plane.

ProjectionsofRegular Solids:

Solid with axis inclinedtoboththePlanes;

UNIT - III

Sections and Sectional Viewsof Right Regular Solids:

Sectional views of simple right regular soilds like prism, pyramid, Cylinder and Cone. Development ofsurfacesofRightRegularSolids-Prism,Pyramid,CylinderandCone;

UNIT - IV

Isometric Projections:

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of IsometricViews to Orthographic Views and Vice-versa, Conventions;

Suggested Books:

- 1. Engineering Graphics using AUTOCAD 2000: T. Jeyapoovan, Vikas Publishing House.
- 2. Engineering Drawing: Plane and Solid Geometry: N.D. Bhatt and V.M.Panchal, Charotar Publishing House.
- 3. Engineering Drawing: Amar Pathak, Dreamtech Press, New Delhi.
- 4. Thomas E.French, Charles J.Vierck, Robert J.Foster, "Engineering drawing and graphic technology", McGraw Hill International Editions.
- 5. Engineering Graphics and Drafting: P.S. Gill, Millennium Edition, S.K. Katariaand Sons.
- 6. A Primer on Computer aided Engineering Drawing-2006, published by VTU, Belgaum.
- 7. A.Yarwood, Introduction to AutoCAD 2017, Published by CRC Press.
- 8. O. Ostrowsky, Engineering Drawing with CAD applications, Butterworth Heinemann, 1999.
- 9. BSI, Technical production documentation (TPD) specification for defining, specifying and graphically reporting products, BS8888, 2002.
- 10. CorrespondingsetofCADSoftwareTheoryandUserManuals.

Note: The paper setter will set the paper as per the question paper templates provided.

10(627)

Course code	ES-11	ES-113L							
Coursetitle	Engir	Engineering Graphics & Design Practice							
Scheme and Credits	L	Т	Ρ	Credits	Practical	Minor Test	Total	Time	
	-	-	3	1.5	30	20	50	3h	
Pre-requisites(if any)	-								

Aim:	То	make	student	practice	on	engineering	graphics	and	designsoftwaresand	provide	
expos	exposuretothevisualaspectsofengineeringdesign.										
CO-1		To give an overview of the user interface and toolboxes in a CAD software.									
CO-2	To understand to customize settings of CAD software and produce CAD drawing.										
CO-3	0-3 To practice performing various functions in CAD softwares.										
CO-4		To Lo	To Learn about solid modelling and demonstration of a simple team design project.								

Module 1: Overview of Computer Graphics:

Listing the computer technologies that impact on graphical communication, Demonstrating Knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus(Button Bars), The Command Line(where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

Module2: Customization & CAD Drawing:

Setup of the drawing page and the printer ,including scale settings, Setting up of units and drawing limits ;ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module3: Annotations, layering & other functions:

Applying dimensions to objects applying annotations to drawings ;Setting up and use of Layers ,layers to create drawings ,Create ,edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen);Printing documents to paper using the print command ;orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation ,Computer-aided design(CAD) software modeling of parts and assemblies .Parametric and non-parametric solid, surface, and wire frame models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises .Dimensioning guidelines ,tolerancing techniques; dimensioning and scale multi views of dwelling;

Module4: Demonstration of a simple team design project:

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blue print form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows ,doors ,and fixtures such as WC, bath ,sink ,shower ,etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modeling (BIM).

Suggested Books(ES-113L):

- 1. Chris McMahon and Jimmie Browne, CAD/CAM Principle Practice and Manufacturing Management, Addison Wesley England, Second Edition, 2000.
- 2. Chougule N.K.; CAD/CAM /CAE, Scitech Publications India Pvt. Ltd.
- 3. Vikram Sharma; Computer Aided Design and Manufacturing, S.K. Kataria and Sons.
- 4. Rogers, D.F. and Adams, A., Mathematical Elements for Computer Graphics, McGraw Hill Inc, NY, 1989
- 5. Ibrahim Zeid, CAD/CAM theory and Practice, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1992.
- 6. M.P. Groover, Automation, Productions systems and Computer-Integrated Manufacturing by Prentice Hall.
- 7. A Primer on Computer aided Engineering Drawing-2006, published by VTU, Belgaum.
- 8. A.Yarwood, Introduction to AutoCAD 2017, Published by CRC Press.
- 9. O. Ostrowsky, Engineering Drawing with CAD applications, Butterworth Heinemann, 1999.
- 10. BSI, Technical production documentation (TPD) specification for defining, specifying and graphically reporting products, BS8888, 2002.
- 11. (Corresponding set of)CAD Software Theory and User Manuals
- 12. Ibrahim Zeid, Mastering CAD/CAM, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
- 13. P. Radhakrishnan, S. Subramanayan and V.Raju, CAD/CAM/CIM, New Age International (P) Ltd., New Delhi.
- 14. Groover M.P. and Zimmers E. W., CAD/CAM: Computer Aided Design and Manufacturing, Prentice Hall International, New Delhi, 1992.
- 15. Dr. Sadhu Singh, Computer Aided Design and Manufacturing, Khanna Publishers, New Delhi, Second Edition, 2000.
- 16. Thomas E.French, Charles J.Vierck, Robert J.Foster, "Engineering drawing and graphic technology", McGraw Hill International Editions.

Course code	ES-111L								
Coursetitle	Manuf	Manufacturing Processes Workshop							
Scheme and Credits	L	Т	Р	Credits	Practical	Minor Test	Total	Time	
	0	0	3	1.5	60	40	100	3h	
Pre-requisites (if any)						·			

Aim: To	Aim: To make student gain a hands on work experience in a typical manufacturing industry environment.								
CO-1	To familiarize with different manufacturing methods in industries and work on CNC machine.								
CO-2	To learn working in Fitting shop and Electrical and Electronics shops,								
CO-3	To practice working on Carpentry and Plastic moulding/glass cutting jobs.								
CO-4	To gain hands on practice experience on Metal casting and Welding jobs.								

ManufacturingProcessesWorkshop

Contents

1. Manufacturing Methods-casting, forming, machining ,joining, advanced manufacturing methods

- 2. CNCmachining, Additivemanufacturing
- 3. Fittingoperations&powertools
- 4. Electrical&Electronics
- 5. Carpentry
- 6. Plastic moulding ,glass cutting
- 7. Metalcasting
- 8. Welding(arc welding&gas welding), brazing

Suggested Books:

- 1. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 7th edition, Pearson Education India Edition.
- 2. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., " Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- 3. Gowri P. Hariharan and A. Suresh Babu," Manufacturing Technology I" Pearson Education, 2008.
- 4. Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998
- 5. Rao P.N., " Manufacturing Technology", Vol. I and Vol. II, Tata McGraw-Hill House, 2017.

BS-141		Biology							
L	Т	Р	Credit	Major Test	Minor Test	Total	Time		
2	1	-	3	75	25	100	3h		
Purpose	Ise To familiarize the students with the basics of Biotechnology								
Course Outcomes									
C01	Introduction to essentials of life and macromolecules essential for growth and								
	Development								
CO2	Defining the basic concepts of cell division, genes and Immune system								
CO3	Introduction of basic Concept of Thermo Genetic Engg. & Biochemistry								
CO4	Introduction of basic Concept of Microbiology & Role of Biology in Different Fields								

Unit – I

Introduction to living world: Concept and definition of Biology; Importance of biology in major discoveries of life Characteristic features of living organisms; Cell ultra-structure and functions of cell organelles like nucleus, mitochondria, chloroplast, ribosomes and endoplasmic reticulum; Difference between prokaryotic and eukaryotic cell; Difference between animal and plant cell.

Classification of organisms: Classify the organisms on the basis of (a) Cellularity;- Unicellular and Multicellular organisms. (b) Energy and Carbon Utilization:- Autotrophs, Hetrotrophs and Lithotrops (c) Habitat (d) Ammonia excretion:- ammonotelic, 631ricotelic and ureotelic. (e) Habitat- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life

Unit-II

Introduction to Biomolecules: Definition, general classification and important functions of carbohydrates, lipids, proteins, nucleic acids (DNA& RNA: Structure and forms). Hierarch in protein structure: Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

Enzymes as biocatalysts: General characteristics, nomenclature and classification of Enzymes. Effect of temperature, Ph, enzyme and substrate concentrations on the activity of enzymes. Elementary concept of and coenzymes. Mechanism of enzyme action. Enzyme kinetics and kinetic parameters (Km and Vmax)

Unit-III

Genetics:-Mendel's laws of inheritance. Variation and speciation. Concepts of recessiveness and dominance. Genetic Disorders: Single gene disorders in human. **Human traits**: Genetics of blood groups, diabetes type I & II.

Cell Division:- Mitosis and its utility to living systems. Meiosis and its genetic significance. Evidence of nucleic acids as a genetic material. Central Dogma of molecular biology

4. Role of immune system in health and disease: Brief introduction to morphology and pathogenicity of bacteria, fungi, virus, protozoa beneficial and harmful for human beings.

Unit-IV

Metabolism:-Concept of Exothermic and endothermic reactions. Concept of standard free energy and Spontaneity in biological reactions. Catabolism (Glycolysis and Krebs cycle) and synthesis of glucose (Photosynthesis:- Light and Dark Reaction) of glucose. ATP as Energy Currency of the cell

Microbiology: Concept of species and strains, sterilization and media compositions, growth kinetics.

Role of Biology : Role of Biology in Agriculture, Medicine, Forensic science, Bioinformatics, Nanotechnology, Microelectromechanical systems (Bio-MEMS) and Sensors (Biosensors).

Text Book:

1. Introduction to Biotechnology, By Deswal & Deswal, Dhanpat Rai Publications N.A

2.Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2014.

3. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.

D. L. Nelson and M. M. Cox, "Principles of Biochemistry", W.H. Freeman and Company, 2012.

4.G. S. Stent and R. Calendar, "Molecular Genetics", Freeman and company, 1978.

Note: The paper setter will set the paper as per the question paper templates provided

Suggested Books:

1. Molecular Biology of cell, 4th ed. Alberts, Bruce et al. Garland Science Publishing, New York.

2. Microbiology. Pelczar Jr., M.J.; Chan, E.C.S. and Krieg, N.R. Tata McGraw Hill, New Delhi.

3. Lehninger: Principles of Biochemistry, 3rd edition, by David L. Nelson and M.M. Cox. Maxmillan/ Worth publishers.

4. Genetics by Snusted& Simmons.

5. Molecular Biotechnology: Principles Application of Recombinant DNA. Glick, B. R. and Pasternak, J. J. ASM press Washington DC.

6. Kuby's Immunology, Goldsby, R A, Kindt, T.J, Osborne, B.A. (2003) W. H. Freeman and company, New York.

7. Recombinant DNA 2nd Edition. Watson, James D. and Gilman, M. (2001) W.H Freeman and Company, NewYork.

8. Essentials of Molecular Biology 4thed, Malacinski, G. M. (2003) Jones & Bartlet Publishers, Boston.

ES-101		BASIC ELECTRICAL ENGINEERING								
L	Т	Р	Credit	Major Test	Minor Test	Total	Time(Hrs)			
4	1	-	5	75	25	100	3			
Purpose	To familiarize the students with the basics of Electrical Engineering									
Course Outcomes										
C01	CO1 Deals with steady state circuit analysis subject to DC.									
CO 2	CO 2 Deals with AC fundamentals & steady state circuit response subject to AC.									
CO 3	Deals with introductory Balanced Three Phase System analysis and Single Phase Transformer.									
CO 4	Explains the B	Explains the Basics of Electrical Machines & Electrical installations								

Unit-I

D.C. circuits: Ohm's Law, junction, node, circuit elements classification: Linear & nonlinear, active & passive, lumped & distributed, unilateral & bilateral with examples. KVL, KCL, Loop and node-voltage analysis of resistive circuit. Star-Delta transformation for resistors.**Network Theorems:** Superposition, Thevenin's, Norton's and Maximum power transfer theorems in a resistive network.

Unit-II

AC Fundamentals: Mathematical representation of various wave functions. Sinusoidal periodicsignal, instantaneous and peak values, polar & rectangular form of representation of impedances and phasor quantities. Addition & subtraction of two or more phasor sinusoidal quantities using component resolution method.RMS and average values of various waveforms.

A.C. Circuits: Behavior of various components fed by A.C. source (steady state response of pureR, pure L, pure C, RL, RC, RLC series with waveforms of instantaneous voltage, current & power on simultaneous time axis scale and corresponding phasor diagrams), power factor, active, reactive & apparent power. Frequency response of Series & Parallel RLC ckts. including resonance, Q factor, cut-off frequency & bandwidth. Generation of alternating emf.

Unit-III

Balanced Three Phase Systems: Generation of alternating 3- phase emf). 3-phase balanced circuits, voltage and current relations in star and delta connections. Measurement of 3-phase power by two wattmeter method for various types of star & delta connected balanced loads.

Single Phase Transformer (qualitative analysis only): Concept of magnetic circuits.Relation between MMF & Reluctance.Hysteresis & Eddy current phenomenon. Principle, construction &emf equationPhasor diagram at ideal, no load and on load conditions. Losses & Efficiency, regulation. OC & SC test, equivalent circuit, concept of auto transformer.

Unit-IV

Electrical Machines (qualitative analysis only): Construction and working of dc machine with commutator action, speed control of dc shunt motor. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Basics of Single-phase induction motor, capacitor start capacitor run Single-phase induction motor working. Basic construction and working of synchronous generator and motor.

Electrical Installations (LT Switchgear): Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing.

Suggested Books:

- 1. Basic Electrical Engg: A complete Solution by Vijay Kumar Garg, Wiley India Ltd.
- 2. Electrical Engg. Fundamentals by Rajendra Prasad, PHI Pub.
- 3. Basic Electrical Engg. by S.K. Sahdev, Pearson Education
- 4. Electrical Engg. Fundamentals: by Bobrow, Oxford Univ. Press
- 5. Basic Electrical Engg. By Del Toro.
- 6. Saxena & Dasgupta: Fundamentals of Electrical Engg (Cambridge University Press).

ES-103L	BASIC	BASIC ELECTRICAL ENGINEERING LAB								
L	Т	Practical	Credit	Minor Test	(Practical)	Total	Time (Hrs)			
-	-	2	1	20	30	50	3			
Purpose	To familiarize the students with the Electrical Technology Practicals									
Course Outcomes										
C01	Understand basi	c concepts	of Networ	k theorems						
CO 2	CO 2 Deals with steady state frequency response of RLC circuit parameters solution techniques									
CO 3	D 3 Deals with introductory Single Phase Transformer practicals									
CO 4	O 4 Explains the constructional features and practicals of various types of Electrical Machines									

LIST OF EXPERIMENTS

- 1. To verify KVL and KCL.
- 2. To verify Superposition theorem on a linear circuit with at least one voltage & one current source.
- 3. To verify Thevenin's Theorem on a linear circuit with at least one voltage & one current source.
- 4. To verify Norton's Theorem on a linear circuit with at least one voltage & one current source.
- 5. To study frequency response of a series R-L-C circuit on CRO and determine resonant frequency& Qfactor for various Values of R, L, and C.
- 6. To study frequency response of a parallel R-L-C circuit on CRO and determine resonant frequency& Q Factor for various values of R, L, and C.
- 7. To perform O.C. and S.C. tests on a single phase transformer.
- 8. To perform direct load test on a single phase transformer and plot efficiency v/s load characteristic.
- 9. To perform speed control of DC shunt motor.
- 10. To perform starting & reversal of direction of a three phase induction motor.
- 11. Measurement of power in a 3 phase balanced system by two watt meter method.
- 12. Study of Cut sections of DC Machines, Induction Motor
- 13. To study components of various LT Switchgears

Note: At least 9 out of the listed experiments to be performed during the semester.

Kurukshetra University Kurukshetra (Established by the State Legislature Act XII of 1956; 'A+' Grade, NAAC Accredited) Model Curriculum for Bachelor of Technology (B.Tech.) in Bio-Technology General, Course Structure & Scheme& Semester-Wise Credit Distribution (Credit-Based Scheme of Studies/Examination ((2018-19 Onwards in Phased Manner))

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit
1Hour Tutorial (T) per week	1 credit
1 Hour Practical (P) per week	0.5 credit
2 Hours Practical (Lab) per week	1 credit

B. Range of credits:

A total credit of about 160 is required for a student to be eligible to get Under Graduate degree in Biotechnology. A student will be eligible to get Under Graduate degree (B.Tech.) with Honours, if he/she completes an additional 20 credits. These could be acquired through MOOCs at Swayam portal or with in-house examination being conducted. In order to have an Honours degree, a student may choose minimum 20 credits provided that the student must ensure the course is approved by the Competent Authority, Government of India.

C. Structure of Undergraduate Engineering program:

S.No	Category Suggested	Approx. Breakup of Credits
1	Humanities and Social Sciences including management courses	12
2	Basic Science courses 25	24
3	Engineering Science courses including workshop, drawing, basics of	24
	electrical/mechanical/computer etc.	
4	Professional core courses	52.5
5	Professional Elective courses relevant to chosen specialization/branch	12
6	Open subjects – Electives from other technical and /or emerging	14
	subjects	
7	7 Project work, seminar and internship in industry or elsewhere	14
8	Mandatory Courses	(credit less)

Semester – III	
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S.	Course No.	Course Title	Teaching Schedule			hedule	Credits	ts Allotment of Marks				Duration
			L	Т	Р	Hours/W		Major	Minor	Practical	Total	UI EXAIII
						еек		Test	Test			(113.)
1	BTE-201	Cell Biology & Genetics	3	0	0	3	3.0	75	25	0	100	3
2	BTE-203	Microbiology	3	0	0	3	3.0	75	25	0	100	3
3	BTE-205	Biochemistry	3	0	0	3	3.0	75	25	0	100	3
4	BTE-207	Principles of Biostatistics	3	0	0	3	3.0	75	25	0	100	3
5	HM-901	Organizational Behavior	3	0	0	3	3.0	75	25	0	100	3
6	BTE-209L	Cell Biology & Genetics Lab	0	0	3	3	1.5	0	40	60	100	3
7	BTE-211L	Microbiology Lab	0	0	3	3	1.5	0	40	60	100	3
8	BTE-213L	Biochemistry Lab	0	0	3	3	1.5	0	40	60	100	3
		Total	15	0	9	24	19.5	375	245	180	800	
9	BTE-215	Industrial Training-I	2	0	0	2	-	-	100	-	100	-
10	*MC-902	Constitution of India	3	0	0	3		75	25	0	100	3

Note: BTE-215 is a mandatory credit less course in which the students to be evaluated for the industrial training undergone after 2nd semester and students will be required to get passing marks to qualify.

*MC-902 is a mandatory credit less course in which the student will be required to get passing marks in the major test.

Semester – IV	
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S.	Course No.	Course Title	Teaching Schedule			Credits	Allotment of Marks				Duration	
NU.			L	Т	Р	Hours/ Week	•	Major Test	Minor Test	Practical	Total	(Hrs.)
1	BTE-202	Molecular Biology	3	0	0	3	3.0	75	25	0	100	3
2	BTE-204	Bio-analytical Techniques	3	0	0	3	3.0	75	25	0	100	3
3	BTE-206	Immunology	3	0	0	3	3.0	75	25	0	100	3
4	BTE-208	Industrial Biotechnology	3	0	0	3	3.0	75	25	0	100	3
5	BS-202	Organic Chemistry	3	0	0	3	3.0	75	25	0	100	3
6	BTE-212L	Molecular Biology Lab	0	0	3	3	1.5	0	40	60	100	3
7	BTE-214L	Bio-analytical Techniques Lab	0	0	3	3	1.5	0	40	60	100	3
8	BTE-216L	Industrial Microbiology Lab	0	0	3	3	1.5	0	40	60	100	3
9	BTE-218L	Immunology Lab	0	0	3	3	1.5	0	40	60	100	3
		Total	15	0	12	27	21	375	285	240	900	
10	MC-901*	Environmental Sciences*	3	0	0	3		75	25	0	100	3

*MC-901 is a mandatory credit less course in which the student will be required to get passing marks in the major test. Note: All the students have to undergo 4-6 weeks industrial training after IV semester and to be evaluated in V semester.

Semester – V

S.	Course	Course Title	Teaching Schedule			chedule	Credits	Allotment of Marks				Duration
No.	No.		L	Τ	Р	Hours /Week		Major Test	Minor Test	Practical	Total	of Exam(Hrs.)
1	BTE-301	Recombinant DNA Tech	3	0	0	3	3.0	75	25	0	100	3
2	BTE-303	Bioprocess Engineering	3	0	0	3	3.0	75	25	0	100	3
3	BTE-305	Downstream Processing	3	0	0	3	3.0	75	25	0	100	3
4	BTE-307	Healthcare Biotechnology	3	0	0	3	3.0	75	25	0	100	3
5	OEC-I*		3	0	0	3	3.0	75	25	0	100	3
6	BTE-307L	Recombinant DNA Technology Lab	0	0	3	3	1.5	0	40	60	100	3
7	BTE-309L	Fermentation & Downstream Processing Lab	0	0	3	3	1.5	0	40	60	100	3
8	OEC-IL		0	0	2	2	1.0	0	40	60	100	3
		Total	15	0	10	25	19	375	245	180	800	
9	**MC-903	Essence of Indian Traditional Knowledge	3	0	0	3		100		0	100	3
10	*BTE-311	Industrial Training-II	0	0	2	2	0	0	100		100	

**MC-903 is a mandatory credit less course in which the student will be required to get passing marks in the major test.

* BTE-311 is a mandatory credit less course in which the students to be evaluated for the industrial training undergone after 4th semester and students will be required to get passing marks to qualify.

The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

The students should select one open Elective Courses (OEC) from the following list.

Course No.	OEC-I*							
ES-201	Essentials of Information Technology							
ES-211L	Information Technology Lab							
ES-213	Python							
ES-215L	Python Lab							
MOOC-1	Any one MOCC course with lab through SWAYAM							

Semester – VI	
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S.	Course	Course Title	T	eachin	ig Sche	edule	Credits		Allotmen	t of Marks	Duratio	
No.	No.		L	Т	Р	Hours/ Week		Major Test	Minor Test	Practical	Total	n of Exam (Hrs.)
1	OEC-II		3	0	0	3	3.0	75	25	0	100	3
2	BTE-304	Plant Biotechnology	3	0	0	3	3.0	75	25	0	100	3
3	BTE-306	Animal Biotechnology	3	0	0	3	3.0	75	25	0	100	3
4	BTE-308	Food Biotechnology	3	0	0	3	3.0	75	25	0	100	3
5	BTE-310	Environmental Biotechnology& Engineering	3	0	0	3	3.0	75	25	0	100	3
6	HM-902	Business Intelligence & Entrepreneurship	3	0	0	3	3.0	75	25	0	100	3
7	BTE-312	Animal Cell Culture Lab	0	0	3	3	1.5	0	40	60	100	3
8	BTE-314	Plant Cell Culture Lab	0	0	3	3	1.5	0	40	60	100	3
9	BTE-316	Food & Environmental Biotechnology Lab	0	0	3	3	1.5	0	40	60	100	3
		Total	18	0	9	27	22.5	450	270	180	900	

Note: All the students have to undergo 4-6 weeks industrial training after VI semester and it will be evaluated in VII semester. The students should select two open Elective Courses (OEC) from the following list.

The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

OEC-II	Course No.	OEC-II
Nano Biotechnology	OEC-BT-322	Introduction to Arts & Aesthetics
Introduction to MEMS	MOOC-2	Anyone MOOC through SWAYAM
Non Conventional Energy Resources		
	OEC-II Nano Biotechnology Introduction to MEMS Non Conventional Energy Resources	OEC-IICourse No.Nano BiotechnologyOEC-BT-322Introduction to MEMSMOOC-2Non Conventional Energy ResourcesResources

Semester – VII

S.	Course No.	Course Title	T	eachin	g Sch	edule	Credits	Allotment of Marks				Duration of Exam
NO.			L	T	Р	Hours/ Week		Major Test	Minor Test	Practical	Total	(Hrs.)
1	BTE-401	Bioinformatics	2	1	0	3	3.0	75	25	0	100	3
2	BTE-403	Pharmaceutical Biotechnology	3	0	0	3	3.0	75	25	0	100	3
3	*PE-I	Program Elective-I*	2	1	0	3	3.0	75	25	0	100	3
4	*PE-II	Program Elective-II*	2	1	0	3	3.0	75	25	0	100	3
5	BTE-405	Bioinformatics Lab	0	0	3	3	1.5	0	40	60	100	3
7	BTE-407	Project-I**	0	0	8	8	4.0	0	100	100	200	3
		Total	9	3	11	23	17.5	300	240	160	700	
8	*BTE-409	Industrial Training (Viva-Voce)***	0	0	2	2	-	0	0	100	100	

The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

Course No.	*PE-I	Course No.	*PE-II
BTE-411	Biosensor and Bioinstrumentation	BTE-417	Advanced Management Information System and Information Technology
BTE-413	Biochips and Microarray Technology	BTE-419	Stem Cell Technology
BTE-415	Enzyme Technology	BTE-421	Herbal Drug Technology

**The project should be initiated by the students in the beginning of VII semester and will be evaluated at the end of the semester on the basis of a presentation and report.

*BTE-409 is a mandatory credit less course in which the students to be evaluated for the industrial training undergone after 6th semester and students will be required to get passing marks to qualify.

Semester – VIII

S.	Course No.	Course Title		Feachin	g Sch	edule	Credits			Duration		
No.			L	Т	Р	Hours/		Major	Minor Test	Total	of Exam	
						Week		Test				(Hrs.)
1	*PE-III		2	1	0	3	3.0	75	25	0	100	3
2	*PE-IV		2	1	0	3	3.0	75	25	0	100	3
3	BTE-402	Biocatalysis & Biotransformation	3	0	0	3	3.0	75	25	0	100	3
4	**OEC-III		3	0	0	3	3.0	75	25	0	100	3
5	BTE-416	Project-II	0	0	15	15	7.5	0	100	100	200	3
		Total	10	2	15	27	19.5	300	200	100	600	

The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

*The student should select two Program Elective Courses (PEC) from the following list.

Course No.	PE-III	Course No.	PE-IV
BTE-404	Metagenomics	BTE-410	Developmental Biology
BTE-406	Molecular Modeling and Drug Design	BTE-412	Protein Engineering
BTE-408	Cancer Biology	BTE-414	Bioethics, IPR and Bio-safety

*The student should select one Open Elective Courses (OEC) from the following list.

Course No.	OEC-III
OEC-BT-418	Biomedical Electronics
OEC-BT-420	MATLAB & Simulation
OEC-BT-422	History of Science
OEC-BT-424	Internet of things
MOOC-3	Anyone MOOC through SWAYAM

Additional Courses for B.Tech. (Honours Degree) Branch/Course: Biotechnology

In order to have an Honours degree, a student may choose 20 credits from the following professional electives courses or MOOC through SWAYAM in addition. In addition to the following list, the student can also opt some more courses offered under MOOCs at Swayam portal from time to time

	Bachelor of Technology Biotechnology												
	Scheme of Studies/Examination												
	Additional Courses for B.Tech. (Honours Degree)												
S. No.	Course Code	Subject	L:T:P	Hours/W eek	Credits	Exa	mination S	Schedule (Mark	s)	Duration of Exam			
						Major Test	Minor Test	Practical	Total	(Hrs)			
1	PEC-BT-H 801	Chemical Genetics	3:0:0	3	3	75	25	0	100	3			
2	PEC-BT-H 802	Biological Waste Treatment	3:0:0	3	3	75	25	0	100	3			
3	PEC-BT-H 803	Industrial Biotechnology	3:0:0	3	3	75	25	0	100	3			
4	PEC-BT-H 804	Enzyme Engineering & Technology	3:0:0	3	3	75	25	0	100	3			
5	PEC-BT-H 805	Bioprocess Equipment design & Economics	3:0:0	3	3	75	25	0	100	3			
6	PEC-BT-H 806	Protein Engineering	3:0:0	3	3	75	25	0	100	3			
7	PEC-BT-H 807	Biomaterial Sciences	3:0:0	3	3	75	25	0	100	3			
8	PEC-BT-H 808	Biosensors	3:0:0	3	3	75	25	0	100	3			
9	PEC-BT-H 809	Biodiversity, Bio-prospecting and	3:0:0	3	3	0	40	60	100	3			
		Organic farming											
10	PEC-BT-H 810	Molecular Biophysics	3:0:0	3	3	0	40	60	100	3			
11	PEC-BT-H 811	Virology	3:0:0	3	3	0	40	60	100	3			
12	PEC-BT-H 812	Vaccine Biotechnology	3:0:0	3	3	0	40	60	100	3			

Open Elective Course for B. Tech. Students of other Departments

Course No.	OEC
BTE 401	Bioinformatics
BTE-414	Bioethics, IPR and Biosafety

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY (U.I.E.T) (A Constituent Autonomous Institute and Recognized by UGC under Section 12 (B) and 2 (f)); AICTE Approved; TEQIP-III) Kurukshetra University, Kurukshetra (K.U.K) – 136119, Haryana, INDIA (Established by the state Legislature Act XII of 1956; 'A+' Grade, NAAC Accredited) Phone: +91-1744-239155; Fax: +91-1744-238967, Web: http://www.uietkuk.org

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit
1Hour Tutorial (T) per week	1 credit
1 Hour Practical (P) per week	0.5 credit
2 Hours Practical (Lab) per week	1 credit

B. Range of Credits:

A total credit of 160 is required for a student to be eligible to get Under Graduate degree in **Electronics and Communication Engineering**. A student will be eligible to get Under Graduate degree **(B.Tech.) with Honours**, if he/she completes an additional 20 credits. These could be acquired through MOOCs at Swayam portal or with in-house examination being conducted. In order to have an Honours degree, a student may choose minimum 20 credits provided that the student must ensure the course is approved by the Competent Authority, Government of India.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination Semester III (w.e.f. session 2019-2020)

Sr. No.	Course No.	Subject	L:T:P	Hours/Week	Credits	Exa	Duration of Exam (Hrs)			
						Major Test	Minor Test	Practical	Total	(113)
1	BS-201	Optics & Waves	3:0:0	3	3	75	25	0	100	3
2	EC-201	Electronic Devices	3:0:0	3	3	75	25	0	100	3
3	EC-203L	Electronic Devices Lab	0:0:2	2	1	-	40	60	100	3
4	EC-205	Digital Electronics	3:0:0	3	3	75	25	0	100	3
5	EC-207L	Digital Electronics Lab	0:0:2	2	1	-	40	60	100	3
6	EC-209	Signals & Systems	3:0:0	3	3	75	25	0	100	3
7	EC-211L	Signals & Systems Lab	0:0:2	2	1	-	40	60	100	3
8	EC-213	Network Theory	3:0:0	3	3	75	25	0	100	3
9	ES-201	Essentials of Information Technology	3:0:0	3	3	75	25	0	100	3
10	*EC-215	Industrial Training-I	2:0:0	2	-	-	100	-	100	3
11	**MC-901	Environmental Sciences	3:0:0	3	-	100	-	0	100	3
		Total		26	21	450	270	180	900	
*EC-215 is	a mandatory c	redit-less course in which the stud	ents will be eval	uated for the indust	trial training u	undergone a	fter 2nd sen	hester and stud	dents will b	be required to

get passing marks to qualify.

**MC-901 is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination Semester IV (w.e.f. session 2019-2020)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Exa	s)	Duration of Exam (Hrs)		
						Major Test	Minor Test	Practical	Total	(113)
1	BS-204	Higher Engineering Mathematics	3:0:0	3	3	75	25	0	100	3
2	HM-903	Soft Skills & Interpersonal Communication	3:0:0	3	3	75	25	0	100	3
3	EC- 202	Digital Communication	3:0:0	3	3	75	25	0	100	3
4	EC-204L	Communication Lab	0:0:2	2	1	-	40	60	100	3
5	EC-206	Analog Circuits	3:0:0	3	3	75	25	0	100	3
6	EC-208L	Analog Circuits Lab	0:0:2	2	1	-	40	60	100	3
7	EC-210	Microprocessors & Microcontrollers	3:0:0	3	3	75	25	0	100	3
8	EC-212L	Microprocessors & Microcontrollers Lab	0:0:2	2	1	0	40	60	100	3
9	ES-202	Basics of Analog Communication	3:0:0	3	3	75	25	60	100	3
10	*MC-902	Constitution of India	3:0:0	3	-	100	-	0	100	3
		Total		27	21	550	270	240	900	

*MC-202 is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

Note: All the students have to undergo 4 to 6 weeks Industrial Training after 4th semester which will be evaluated in 5th semester.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination Semester V (w.e.f. session 2020-2021)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Exa	Examination Schedule (Marks)			
						Major Test	Minor Test	Practical	Total	(ni s.)
1	EC-301	Electromagnetic Waves	3:0:0	3	3	75	25	0	100	3
2	EC-303L	Electromagnetic Waves Lab	0:0:2	2	1	-	40	60	100	3
3	EC-305	Computer Organization & Architecture	3:0:0	3	3	75	25	0	100	3
4	EC-307	Information Theory and Coding	3:0:0	3	3	75	25	0	100	3
5	EC-309	Digital Signal Processing	3:0:0	3	3	75	25	0	100	3
6	EC-311L	Digital Signal Processing Lab	0:0:2	2	1	0	40	60	100	3
7	ECP*	Program Elective-I	3:0:0	3	3	75	25	0	100	3
8	ECO*	Open Elective-I	3:0:0	3	3	75	25	0	100	3
9	**EC-313	Industrial Training-II	2:0:0	2	-	-	*100	-	*100	3
10	***MC-903	Essence of Indian Traditional Knowledge	3:0:0	3	-	100	-	0	100	3
		Total		27	20	550	230	120	900	

* The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

**EC-313 is a mandatory credit-less course in which the students will be evaluated for the industrial training undergone after 4th semester and students will be required to get passing marks to qualify.

*** MC-903 is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination Semester VI (w.e.f. session 2020-2021)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Exa	mination	Schedule (Ma	arks)	Duration of Exam
						Major Test	Minor Test	Practical	Total	(Hrs.)
1	HM-901	Organizational Behavior	3:0:0	3	3	75	25	0	100	3
2	EC-302	Control System Engineering	3:0:0	3	3	75	25	0	100	3
3	EC-304L	Control System Engineering Lab	0:0:3	3	1.5	-	40	60	100	3
4	EC-306	Verilog HDL	3:0:0	3	3	75	25	0	100	3
5	EC-308L	Verilog HDL Lab	0:0:3	3	1.5	-	40	60	100	3
6	EC-310L	Mini Project/Electronic Design Workshop	0:0:4	4	2	-	40	60	100	3
7	ECP*	Program Elective-II	3:0:0	3	3	75	25	0	100	3
8	ECO*	Open Elective-II	3:0:0	3	3	75	25	0	100	3
		Total		25	20	375	245	180	800	

* The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

Note: All the students have to undergo 4 to 6 weeks Industrial Training after 6th semester which will be evaluated in 7th semester.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination Semester VII (w.e.f. session 2021-2022)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Exar	mination So	chedule (Mar	ks)	Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	HM- 904	Intellectual Property Rights for Technology Development & Management	3:0:0	3	3	75	25	0	100	3
2	ECP*	Program Elective-III	3:0:0	3	3	75	25	0	100	3
3	ECP*	Program Elective-IV	3:0:0	3	3	75	25	0	100	3
4	ECP*	Program Elective-V	3:0:0	3	3	75	25	0	100	3
5	ECO*	Open Elective-III	3:0:0	3	3	75	25	0	100	3
6	EC-401L	Project Stage-I	0:0:6	6	3	-	40	60	100	3
7	**EC-403	Industrial Training-III	2:0:0	2	-	-	*100	-	*100	3
		Total		23	18	375	165	60	600	
* The co **EC-403 required	urse of both 3 is a manda to get passin	Program Elective and Open Elective credit-less course in which the g marks to qualify.	ective will ne students	be offered a will be evalu	t 1/3 rd stren Jated for the	i gth or 20 s industrial t	students (w training und	/hichever is s lergone after	smaller) o 6 th semes	f the section. ter and students will be

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination Semester VIII(w.e.f. session 2021-2022)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Exa	amination S	Duration of Exam. (Hrs.)		
						Major Test	Minor Test	Practical	Total	
1	ECP*	Program Elective-VI	3:0:0	3	3	75	25	0	100	3
2	ECP*	Program Elective-VII	3:0:0	3	3	75	25	0	100	3
3	ECO*	Open Elective-IV	3:0:0	3	3	75	25	0	100	3
4	ECO*	Open Elective-V	3:0:0	3	3	75	25	0	100	3
5	EC-402L	Project Stage-II	0:0:14	14	7	-	40	60	100	3
		Total		26	19	300	140	60	500	

*The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.
Bachelor of Technology (Electronics & Communication Engineering) (Credit Based) KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Studies/Examination

	LIST OF	OPEN ELECTIVES (B.TECH. ECE)				
SEM	CODE	SUBJECT				
V	ECO-1	Computer Networks				
	ECO-2	Mechatronics				
	ECO-3	Electronic Measurement and Instruments				
	ECO-4	Renewable Energy Resources				
VI	ECO-5	Data Structures				
	ECO-6	O-6 Multimedia Communication				
	ECO-7	Consumer Electronics				
	ECO-8	Transducers and Their Applications				
VII	ECO-9	Bio-informatics				
	ECO-10	Electromechanical Energy Conversion				
	ECO-11	Operating Systems				
	ECO-12	Robotics				
VIII	ECO-13	Machine Learning				
	ECO-14	Soft Computing				
	ECO-15	Neural Networks and Fuzzy Logic				
	ECO-16	Software Defined Radio				
	ECO-17	Statistics and Operational Research				
	ECO-18	Biomedical Signal Processing				
	ECO-19	Internet of Things				
	ECO-20	Wireless Sensor Networks				

	LIST OF PROGRAM ELECTIVES (B.TECH. ECE)							
SEM	CODE	SUBJECT						
V	ECP-1	Probability Theory & Stochastic Processes						
	ECP-2	Speech and Audio Processing						
	ECP-3	Introduction to MEMS						
	ECP-4	Power Electronics						
	ECP-5	VLSI						
VI	ECP-6	Antennas and Propagation						
	ECP-7	CMOS Design						
	ECP-8	Bio-Medical Electronics						
	ECP-9	Scientific Computing						
VII ECP-10		Fiber Optic Communications						
	ECP-11	Nano electronics						
	ECP-12	Microwave Theory and Techniques						
	ECP-13	Adaptive Signal Processing						
VIII	ECP-14	Wireless Sensor Networks						
	ECP-15	Satellite Communication						
	ECP-16	High Speed Electronics						
	ECP-17	Wavelets						
	ECP-18	Embedded systems						
	ECP-19	Mixed Signal Design						
	ECP-20	Error correcting codes						
	ECP-21	Digital Image & Video Processing						
	ECP-22	Mobile Communication and Networks						

DEPARTMENT OF MECHANICAL ENGINEERING UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY (U.I.E.T) (A Constituent Autonomous Institute and Recognized by UGC under Section 12 (B) and 2 (f)); AICTE Approved; TEQIP-III) Kurukshetra University, Kurukshetra (K.U.K) – 136119, Haryana, INDIA (Established by the state Legislature Act XII of 1956; 'A+' Grade, NAAC Accredited) Phone: +91-1744-239155,; Fax: +91-1744-238967, Web: http://www.uietkuk.org

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit
1Hour Tutorial (T) per week	1 credit
1 Hour Practical (P) per week	0.5 credit
2 Hours Practical (Lab) per week	1 credit

B. Range of Credits:

A total credit of 160 is required for a student to be eligible to get Under Graduate degree in **Mechanical Engineering**. A student will be eligible to get Under Graduate degree **(B.Tech.)** with Honours, if he/she completes an additional 20 credits. These could be acquired through MOOCs at Swayam portal or with in-house examination being conducted. In order to have an Honours degree, a student may choose minimum 20 credits provided that the student must ensure the course is approved by the Competent Authority, Government of India.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED KURUKSHETRA UNIVERSITY KURUKSHETRA SCHEME OF STUDIES/EXAMINATION SEMESTER III (w.e.f. session 2019-2020)

S. No. **Course Name** L:T:P Hours/ **Examination Schedule (Marks)** Duration Course No. Credits Week of Exam (Hrs.) Major Minor Practical Total Test Test BS-201 **Optics & Waves** 1 3:0:0 3 3 75 25 0 100 3 2 BS-205 **Advanced Engineering Mathematics** 3:0:0 3 3 75 25 3 0 100 75 25 3 ES-203 **Basic Electronics Engineering** 3:0:0 3 3 0 100 3 MEC-201 Theory of Machines 3:1:0 4 75 25 0 100 3 4 4 MEC-203 75 5 Mechanics of Solids-I 3:1:0 4 4 25 0 100 3 MEC-205 Thermodynamics 75 25 100 6 3:1:0 4 0 3 4 Theory of Machines Lab 7 **MEC-207L** 0:0:2 2 40 60 3 1 0 100 MEC-209L 0:0:2 2 40 60 3 8 Mechanics of Solids Lab 0 100 1 9 *MEC-211 2:0:0 100 100 Industrial Training-I 2 -_ -10 **MC-901 **Environmental Sciences** 3:0:0 3 100 0 100 3 --450 Total 30 23 230 120 800

*MEC-211 is a mandatory non-credit course in which the students will be evaluated for the industrial training undergone after 2nd semester and students will be required to get passing marks to gualify.

**MC-901 is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED

KURUKSHETRA UNIVERSITY KURUKSHETRA

SCHEME OF STUDIES/EXAMINATION

SEMESTER IV(w.e.f. session 2019-2020)

S. No.	Course No.	Course Name	L:T:P Hou Wee	Hours/ Week	Hours/ Week	Hours/ Week	Hours/ Week	L:T:P Hours/ Week	Credits	Examination Schedule (Marks) Credits				
						Major Test	Minor Test	Practical	Total					
1	ES-204	Materials Engineering	3:0:0	3	3	75	25	0	100	3				
2	MEC-202	Applied Thermodynamics	3:0:0	3	3	75	25	0	100	3				
3	MEC-204	Fluid Mechanics & Fluid Machines	3:1:0	4	4	75	25	0	100	3				
4	MEC-206	Mechanics of Solids-II	3:1:0	4	4	75	25	0	100	3				
5	MEC-208	Instrumentation& Control	3:0:0	3	3	75	25	0	100	3				
6	ES-206L	Materials Engineering Lab	0:0:2	2	1	0	40	60	100	3				
7	MEC-210L	Fluid Mechanics & Fluid Machines Lab	0:0:2	2	1	0	40	60	100	3				
8	*MC-902	Constitution of India	3:0:0	3	-	100	-	-	100	3				
			Total	24	19	375	205	120	700					

*MC-902 is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

Note: All the students have to undergo 4 to 6 weeks Industrial Training after 4th semester which will be evaluated in 5th semester.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED KURUKSHETRA UNIVERSITY KURUKSHETRA SCHEME OF STUDIES/EXAMINATION

SEMESTER V(w.e.f. session 2020-2021)

S. No.	Course No.	Course Name	L:T:P	Hours/ Week	Credits	Examinatio	on Schedul	e (Marks)		Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	
1	HM-905	Entrepreneurship	3:0:0	3	3	75	25	0	100	3
2	MEC-301	Heat Transfer	3:1:0	4	4	75	25	0	100	3
3	MEC-303	Production Technology	3:0:0	3	3	75	25	0	100	3
4	MEC-305	Mechanical Vibrations and Tribology	3:0:0	3	3	75	25	0	100	3
5	MEC-307L	Heat Transfer lab	0:0:2	2	1	0	40	60	100	3
6	MEC-309L	Production Technology Lab	0:0:2	2	1	0	40	60	100	3
7	MEC-311L	Mechanical Vibrations and Tribology Lab	0:0:2	2	1	0	40	60	100	3
8	MEC-313L	Project-I	0:0:2	2	1	-	0	100	100	3
9	*MEC-315	Industrial Training-II	2:0:0	2	-	-	100	-	100	-
10	**MC-903	Essence of Indian Traditional Knowledge	3:0:0	3	-	100	-	-	100	3
			Total	26	17	300	220	280	800	

*MEC-315 is a mandatory non-credit course in which the students will be evaluated for the industrial training undergone after 4th semester and students will be required to get passing marks to qualify.

**MC-903 is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED KURUKSHETRA UNIVERSITY KURUKSHETRA SCHEME OF STUDIES/EXAMINATION

SEMESTER VI(w.e.f. session 2020-2021)

S. No.	Course No.	Course Name	L:T:P	Hours/ Week	Credits	Examina	ation Sche	edule (Marks)		Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	-
1	HM-901	Organizational Behaviour	3:0:0	3	3	75	25	0	100	3
2	MEC-302	Manufacturing Technology	3:0:0	3	3	75	25	0	100	3
3	MEC-304	Design of Machine Elements	2:4:0	6	6	75	25	0	100	4
4	MEC-306L	Mechanical Engineering Lab-I	0:0:2	2	1	0	40	60	100	3
5	MEC-308L	Mechanical Engineering Lab-II	0:0:2	2	1	0	40	60	100	3
6	MEC-310L	Project-II	0:0:6	6	3	0	0	100	100	3
7	MEP*	Program Elective-I	3:1:0	4	4	75	25	0	100	3
8	MEP*	Program Elective -II	3:1:0	4	4	75	25	0	100	3
			Total	30	25	375	205	220	800	

Course No.	ProgramElective I	Course No.	ProgramElective II
MEP-302	Internal Combustion Engines	MEP-308	Composite Materials
MEP-304	Gas Dynamics and Jet Propulsion	MEP-310	Refrigeration and Air Conditioning
MEP-306	Design of Transmission Systems	MEP-312	Product Engineering

Note: All the students have to undergo 4 to 6 weeks Industrial Training after 6th semester which will be evaluated in 7th semester.

* The course of Program Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED KURUKSHETRA UNIVERSITY KURUKSHETRA SCHEME OF STUDIES/EXAMINATION SEMESTER VII(w.e.f. session 2021-2022)

S. No.	Course No.	Course Name	L:T:P	Hours/ Week	Credits	Exa	mination Sc	hedule (Marks	s)	Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	
1	MEO*	Open Elective-I	3:0:0	3	3	75	25	0	100	3
2	MEC-401	Automation in Manufacturing	3:0:0	3	3	75	25	0	100	3
3	MEC-403L	Mechanical Engineering Lab-III	0:0:2	2	1	0	40	60	100	3
4	MEC-405L	Project-III	0:0:10	10	5	0	100	100	200	3
5	MEP*	Program Elective-III	3:0:0	3	3	75	25	0	100	3
6	MEP*	Program Elective -IV	3:0:0	3	3	75	25	0	100	3
7	**MEC-407	Industrial Training-III	2:0:0	2	-	-	100	-	100	
			Total	26	18	300	240	160	700	

Pro	ogram Elective-III	Program Elec	tive-IV	Open Elect	ives-l
Course No.	Course Name	Course No.	Course Name	Course	Course Name
				No.	
MEP-401	Computer Aided Design	MEP-407	Mechatronic Systems	MEO-401	Smart Materials
MEP-403	Finite Element Analysis	MEP-409	Industrial Robotics	MEO-405	Non-Destructive Testing
MEP-405	Power Plant Engineering	MEP-411	Solar Energy Analysis	MEO-407	Manufacturing Cost Estimation
				MEO-409	Ergonomics
				MEO-411	Air and Noise Pollution

* The course of both Program Elective and Open Elective will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

**MEC-407 is a mandatory non-credit course in which the students will be evaluated for the industrial training undergone after 6th semester and students will be required to get passing marks to qualify.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED KURUKSHETRA UNIVERSITY KURUKSHETRA SCHEME OF STUDIES/EXAMINATION

SEMESTER VIII(w.e.f. session 2021-2022)

S. No.	Course No.	Course Name	L:T:P	Hours/ Week	Credits	Examin	Examination Schedule (Marks)		s)	Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	
1	MEC-402L	Project-IV	0:0:10	10	5	-	100	100	200	3
2	MEO*	Open Elective-II	3:0:0	3	3	75	25	0	100	3
3	MEO*	Open Elective-III	3:0:0	3	3	75	25	0	100	3
4	MEP*	Program Elective-V	3:0:0	3	3	75	25	0	100	3
5	MEP*	Program Elective-VI	3:0:0	3	3	75	25	0	100	3
			Total	22	17	300	200	100	600	

	Program Elective- V	Program Elective-VI				
Course No.	Course Name	Course No.	Course Name			
MEP-402	Non-Conventional Machining	MEP-408	Welding Technology			
MEP-404	Automobile Engineering	MEP-410	Design of Pressure Vessels and Piping			
MEP-406	Product Design and Manufacturing	MEP-412	Quality and Reliability Engineering			

	Open Elective- II	Open Elective-III				
Course No.	Course Name	Course No.	Course Name			
MEO-402	Supply Chain Management	MEO-408	Lubricants and Lubrication			
MEO-404	Competitive Manufacturing Systems	MEO-410	Total Quality Management			
MEO-406	Concurrent Engineering	MEO-412	Energy Conservation and Management			

Model Curriculum Scheme for Bachelor of Technology (B.Tech.) in Computer Science and Engineering (CSE) Program

(Credit-Based Scheme of Studies/Examination from 2018-19 Onwards in Phased Manner)



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY (U.I.E.T) (A Constituent Autonomous Institute and Recognized by UGC under Section 12 (B) and 2 (f)); AICTE Approved; TEQIP-III)

Kurukshetra University, Kurukshetra (K.U.K) – 136119, Haryana, INDIA (Established by the state Legislature Act XII of 1956; 'A+' Grade, NAAC Accredited) Phone: +91-1744-239155; Fax: +91-1744-238967, Web: http://www.uietkuk.org

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit							
1Hour Tutorial (T) per week	1 credit							
1 Hour Practical (P) per week	0.5 credit							
2 Hours Practical (Lab) per week	1 credit							

B. Range of Credits:

A total credit of 160 is required for a student to be eligible to get Under Graduate degree in Computer Science and Engineering. A student will be eligible to get Under Graduate degree **(B.Tech.) with Honours**, if he/she completes an additional 20 credits. These could be acquired through MOOCs or with in-house examination being conducted. In order to have an Honours degree, a student may choose minimum 20 credits provided that the student must ensure the course is approved by the Competent Authority, Government of India.

C. Abbreviations Used for Various Course Codes:

BS: Basic Science Courses
ES: Engineering Science Courses
HM: Humanities and Social Sciences including Management Courses
PC: Professional Core Courses
MC: Mandatory Courses
PE: Professional Elective Courses/Program Elective Courses
OE: Open Elective Courses
PROJ: Project
CS: Computer Science & Engineering
OE-CS: Open Elective Courses-Computer Science & Engineering
A: Applications
D: Data Science and Machine Intelligence
S: Systems
T: Theory and Algorithms

	Bachelor of Technology (Computer Science & Engineering)												
		Credit-Ba	sed Sch	neme of	f Studies	s/Exami	nation						
	Semester III (w.e.f. session 2019-2020)												
S.	Course S	Subject	L:T:P	Hour	Credit	Examir	nation S	chedule (N	Marks)	Duration			
NO.	Code			s/We	S					of Exam (Hrs)			
				CK		Major	Minor	Practical	Total	(113)			
						Test	Test						
	ES-205	Principles of	3:0:0	3	3	75	25	0	100	3			
1		Programming Languages											
2	PC-CS- 201	Data Structure & Algorithms	3:0:0	3	3	75	25	0	100	3			
3	ES-207	Digital Electronics	3:0:0	3	3	75	25	0	100	3			
	PC-CS-	Object Oriented	3:0:0	3	3	75	25	0	100	3			
4	203	Programming											
5	BS-205	Mathematics-III	3:0:0	3	3	75	25	0	100	3			
6	HM-902	Business Intelligence and Entrepreneurship	2:0:0	2	2	75	25	0	100	3			
7	PC-CS-	Data Structure &	0:0:4	4	2	0	40	60	100	3			
0	205L ES 2001	Algorithms Lab	0.0.1	1	2	0	40	60	100	2			
8	L3-209L	Digital Electronics Lab	0.0.4	4	2	0	40	00	100	3			
9	PC-CS- 205 L	Programming Lab	0:0:4	4	2	0	40	60	100	3			
	Total			29	23	450	270	180	900				
10	SIM-201*	Seminar on Summer Internship	2:0:0	2	0	0	50	0	50				

***Note:** SIM-201^{*} is a mandatory credit-less course in which the students will be evaluated for the Summer Internship (training) undergone after 2nd semester and students will be required to get passing marks to qualify.

	Bachelor of Technology (Computer Science & Engineering)												
		Credit-Ba	sed Sch	neme of	f Studies	/Exami	nation						
	Semester IV (w.e.f. session 2019-2020)												
S. No.	Course Code	Subject	L:T:P	Hour s/We	Credits	s Examination Schedule (Marks)				Duration of Exam			
				CK		Major Test	Minor Test	Practical	Total	(113)			
1	PC-CS- 202	Discrete Mathematics	3:0:0	3	3	75	25	0	100	3			
2	PC-CS- 204	Internet Technology and Management	3:0:0	3	3	75	25	0	100	3			
3	PC-CS- 206	Operating Systems	3:0:0	3	3	75	25	0	100	3			
4	PC-CS- 208	Design & Analysis of Algorithms	3:0:0	3	3	75	25	0	100	3			
5	HM-901	Organizational Behaviour	3:0:0	3	3	75	25	0	100	3			
6	PC-CS- 210L	Internet Technology and Management Lab	0:0:4	4	2	0	40	60	100	3			
7	PC-CS- 212L	Operating Systems Lab	0:0:4	4	2	0	40	60	100	3			
8	PC-CS- 214L	Design & Analysis of Algorithms Lab	0:0:4	4	2	0	40	60	100	3			
	Total			27	21	375	245	180	800				
9	MC-901	Environmental Sciences	3:0:0	3	0		100	0	100	3			

Note: Students be encouraged to go to 6-8 weeks summer internships mandatory during the summer break after the completion of fourth semester exams.

	Bachelor of Technology (Computer Science & Engineering)												
		Credit-Bas	sed Sch	ieme of	f Studies	/Exami	nation						
	Semester V (w.e.f. session 2020-2021)												
S. No.	Course Code	Code Subject L:T:P Hour Credits Examination Schere (Marks)				on Schedu arks)	lle	Duration of Exam					
			CK		Major Test	Minor Test	Practical	Total	(113)				
1	ES-301	Signals & Systems	3:0:0	3	3	75	25	0	100	3			
2	PC-CS- 301	Database Management Systems	3:0:0	3	3	75	25	0	100	3			
3	PC-CS- 303	Formal Language & Automata Theory	3:0:0	3	3	75	25	0	100	3			
4	PC-CS- 305	Essential of Information Technology	3:0:0	3	3	75	25	0	100	3			
5	PC-CS- 307	Computer Organization & Architecture	2:0:0	2	2	75	25	0	100	3			
6	PE	Elective-I	3:0:0	3	3	75	25	0	100	3			
7	PC-CS- 309L	Database Management Systems Lab	0:0:4	4	2	0	40	60	100	3			
8	PC-CS- 311L	Essential of Information Technology Lab	0:0:4	4	2	0	40	60	100	3			
Total				25	21	450	230	120	800				
9	MC-904	Energy Resources & Management	3:0:0	3	0	0	100	0	100	3			
10	SIM-301*	Seminar on Summer Internship	2:0:0	2	0	0	50	0	50				

PEC Elective-I
Digital Data Communication: PE-CS-T301
Parallel and Distributed Computing: PE-CS-T303
Information Theory and Coding: PE-CS-T305
Advanced Algorithms: PE-CS-T307

Note: SIM-301^{} is a mandatory credit-less course in which the students will be evaluated for the Summer Internship undergone after 4th semester and students will be required to get passing marks to qualify.

	Bachelor of Technology (Computer Science & Engineering)													
		Credit-Ba	ised Sch	neme of	f Studies	/Examina	ation							
	Semester VI (w.e.f. session 2020-2021)													
S. No.	Course Subject Code	Subject	L:T:P	Hour s/We	Credits	Examin	ation So	hedule (N	larks)	Duratio n of				
			CN		Major Test	Minor Test	Practical	Total	(Hrs)					
1	PC-CS- 302	Complier Design	3:0:0	3	3	75	25	0	100	3				
2	PC-CS- 304	Computer Networks	3:0:0	3	3	75	25	0	100	3				
3	PE	Elective-II	3:0:0	3	3	75	25	0	100	3				
4	PE	Elective-III	3:0:0	3	3	75	25	0	100	3				
5	OE	Open Elective-I	3:0:0	3	3	75	25	0	100	3				
6	PROJ – CS-302	Project-1	0:0:6	6	3	0	40	60	100	3				
7	PC-CS- 306L	Complier Design Lab	0:0:4	4	2	0	40	60	100	3				
8	PC-CS- 308L	Computer Networks Lab	0:0:4	4	2	0	40	60	100	3				
		Total		29	22	375	245	180	800					

PEC Elective-II	PEC Elective-III
Advanced Computer Architecture: PE-CS-S302	Simulation & Modeling: PE-CS-S310
Distributed Systems: PE-CS-S304	Mobile Computing: PE-CS-S312
Fault Tolerant Computing: PE-CS-S306	Unix & Linux Programming: PE-CS-S314
Ad-Hoc and Sensor Networks: PE-CS-S308	Real Time Systems: PE-CS-S316
OEC Elective-I	
Soft Skills and Interpersonal Communication: OE-CS-	
302	
Management Information System: OE-CS-304	
Enterprise Resource Planning: OE-CS-306	

Note: Students be encouraged to go to 6-8 weeks summer internships mandatory during the summer break after the completion of sixth semester exams.

The course of both PE & OE will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

Bachelor of Technology (Computer Science & Engineering)													
		Credit-Ba	sed Sch	neme o	f Studies	/Examina	ation						
	Semester VII (w.e.f. session 2021-2022)												
S. No.	Course Code	ourse Subject L:T:P Hour Credits Examination Schedule (Mark code s/We ek					larks)	Duration of Exam (Hrs)					
				ÖN		Major	Minor	Practical	Total	(
						Test	Test						
1	PE	Elective-IV	3:0:0	3	3	75	25	0	100	3			
2	PE	Elective-V	3:0:0	3	3	75	25	0	100	3			
3	OE	Open Elective-II	3:0:0	3	3	75	25	0	100	3			
4	PROJ-CS- 401	Project-II	0:0:12	12	6	0	40	60	100	3			
5	PE-L	Elective-IV Lab	0:0:2	2	1	0	40	60	100	3			
6	PE-L	Elective-V Lab	0:0:2	2	1	0	40	60	100	3			
Total				21	17	225	115	60	400				
7	SIM-401*	Seminar on Summer Internship	2:0:0	2	0	0	50	0	50				

PEC Elective-IV	PEC Elective-V
Data Mining: PE-CS-D401	Soft Computing: PE-CS-D409
Speech and Natural Language Processing: PE-CS-	Neural Networks and Deep Learning:
D403	PE-CS-D411
Information Retrieval: PE-CS-D405	Object Oriented Software Engineering: PE-CS-
	D413
Software Verification and	Expert Systems: PE-CS-D415
Validation and Testing: PE-CS-D407	
OEC Elective-II	
Cyber Law and Ethics: OE-CS-401	
Bioinformatics: OE-CS-403	
Fiber Optic Communications: OE-CS-405	
Industrial Electrical Systems: OE-CS-407	

The course of both PE & OE will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

Note: SIM-401^{} is a mandatory credit-less course in which the students will be evaluated for Summer Internship undergone after 6th semester and students will be required to get passing marks to qualify.

	Bachelor of Technology (Computer Science & Engineering)												
		Credit-E	Based Sch	ieme of	f Studies	/Examin	ation						
	Semester VIII (w.e.f. session 2021-2022)												
S. No.	Course Code	Subject	L:T:P	Hour s/We	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)			
				U.		Major	Minor	Practical	Total	(113)			
						Test	Test						
1	PE	Elective-VI	3:0:0	3	3	75	25	0	100	3			
2	OE	Open Elective-III	2:0:0	2	2	75	25	0	100	3			
3	OE	Open Elective-IV	2:0:0	2	2	75	25	0	100	3			
4	PROJ-CS- 402	Project-III	0:0:12	12	6	0	40	60	100	3			
5	PE-L	Elective-VI Lab	0:0:4	4	2	0	40	60	100	3			
		Total		23	15	225	155	120	500				

The course of both PE & OE will be offered at 1/3rd strength or 20 students (whichever is smaller) of the section.

PE Elective-VI	
Cloud Computing: PE-CS-A402	
Computer Graphics: PE-CS-A404	
Web and Internet Technology: PE-CS-A406	
Mobile Apps Development: PE-CS-A408	
OE Elective-III	OE Elective-IV
Cyber Security: OE-CS-402	Software Quality Models: OE-CS-410
Satellite Communication: OE-CS-404	Automation in Manufacturing: OE-CS-412
Social Networks: OE-CS-406	IPR, Bioethics and Biosafety: OE-CS-414
Agile Software Engineering: OE-CS-408	Microprocessor & Interfacing: OE-CS-416

Additional Courses for B.Tech. (Honours Degree) Branch/Course: B.Tech. - Computer Science Engineering

A student will be eligible to get Under Graduate degree '**B.Tech. with Honours**', if he/she completes an additional 20 credits. These could be acquired through MOOCs or with in-house examination being conducted. In order to have an Honours degree, a student may choose minimum 20 credits from the following professional electives courses in addition, provided that the student must ensure the course is approved by the Competent Authority, Government of India. The professional electives courses may be selected excluding these. In addition to the following list, the student can also opt some more courses offered under MOOCs at Swayam portal from time to time.

	Bachelor of Technology (Computer Science & Engineering)												
		Credit-Ba	sed Sch	neme of	Studies	/Examin	ation						
	Additional Courses for B.Tech. (Honours Degree)												
S. No.	Course Code	Subject	L:T:P	Hours /Week	Credits	Examir	nation S	chedule (I	Duration of Exam				
						Major Test	Minor Test	Practical	Total	(Hrs)			
1	PE-CS- T509	Graph Theory	3:0:0	3	3	100		0	100	3			
2	PE-CS- S611	Software Engineering	3:0:0	3	3	100		0	100	3			
3	PE-CS- S612	Embedded Systems	3:0:0	3	3	100		0	100	3			
4	PE-CS- D709	Artificial Intelligence	3:0:0	3	3	100		0	100	3			
5	PE-CS- A805	Cryptography & Network Security	3:0:0	3	3	100		0	100	3			
6	PE-CS- S613	Internet-of-Things	3:0:0	3	3	100		0	100	3			
7	PE-CS- D710	Data Analytics	3:0:0	3	3	100		0	100	3			
8	PE-CS- D711	Machine Learning	3:0:0	3	3	100		0	100	3			
9	PE-CS- S611L	Software Engineering Lab	0:0:4	4	2	0		100	100	3			
10	PE-CS- S612L	Embedded Systems Lab	0:0:4	4	2	0		100	100	3			
11	PE-CS- D710L	Data Analytics Lab	0:0:4	4	2	0		100	100	3			
12	PE-CS- D711L	Machine Learning Lab	0:0:4	4	2	0		100	100	3			

<u>M.A. Yoga</u> From session 2017-2018

NEW SCHEME OF EXAMINATION & NEW SYLLABUS

(Time: 3 hours for each Theory Paper)

SEMESTER -I

Paper No.	Nomenclature of the paper	Max.	External	Internal marks
		Marks	Marks	
Paper-101	Fundamentals of Yoga	100	80	20
Paper-102	Anatomical and Physiological Aspects of Yoga - I	100	80	20
Paper-103	Pantanjali Yog Sutra	100	80	20
Paper-104	Research Methodology in Yoga	100	80	20
Paper-105	<u>Practical</u> (a) Demonstrations of Assan (b) Pranayam and Shudhi Kriya	100	100	
	Total	500	420	80

<u>SEMESTER –II</u>

Paper No.	Nomenclature of the paper	Max.	External	Internal marks
		Marks	Marks	
Paper-201	Fundamentals of Hatha Yoga	100	80	20
Paper-202	Anatomical and Physiological Aspects of Yoga - II	100	80	20
Paper-203	Health Aspects of Yoga	100	80	20
Paper-204	Applied Statistics in Yoga	100	80	20
Paper-205	Practical (i) Demonstrations of Asana, Pranayam and Shudhi Kriya ii) Applied Statistic	100	100	
	Total	500	420	80

SEMESTER –III

Paper No.	Nomenclature of the paper	Max. Marks	External Marks	Internal marks
Paper-301	Fundamentals of Naturopathy	100	80	20
Paper-302	Basic Yoga Texts Principle Upanishads & Bhagwat Geeta	100	80	20
Paper-303	Applications of Yoga	100	80	20
Paper-304	Applied Psychology in Yoga	100	80	20
Paper-305 Practical (i) Demonstrations of Asana Pranayam and Shudhi		70	70	
	Krıya. (ii) Applied Psychology	30	30	
	Total	500	420	80

SEMESTER –IV

Paper No.	Nomenclature of the paper	Max. Marks	External Marks	Internal marks
Paper-401	Yoga Therapy	100	80	20
Paper-402	Options: i) Food & Nutrition / ii) Dissertation	100	80	20
Paper-403	Kinesiological Aspect of yoga	100	80	20
Paper-404	Teaching Methods of Yoga	100	80	20
Paper-405	<u>Practical</u> (i) Demonstrations of Assan Pranayam (ii) Teaching Practices Lesson Plan	50 50	50 50	
	Total	500	420	80

M. A. YOGA – 3rd SEMESTER

PAPER – 301: FUNDAMENTALS OF NATUROPATHY

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. INTRODUCTION TO NATUROPATHY

- 1.1 Meaning & Definitions, Fundamental Principles of Naturopathy.
- 1.2 Swasthya Vritam: Dinacharya, Ratricharya, Ritucharya, Vegadharana.
- 1.3 Physical, Mental, Spiritual Health.
- 1.4 Naturopathy and Allopathy.

<u>Unit-II</u>

2. HYDROTHERAPY

- 2.1 Hydrotherapy: Meaning, Definition and its Benefits.
- 2.2 General Principles of Hydrotherapy.
- 2.3 Concept of Ushapan and its benefits.
- 2.4 Classification of Temperature, Effects of Different Water Temperature on the body.

<u>Unit-III</u>

3. MUDTHERAPY

- 3.1 Mudtherapy: Meaning and its uses.
- 3.2 Classification of Mud for Therapeutic use and its effects.
- 3.3 Mud Bath, Different Bandages of Mud, their uses and application.
- 3.4 Soil: Meaning, Types, Characteristics and their uses in Naturopathy.

<u>Unit-IV</u>

4. FASTING AND DIETETICS

- 4.1 Fasting: Meaning and Classification.
- 4.2 Difference between Fasting and Starvation, Hunger and Appetite.
- 4.3 Diet According to Naturopathy and its types.
- 4.4 Fasting: Precautions before, during and after, Effect of fasting on human Body.

References Books:-

- 1. History & Philosophy of Naturophaty Dr. S. J. Singh
- 2. Philosophy of Nature Cure Dr. Henri Lindlhai.
- Rational Hydrotherapy: A Manual of the Physiological and Therapeutic Effects of Hydriatic Procedures, and the Technique of their Application in the Treatment of Disease Hardcover – 9 Sep. 2004 by John Harvey Kellogg (Author), Publisher: TEACH Services, Inc. (9 September 2004), ISBN-13: 978-1572582095

Contd.P/2..

- Mud Therapy: Healing Through One of the Five Elements Paperback 13 Sep 2013 by Ashish Indani (Author), Publisher: B Jain Publishers Pvt. Ltd. (13 September 2013), ISBN-13:978-8131908457
- Rational Fasting (Ehret's Health Literature) Mass Market Paperback Import, Jun 1971 by Arnold Ehret (Author), Publisher: Benedict Lust Publications (1 June 1971), ISBN-13:978-0879040055

M. A. YOGA – 3rd SEMESTER

PAPER – 302: BASIC YOGA TEXTS PRINCIPLE UPANISHADS & BHAGWAT GITA

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. INTRODUCTION OF UPANISHADS

- 1.1 Katha Upanishad: Definition of Yoga; Nature of soul; Importance of Self Realization.
- 1.2 Prashna Upanishad: Concept of Prana and rayi (creation); Panchapranas; The five main questions.
- 1.3 Mundaka Upanikshad: Two approaches to Brahma Vidya-the Para and Apara: The greatness of Brahmavidya, The worthlessness of Selfish-Karma; Tapas and Gurubhakti.
- 1.4 The origin of creation, Brahman the target of meditation.

<u>Unit-II</u>

2. MASSAGES OF UPANISHADS

- 2.1 Ishavasyopanishad: Concept of Karmanishta; Concept of Vidya and Avidya; Knowledg of Brahman; Atma Bhava.
- 2.2 Kena Upanishad: indwelling Power; Indriya and antahkarana; Self and the Mind;.
- 2.3 **Kena Upanishad:** Intutive relalization of the truth, Truth transcendental; Moral of Yaksha Upakhyana;
- 2.4 Mandukya: Four States of Consciousness and its relation to syllables in Omkara.

Unit-III

3. BHAGWAT GITA

- 3.1 Introduction to Bhagwat Gita.
- 3.2 History of Bhagwat Gita.
- 3.3 Purpose and Importance of Yoga in Modern Time.
- 3.4 Nature of Dharma (Dharma Ka Swaroop): 2.31, 2.33, 2.39, 2.40, 3.35, 4.30, 9.31, 18.47 and 18.66

<u>Unit-IV</u>

4. TYPES OF YOGA IN BHAGWAT GITA

- 4.1 Sankhya and Gyan Yoga (Chapter-2: Shloka 12-72) and (Chapter-13: Shloka 07-34).
- 4.2 Karma Yoga (Chapter-3: Shloka 09-35) and (Chapter-4: Shloka 17-42).
- 4.3 Bhakti Yoga (Chapter-12: Shloka 01-20).
- 4.4 Characteristics of a Yogi (Chapter-2: Shloka 55-72).

Contd.P/2..

References Books:-

- 1. Message of Upanishad, Bharatiya Vidya Bhawan, (1993)
- 2. Prasad, Ramanuj, (2003), "Know the Upanishads", V & S Publication, New Delhi, ISBN-9381384754.
- 3. Gambhirananda, Swami, (1957), Eight Upanishads with the commentary of Shankaracharya-Vol. 1 and Vol. 2", Advaita Ashrama, University of Virginia.
- 4. Radhakrishnan, Sarvepalli, (1974), "The Principal Upanishads", Allen & Unwin Publications, ISBN-8172231245.
- 5. Ghosh Aurobindo, (1995), "Essays on Gita", Shri Aurobindo Ashrama Press, Pondicherry.
- 6. Ranganathananda Swami, (2000), "Universal Message of Bhagawad Gita" Vol- 1 & 2, Advaita Ashrama, ISBN-8175052139.
- Shastri, A. Mahadeva, (1901), "Shrimad Bhagawad Gita with Shankara Bhashya", Literary Licensing LLC, ISBN-1498160336.
- 8. Easwaran, Eknath, "Bhagawad Gita", Nilgiri Press, Canada, ISBN-978-1-58638-019-9

PAPER – 303: APPLICATIONS OF YOGA

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. YOGA IN EDUCATION

- 1.1 Meaning, Definitions, Aim and Objectives of Yoga Education.
- 1.2 Relationship between Yoga and Education.
- 1.3 Factors of Yoga Education and its significance.
- 1.4 Guru-Shishya Prampra in Yoga Education.
- 1.5 Role of Yoga in Development of Human Society.

<u>Unit-II</u>

2. VALUE EDUCATION

- 2.1 Meaning, Definitions and Types of Values.
- 2.2 Value Oriented Education and Modes of Living.
- 2.3 Contribution of Yoga towards development of values.
- 2.4 Role of Yoga Teacher in Value Oriented Education.
- 2.5 Salient Features of Ideal Yoga Teachers.

<u>Unit-III</u>

3. PERSONALTY DEVELOPMENT

- 3.1 Astang Yoga and Personality Development.
- 3.2 Personality Development with Specific Emphasis on Panchkosh.
- 3.3 Different Yoga Modules to improve memories.
- 3.4 Intelligence: Meaning and Concept of Intelligence According to Yoga.
- 3.5 Yoga Practice for I.Q. development.

<u>Unit-IV</u>

4. YOGA FOR STESS MANAGEMENT

- 4.1 Stress: Introduction, Concept & Solution through Mandukya Krika (Relaxation and Stimulation as core for stress management.
- 4.2 Techniques of Stress Management in Astang Yoga of Patanjali and Bhagwat Gita.
- 4.3 Specific Practices for Stress Management (Breath Awareness, Shavasan, Yognidra).
- 4.4 Pranayam and Meditation for Stress Management.
- 4.5 Impact of Yogic Life Style on Stress Management.

References Books:-

- 1. Arun Kumar Singh, Education Psychology (2015) Bharti Bhawan Publishers & Distributors.
- 2. Baron, R.A (2007). Psychology (Fifth edition) New Delhi: Pearson Prentice-Hall of India.
- 3. Baron, A. Rober, (2002) "Psychology", Pearson Education Vth Ed.
- 4. Yog Prichya and Prampra Dr. Praveen Kumar & Dr. Amrita Pritam.
- 5. Ahuja, R (2000) Value oriented education in India. In Modi, R. (Ed.), Human values and social change, Jaipur: Rawat Publications.

M. A. YOGA – 3rd SEMESTER

PAPER - 304: APPLIED PSYCHOLOGY IN YOGA

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. INTRODUCTION OF PSYCHOLOGY

- 1.1 Psychology: Meaning, Definition and Scope of Psychology in Yoga.
- 1.2 Nature and Branches of Psychology.
- 1.3 Relevance and Contribution of Psychology in Teaching & Learning Process of Yoga Education.
- 1.4 Methods of Psychology: General Introduction, Survey and Experiment Method.

<u>Unit-II</u>

2. LEARNING AND MOTIVATION

- 2.1 Learning: Meaning, Definition, Laws of Learning and Learning Curves.
- 2.2 Theories of Learning: Thorndike's Trial and Error, Pavlov's Learning by conditioning.
- 2.3 Motivation: Meaning, Definition, Concept and Dynamics of Motivation in Yoga.
- 2.4 Theories of Motivation: Abraham Maslow's Self Actualization Theory, Sigmond Freud's Instinct Theory.

<u>Unit-III</u>

3. PERSONALITY

- 3.1 Personality: Meaning, Definition and Structure of Personality.
- 3.2 Theories of Personality: Sigmond Freud's Psycho-Analytical Theory.
- 3.3 Type Theories of Personality: Kretschmer's, Sheldons and Jung's Classification.
- 3.4 Trait Theory of Personality: Allport and Eyesenk .

Unit-IV

4. GUIDANCE AND COUNSELLING

- 4.1 Guidance: Meaning, Definition and Significance of guidance.
- 4.2 Principles of Guidance in Yoga Education.
- 4.3 Counseling: Meaning, Definition and Significance of Counseling and Different types of Counseling.
- 4.4 Concept of Counseling Process and Qualities of a Counselor.

Contd.P/2..

References Books:-

- 1. Dr. Arun Kumar Singh, Education Psychology (2015) Bharti Bhawan Publishers & Distributors.
- 2. Dridge & Hung: Psychological Foundations of Education. Harper and Row Publishers.
- 3. Kamlesh, M. L. Educatin Sports Psychology, New Delhi, Friends Pub., 2006.
- 4. Jaswant kaur Vir Psychology of Teaching and Learning (Twenty First Century Publication Pardeep Kumar Sahu Patiala. (2008).
- 5. Baron, R. A. (2007). Psychology (Fifth edition) New Delhi: Pearson Prentic-Hall of India.
- 6. Baron, A. Rober, (2002) "Psychology", Pearson Education Vth Ed.
- Cliffor T. Morgan, Richard a. King, John R. Weis and John Schopler (1993), "Introduction to Psychology" – 7th Edition. Tata Mcgrw Hill Book Co. New Delhi.

M. A. YOGA – 3RD SEMESTER

PAPER – 305 PRACTICAL SYLLABUSES

(i) Demonstrations of Asana, Pranayam and Shudhi Kriya Maximum Marks: 70

- **1. PRAYER:** Gayatri Mantra, Mahamrintumjeya Mantra.
- 2. SUKSHAMA VYAYAMA
- **3. SURYA NAMASKAR:** 12 Counts.
- 4. SUPINE LYING ASANAS: Sarvangasana, Padamsarvangasana, Karnpeedasana, Setubandhasana,
- 5. **PRONE LYING ASANAS:** Sarpasana, Dhanurasana, Puranabhujangasana, Puranashalabhasana.
- 6. SITTING ASANAS: Shirsasana, Kukkutasana, Suptvajrasana, Purnamatsyasana, Bakasana, Paschimottansana, Baddhpadmasana.
- 7. STANDING ASANAS: Tadasan, Vrikshasan, Trikonasana, Natrajasana.
- 8. PRANAYAM: Anulomvilom Pranayam, Shitali Pranayam, Ujjayi Pranayam, Suryabhedan Pranayam
- 9. BANDH: Mahabandh
- **10. MUDRA:** Matangini Mudra, Shaktichalani Mudra.

11. SHATKARM:

- a) NETI : Double Rubber Neti
 b) DHAUTI : Vastra Dhauti, Dhanda Dhauti
 c) KAPALBHATI : Vaatkarma, Sheetkarma
 d) NAULI : Madhya, Vaam, Dakshine
- **12. MEDITATION Om recitation**
- 13. **RELAXATION TECHNIQUES** Shavasana, Yog Nidra,
- 14. PRACTICAL NOTE BOOK

M. A. YOGA – 3RD SEMESTER

PAPER – 305 PRACTICAL SYLLABUS

ii) APPLIED PSYCHOLOGY:

Maximum Marks: 30

i)	Self Concept Questionare by Dr. Raj Kumar Saraswat.	(Marks = 10)
ii)	Locus of Control by Leverson Scale	(Marks = 10)
iii)	Emotional Intelligence Inventory by Dr. S. K. Mangal and Mrs. Shubhra Mangal.	(Marks = 10)

M. A. YOGA – 4th SEMESTER

PAPER - 401: YOGA THERAPY

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. YOGA THERAPY: AN INTRODUCTION

- 1.1 Meaning, Definition and Importance of Yoga Therapy in modern age.
- 1.2 Concept and Scope of Yoga Therapy.
- 1.3 Principles of Yoga Therapy.
- 1.4 Limitations of Using Yoga Therapy.

<u>Unit-II</u>

2. CONCEPT OF DISEASES

- 2.1 Diseases, Meaning and their causes.
- 2.2 Classifications of Diseases.
- 2.3 Postural Deformities: Meaning and their Causes.
- 2.4 Treatment of Different types of Postural Deformities through Yoga Therapy (KYPHOSIS, LORDOSIS, SCIOLIOSIS, KNOCK-KNEE, FLAT-FOOT).

<u>Unit-III</u>

3. YOGA THERAPY FOR LIFE STYLE DISORDERS

- 3.1 Hypertension, Obesity and Blood Glucose disorders: Causes, Symptoms and Treatment through Yogic Therapy.
- 3.2 Gastric Intestinal Problem: Indigestion, Constipation, Acidity, Causes, Symptoms and Treatment through Yogic Therapy.
- 3.3 Cardiorespiratory disorders: Atherosclerosis and Bronchi Asthma: Causes Symptoms and their Treatment through Yoga Therapy.

Unit-IV

4. YOGA THERAPY FOR PSYCHOLOGICAL PROBLEMS

- 4.1 Stress, Anxiety and Depression: Meaning, Causes, Symptoms and their Treatment through Yoga.
- 4.2 Insomnia: Meaning, Causes, Symptoms and Treatment through Yoga.
- 4.3 Adjustment Problems: Meaning, Causes, Symptoms and Treatment through Yoga.
- 4.4 Attention Deficit, Hyperactivity Disorder: Meaning, Causes, Symptoms, Treatment through Yoga.

References Books:-

- 1. Moorthy, A.M. (2005), "Yoga Therapy", Teacher Publising House, Coimbatore ISBN-9788180160240.
- 2. Swami, Shivananda Saraswati, (1957) "Yoga Therapy, Umachal Yoga Ashram, Guwahati".
- 3. Verma, Janki Prasad, (1962), "Rogo Ki Achuke Chikitsa" Leader Press, Allahabad.
- 4. Yogeshwar, "Simple Yoga Therapy', Yoga Center, Madras.
- 5. Tiwari, O.P., (1984), "Asanas-Why and How", Kaivalayadhama, Lonavala.
- 6. Roga & Yoga- Swami Shivanand.

M. A. YOGA – 4th SEMESTER

PAPER - 402: FOOD & NUTRITION

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. FOOD & NUTRITION

- 1.1 Meaning of Food, Nutrition and their importance.
- 1.2 Functions of Food and Nutrition.
- 1.3 Classifications of Nutrients.
- 1.4 Basic Principles of Nutrition.
- 1.5

<u>Unit-II</u>

2. NUTRIENTS

- 2.1 Proteins: Meaning, Classification, Sources, Functions and their requirements.
- 2.2 Fats and Carbohydrates: Meaning, Classification, Sources, Functions and their requirements.
- 2.3 Vitamins: Classification, Sources, Functions and their requirements.
- 2.4 Minerals: Classification, Sources, Functions and their requirements.
- 2.5 Water: Meaning, Sources and Functions.

<u>Unit-III</u>

3. BALANCED DIET

- 3.1 Meaning and Importance of Balanced Diet.
- 3.2 Factors Affecting Balanced Diet.
- 3.3 Concept of Yogic Diet.
- 3.4 Advantages/Disadvantages of Vegetarian and Non-Vegetarian Diets.
- 3.5 Malnutrition: Meaning, Causes and Methods for overcoming Malnutrition.

<u>Unit-IV</u>

4. MEAL PLANNING

- 4.1 Concept and Principles of Meal Planning.
- 4.2 Factors Affecting Meal Planning.
- 4.3 Meal Planning for Healthy Living.
- 4.4 Meal Planning for Adolescents Male and Female.
- 4.5 Food Intake: Timing, Concept of Dugdahar, Falahar, Alpahar and Apakahar in Yoga **References Books:-**
- 1. A hand book of food & nutrition F. P. Antia.
- 2. Food & Nutrition Swaminathan.
- 3. Jeukendrup Asker (Ed.) : Sports Nutrition : From Lab to Kitchen, Meyer and Meyer Sport (UK) Ltd., 2010.
- 4. Clark Nany : Sports Nutrition Guidebook Third Edition, Human Kinetics, 2003.

M. A. YOGA – 4th SEMESTER

PAPER – 403: KINESIOLOGICAL ASPECT OF YOGA

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>Unit-I</u>

1. INTRODUCTION OF KINESIOLOGY AND BODY MOVEMENTS

- 1.1 Kinesiology: Meaning, significance and scope in Yoga.
- 1.2 Medical Terminology of Body Position.
- 1.3 Axis and planes: meaning and Types.
- 1.4 Terminologies of different Body movements.
- 1.5 Skeletal Muscle: Gross Structure, meaning of muscle origin and Insertion.

<u>Unit-II</u>

2. MUSCLES OF VARIOUS REGIONS

- 2.1 Functional classification Skeletal Muscles.
- 2.2 Origin, Insertion and Actions of Muscles in different asanas: Latissimus Dorsi, Trapezius Rhomboid Major, Rhomboid Minor, Rectus Abdominal, Gluteus Maximus, Gluteus Medius, Gluteus Minimus and Sternocleidomastoid muscle.

<u>Unit-III</u>

3. JOINTS OF UPPER EXTREMITY

- 3.1 Shoulder Joint Structure, Ligaments, Muscle Reinforcement and Movements.
- 3.2 Elbow Joint Structure, Ligaments, Muscle Reinforcement and Movements.
- 3.3 Origin, Insertion and Actions of Muscles in different asanas: Deltoid, Biceps, Triceps and Pactroralis Major.

<u>Unit-IV</u>

4. JOINTS OF LOWER EXTREMITY

- 4.1 Hip Joint Structure, Ligaments, Muscle reinforcement and Movements.
- 4.2 Knee Joint Structure, Ligaments, Muscle reinforcement and Movements.
- 4.3 Origin, Insertion and Action of Muscles in different asanas: Hamstrings group of Muscles, Quadriceps group of Muscles, Sartorious Muscle, Gastrocnemius Muscle.

References Books:-

- 1. Gowitzke, B.A and Milner, M (1988). Scientific Basis of Human Movement (3rd. ed.) Baltimore: Williams and Wilkins.
- 2. Groves, R and Camaine, D. (1983). Concepts in Kinesiology. (2nd.ed) Philadelphia: Saunders College Publishing.
- 3. Hay, J. & Reid, J (1982). The Anatomical and Mechanical Basis of Human Motion. Englewood Cliffs: Prentice – Hall
- 4. Luttegens, Kathryn, Deutsch, Helga, Hamilton, Nancy. Kinesiology- Scientific Basis of Human Motion. 8th. Ed., Brown & Bench mark.
- 5. Rasch, P. (1989) Kinesiology and Applied Anatomy. Philadelphia: Lea & Febiger.
- 6. Thompson, C. (1985). Manual of Structural Kinesiology. (10th. ed.) St. Louis: Times Mirror/ Mosby College Publishing.

M. A. YOGA – 4th SEMESTER

PAPER- (404): TEACHING METHODS OF YOGA

Time: 3 Hours Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Note: Paper setter is required to set 2 questions from each Unit - I, II, III and IV. Unit - V consists of 10 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I, II, III & IV carrying 15 marks for each question. Unit - V is compulsory for all consisting 2 marks of each short answer.

<u>UNIT –I</u>

1. TEACHING METHODS

- 1.1 Meaning, Definition and Importance of Teaching Methods in Yoga.
- 1.2 Modern Concept of Teaching Methods
- 1.3 Types of Teaching Methods in Yoga.
- 1.4 Factors Affecting Teaching Methods.
- 1.5 Principles of teaching.

UNIT-II

2. COMMAND, FORMATION AND TEACHING AIDS

- 2.1 Command: Their types and uses in Yoga.
- 2.2 Teaching Aids: Meaning and Importance.
- 2.3 Types of Teaching Aids.
- 2.4 Modern concept of teaching Aids.
- 2.5 Class Formation: Meaning, Types and their importance.

UNIT-III

3. LESSON PLANNING

- 3.1 Meaning and Importance of Lesson Plan.
- 3.2 Objectives and Steps of Making Lesson Plan.
- 3.3 Types of Lesson Plan.
- 3.4 Factors Affecting Lesson Plan.
- 3.5. Basic Principles of Making Lesson Plan

UNIT-IV

4. CLASS MANAGEMENT

- 4.1 Meaning and Importance of Class Management.
- 4.2 Factors Affecting Class Management.
- 4.3 Steps of Class Management.
- 4.4 Organization and administration of Yoga Competition.
- 4.5 Rules of Inter-collegiate/University Level Yoga Competition.

References Books:-

- 1. Bhatia and Bhatia. The Principles and Methods of Teaching (New Delhi: Doaba House), 1959.
- 2. Prof. Ramesh Chandra, Technology in the preparation of Teachers", Usha Books, Delhi 2004.
- 3. Kochar S.K, "Methods and Techniques of Teaching (Sterling Publishers, New Delhi, 2010).
- 4. Walia JS, "Principles and Methods of Education" (Plant Publishers Jalandhar City-2003).

M. A. YOGA – 4TH SEMESTER

PAPER – 405 PRACTICAL SYLLABUS

(i) Demonstrations of Asana, Pranayam and Shudhi Kriya Maximum Marks: 50

- 1. **PRAYER:** Sankalp Mantra.
- 2. SUKSHAMA VYAYAMA
- 3. SURYA NAMASKAR: 12 Counts. CHANDRA NAMASKAR.
- 4. PRAGYA YOGA
- 5. SUPINE LYING ASANAS: Vipritkarniasana, Halasana, Chakrasana, Naukasana, Pawankuktasana,
- 6. **PRONE LYING ASANAS:** Bhujangasana, Shalabhasana, Dhanurasana, Vipritnaukasana,
- 7. SITTING ASANAS: Vajrasana, Suptvajrasana, Padamasana, Shashankasana, Akarana Dhanurasana, Gomukhasana, Ushtrasana, Ardhmatsyandrasana, Ekpadskandhasana, Vatyanasana.
- 8. STANDING ASANAS: Tadasan, Vrikshasan, Trikonasana, Natrajasana.
- 9. PRANAYAM: Anulomvilom Pranayam, Shitali Pranayam, Ujjayi Pranayam, Suryabhedan Pranayam

10. SHATKARM:

a) NETI	:	Jal, Rubber Neti
b) DHAUTI	:	Vaman (Kunjal), Dhanda Dhauti
c) KAPALBHATI	:	Vaatkarma, Sheetkarma
d) TRATAK		

- **11. MEDITATION Om recitation**
- 12. **RELAXATION TECHNIQUES** Shavasana, Yog Nidra,
- **13. PRACTICAL NOTE BOOK**

M. A. YOGA – 4TH SEMESTER

<u>PRACTICAL - (405)</u>

(ii) Teaching Practices of Asana, Pranayama and Shatkarmas

Marks: 50

Practice of teaching

five lesson plans on any skill (Three Asanas, One Pranayama and One Kriya) on lesson format with chart and Viva-Voce. In the final exam model will be compulsory for all the students.
B.A. (Mass Communication)

Scheme	of	Examination

w.e.f. Academic Session 2017-18

First Semester	Т	Р	IA	Total
Paper-I: Introduction to Communication	80	-	20	100
Paper-II: Language and Media(Hindi-I)	80	-	20	100
Paper-III: Computer Applications for Mass Media	50	30	20	100
Paper-IV: General Awareness and Current Affairs-I	80	-	20	100
Paper-V: Personality Development & Communication Skills	50	30	20	100
Second Semester				
Paper-VI: Language and Media (English-I)	80		20	100
Paper-VII: Communication and Society	80	-	20	100
Paper-VIII: Basics of Mass Communication	80	-	20	100
Paper-IX: Introduction to Reporting	50	30	20	100
Paper-X: Media and Polity	80	-	20	100
Environment Studies				
Third Semester				
Paper-XI: Language and Media (Hindi-II)	80	-	20	100
Paper-XII: Basics of Editing	50	30	20	100
Paper-XIII: Fundamentals of Advertising and Public Relations	80	-	20	100
Paper-XIV: Introduction to Photography	50	30	20	100
Paper-XV: Introduction to Audio-Visual Media	80	-	20	100
Forth Semester				
Paper-XVI: Language and Media (English-II)	80	-	20	100
Paper-XVII: New Media	50	30	20	100
Paper-XVIII: Media Laws and Ethics	50	30	20	100
Paper-XIX: Development Communication	80	-	20	100
Paper-XX: Current Affair & Media Issues-II	80	-	20	100
Fifth Semester				
Paper-XXI: Media Management	80	-	20	100
Paper-XXII: Radio Production	50	30	20	100
Paper-XXIII: Writing for Radio and Television	50	30	20	100
Paper-XXIV: Reporting Skills & Practice	50	30	20	100
Paper-XXV: Current affair & Media Issues-III	80	-	20	100
Sixth Semester				
Paper-XXVI: Print Production	50	30	20	100
Paper-XXVII: Television Production	50	30	20	100
Paper-XXVIII: Research Methodology	50	30	20	100
Paper-XXIX: Personality Development and Presentation Skills	80	-	20	100
Paper-XXX: Current Affairs & Media Issues-IV	80	-	20	100

* Environment studies paper is qualifying subject compulsory for all students of the UG course and the same will be conducted in the 2^{nd} semester of the course.

* Paper No. XVII approved in previous scheme with name Writing for Print and Web Media. Now, it is treated as New Media.

Paper-I (First Semester) Introduction to Communication

Time: 3 Hrs. Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Concept and definition of communication, functions of communication, process of communication, elements of communication and barriers in communication. Concept of Communication in Indian Tradition.

Unit-II

Verbal, non-verbal communication. Forms of communication, visual communication: Characteristics and functions. Concept of listening: developing effective listening, active listening, listening habits & importance of feedback in communication

Unit-III

Intrapersonal communication, Interpersonal communication, Group communication, functions of group communication, factors affecting group performance, mass communication and its characteristics.

Unit-IV

Public communication, responsibility of a public speaker audience relationship, Speech delivery, key concept and terms physical delivery, vocal delivery, style etc., communication skills, Mass communication an overview

- Mass Communication A Critical analysis Keval J Kumar
- Professional Journalism M. V. Kamat
- Theory and Practice of Journalism B. N. Ahuja
- Professional Journalist John Hohenberg
- Mass Communication Wilbur Schram
- Understanding Media Marshall Mc luhan
- Mass Media and National Development Wilbur Schramm
- Passing of Traditional Society Daniel Lerner
- Communication Theories, Origin, Methods, Uses Werner Severin J and James W
- Tankard Jr., Longman Publications, 1988
- Communication models for the study of Mass Communication Denis Mc Quail and S.
- Ven Windah, Longman, Singapore Publications, 1981
- Hkkjr esa tulapkj vkSj izlkj.k ehfM;k e/kqdj ysys] jk/kkd`".k izdk'ku] ubZ fnYyh
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Paper-II Language and Media (Hindi-I)

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

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Paper-III Computer Applications for Mass Media

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Origin and growth of computer Various parts and functioning of computer Computer hardware and software Use of computer in human life

Unit-II

Introduction to operating systems Introduction to computer software

- MS Word
- MS Excel and Power Point

Unit-III

Use of Ms word in copy editing formatting facilities and inserting page break, objects and pictures. Introduction to Ms Excel and PowerPoint. How to design effective presentation.

<u>Unit IV</u>

- Word processing English
- Word processing Hindi
- Introduction to_Quark Express/PageMaker

- Author Adobe, Adobe Photoshop Publisher Techmedia
- Coburn, Foster D. Corel Draw, Tata Mcgraw Hill Publishing Co Ltd, 2007
- A. Jaiswal Fundamentals of computer Information technology Today, Wiley Dreamtech
- V. Rajaraman, Fundamentals of computer, Prentice Hall of India
- G K Parthasarathy, Computer Aided Communication, Authors Press, 2006
- R. Singhal, Computer Application for Journalism, Ess Publishers
- Chetan Shrivastava, Introduction to Information Technology, Kalyani Publishers, Delhi
- T. C. Bartee, Digital Computer Fundamentals, Mc Graw Hill Publication

Paper-IV General Awareness and Current Affairs-I

Time: 3 Hrs. Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit –I

Major current national, regional, local and international issues. Important issues covered by print/ radio / television and new media. Important people and their positions people in news.

Unit-II

Follow up of major stories and editorials during the semester. Trending stories in social media, Readings from popular magazines, news and infotainment.

Unit-III

Follows up/ discussion of popular columns write ups, articles, features middles, letter to editors and blogs. Important talk shows, Interview, Discussion.

Unit-IV

Comparative study of issues covered by media. Discussion on content/ footage/style/presentation etc.On the issue taken up by various television channel radio stations/news and other platforms.

References :

- Year books of various publications.
- Competitive books, magazines and journals.
- Lok Sabha and Rajya Sabha TV Programmes on current affairs
- Major national, international and regional publications- newspapers and magazines.

Paper V Personality Development & Communication Skills

Time: 3 Hours.

Theory Marks: 50 Practical Marks: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit - I

Communication: Nature, Scope and Significance, Interpersonal Skills, Communication and Persuasion

Introduction to Personality: Basic of Personality, Human growth and Behavior, Theories in Personality, Motivation

Unit - II

Communication skills and Personality Development: Intra personal communication and Body Language, Inter personal Communication and Relationships, Leadership Skills, Team Building and public speaking, presentation skills, public speaking, social etiquettes and mannerism.

Unit - III

Techniques in Personality development: Self-confidence, Mnemonics, Goal setting, Time Management and effective planning

Unit IV

Self, Self-confidence, Various personalities and their characteristics

Famous personalities in the country

Techniques in Personality Development: Stress Management, Meditation and Concentration Techniques, Self hypnotism, Self-acceptance and Self Growth

References:

- Wood, Julia T: Communication Mosaics: An Introduction to the field of Communication, 2001. Wadsworth
- Larson, Charles U; Persuation Reception and Responsibility. Wadsworth, 2001
- Personality Development by Rajiv K Mishra, Rupa & Co.

Second Semester-II

Paper-VI Language & Media (English-I)

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit I

Growth and development of English Language in India Punctuation marks, Plural forms, practice of Spellings, Active and Passive Voice Practising Tenses

Unit II

Essentials of good writing Effective News Writing Telephonic Conversation Writing invitations to functions; replies to invitations

Unit III

Forms of writing: News stories, letters, essays, news, articles, features book/film reviews

Unit-IV

Writing headlines: Language and grammar components

Report Writing, writing memoirs, travelogues Writing for the Web

Suggested Reading:

- Jimmy Sharma, *Communicative English* : *For Professional Graduates*. Arihant Prakashan Pvt Ltd: New Delhi, 2012
- Robert M. Knight, A Journalistic Approach to Good Writing: The Craft of Clarity, Surject Publications:Delhi, 2003.
- Lauren Kessler and McDonald Duncan, *When Words Collide*. 4th ed., Belmont Calfornia: Wadsworth Publishing Co. 1996.
- Phil Williams, Bob Wright, The English Tenses: Practical Grammar Guide, Kindle edition
- L.G Alexander, *Longman English Grammar Practice* Longman Publishing Group, 1988 http://hotfile.com/dl/50867818/7a336d6/Longman_English_Grammar_0582558921.rar.html

Paper-VII Communication & Society

Time: 3 Hrs.

Theory Marks: 80

Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit – I

Meaning of family, kinship, class, caste, clan, tribe, marriage Characteristics of Indian culture,

India's main social institutions Mass media and society: Importance of media, media impact on society, social responsibility of media.

Unit – II

Elements of human behaviour

Psychology of a child, teenagers, youths and elders

Psychology of various social groups, Psychology of masses and crowd

Unit – III

Media and democracy, Freedom of speech and expression, Right to information, Right to privacy and media as a watchdog. Mass media and public interest: Role of media in social movements: political – cultural movements, national integration, communal harmony.

Unit – IV

Ownership of media, Internal and external threats, pressures on media, media regulations, Media credibility: factors affecting media credibility.

- Media and culture an introduction to mass communication Richard Campbell
- Mass media issues analysis and debate Jeorge Oddman
- Media and Democracy in Asia An AMIC compilation, 2000
- Dynamics of mass communication: Media in Transition Joseph Dominick
- Conflict sensitive journalism Ross Howard
- Media power in politics Graber, Doris. 1980
- Media and Society Arthur Asa Berger
- Media and Society: challenges and opportunities Edited by VirBalaAggarwal
- New Media and Society Ed: Nicholas Jankowski Pub: Sage Publications
- Communication and Persuasion by CI, Hovland/I.L

Paper-VIII Basics of Mass Communication

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Concept of communication in ancient Indian texts, Indian perspective of communication, Narad as a communicator, Concept of Sadharnikaran, Modern Indian thoughts of communication, Modern Indian Communicator

Unit-II

Mass Communication, Key concept, terms, definition, feature, functions, characteristics of audience of mass media, types of mass media, print, electronic and new media, their reach, advantages and limitations.

Unit-III

Definition, concept, origin of communication models, difference between model and theory, SMR, SMCR, Aristotle model, Lass well's model, Berlo model, Shannon and Waver's, Osgood model

Unit-IV

Communication theory and overview of the emergence and development, Bullet theory, personal influence- two step flow and multi-step flow, individual difference theory Cultivation theory, agenda setting theory.

- Communication models for the study of Mass Communication Denis Mc Quail and S.Ven Windah, Longman, Singapore Publications, 1981
- Mass Communication A Critical analysis Keval J Kumar
- Mass communication theory: An introduction Denis Mcquail
- The process and effects of mass communication Wilbur Schramm
- Mean, massages and media Wilbur schramm
- The effects of mass communication Joseph Klapper
- Mass communication theory Stanley J.Baran and Dennis K.Davis
- Theories of Mass Communication Melvin L.DeFleur and Sandra Ball Rokeach
- Denis Mc Quail 2004. Mass Communication Theory, New Delhi, Sage publication
- Theories of Communication- A short introduction, London, Sage publication

Paper-IX Introduction to Reporting

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Concept of news, definition, nature, qualities, elements of news, news concept of 5 w's & 1H, objectively of news, types of news, news verses information. Hard and soft news, Understanding local, regional and national news, Defining beats and different types of beats

Unit-II

News sources, news gathering, types of sources, sourcing/attribution. Verification and validation of facts, credibility and protection of sources, cultivation of sources, on record sources, off the record sources, Report writing. Scoop and exclusive stories

Unit- III

News writing style, intro types and importance, inverted pyramid, 5W and 1H, Hour glass style, circle style, Tools of reporting, qualities and responsibilities of reporting, principles of reporting-accuracy, objectivity, fairness, balance, Hierarchy function of reporting staff in a newspaper, duties and responsibilities of a chief reporter & reporter.

Unit-IV

Types of Reporting: Investigative & Interpretative reporting, accident, crime, court, political, Human interest, Health reporting, interviewing, reporting press conference.

- News Reporting B. N. Ahuja and S. S. Chhabra
- News Writing and Reporting Mames M Neal and Suzanne S Brown
- Investigative Reporting and Editing P. N. Williams
- Reporting for the Print Media F. Fedler
- Reporting Mitchell V Charnley
- Depth Reporting Neal Copple
- Interpretive Reporting D. D. Mach Dougal
- Writing for the Mass Media James Glen Stevall
- Journalists Hand Book M. V. Kanath
- Professional Journalism M. V. Kamath
- News Reporting and Editing K. M. Srivastava
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Paper-X Media and Polity

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Introduction to the Indian constitution, framing of Indian constitution, Salient feature of Indian constitution Components of Indian constitution, preamble of the constitution Fundamental rights and duties.

Unit-II

Democracy in India, Issues and challenges before Indian Democracy, Parliamentary System, Lok Sabha, Rajya Sabha its functions and power, System of Election of Lok Sabha & Rajya Sabha

Unit-III

Organs of Indian Political System, Legislature: Power and Functions, Executive: Power and Function, Judiciary: Power and Function, Role of Press in Indian Democracy

Unit-IV

Introduction to union Government, president, vice president, prime minister and council of ministry.Different ministries, their nature, functions and roles. Introduction to state Government, Governor Chief Minister and council of ministry, Panchyati Raj System in India and its key features

- Indian Polity, M.Lakshmikanth, McGraw Hill Publication
- Politics in India, Rajni Kothari
- Coalition Politics hi India: Problems and Prospects, Manohar, 2004; M P Singh and Roy, Himanshu (2005).
- Indian Political System. Manak: New Delhi. Satyamurthy, T V(1997).
- Electoral Politics m Indian States- Lok Sabha Elections in 2004 and Beyond.
- The Success of I n d i a ' s Democracy. CUP: New Delhi. Shah, Ghanshyamt.
- Caste and Democratic Politics in India, Orient Blaeks'.van: New Delhi.
- NCERT Books of Social Sciences
- Hkkjrh; jkT;O;oLFkk] ,e y{ehdkar

(Third Semester-III) Paper-XI Language and Media (Hindi-I)

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

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Unit-II

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Unit-III

Hkk"kk dk O;ogkfjd vH;kl % i= ys[ku] fuca/k ys[ku

ehfM;k esa Hkk"kk dk mi;ksx ,oa egÙo] ehfM;k dh Hkk"kk dh izd`fr ,oa fo'ks"krk,a lekpkjksa o foKkiuksa esa mi;ksx gksus okys yksdfiz; 'kCn] ehfM;k dh Hkk"kk esa u;s izpyu ehfM;k dh Hkk"kk ds fodkj ,oa leL;k,a] ubZ rduhd ,oa Hkk"kk]

Unit-IV

ehfM;k ys[ku % lekpkj ys[ku] ys[k] Qhpj] laikndh; ys[ku

Vhoh] jsfM;ks] fQYe ys[ku

fQYe leh{kk] iqLrd leh{kk

foKkiu ys[ku] vkWu ykbu ehfM;k ,oa lks'ky ehfM;k ys[ku

- MkW gjnso ckgjh] fganh Hkk"kk foKku ,oa fganh ekudhdj.k
- MkW□ gfjoa'k r#.k] ekud fganh O;kdj.k vkSj jpuk
- MkW ik.Ms;] ekud fganh O;kdj.k
- Hkk"kk foKku] Hkksyk ukFk frokjh]
- Hkk"kk vkSj fgUnh Hkk"kk dk bfrgkl] izkS- ujs'k feJ
- O;kogkfjd fgUnh O;kdj.k] MkW egsUnz dqekj feJk
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- vk/kqfud ehfM;k ys[ku ,oa fgUnh jpuk] MkW v'kksd c=k

Paper- XII Basics of Editing

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Meaning, Definition and concept of editing, process of editing, significance of editing in journalism, Structure of news desk, nature of work and the role of news desk people .Difference between editing for newspaper and magazine.

Unit-II

Skill of editing, Do's and Don'ts of editing. Subbing of news and news reports, Qualities of sub editor, ability to analyse, synthesize, evaluate unfamiliar material critical thinking, understanding news worthy items. Role of news editor, Chief sub editor and copy editor in a news organisation, Function of News Agency

Unit-III

Headlines writing –types, Do's and Don'ts of headlines writing, functions and importance, Lead & its various types, Concept of 5w's, 1H, inverted style of news writing and its advantages, Brief introduction to printing technology, from letterpress to offset, Photo need and importance. Various applications of Photoshop.

Unit-IV

Concept of Dummy of newspaper and magazine. Page designing principles Lay out preparation for a newspaper. Use of computers in print production, DTP, Page maker, Quark Express & InDesign software and there applications.

- Remnick, David Reporting, Picador Publishers, 2013
- Sehgal, Vivek Editing for Print and Electronic Media, Neha Publishers, 2010
- Raman, Usha, Writing for the Media, Oxford University Press, 2010
- Floyd Baskette and Jack Sissors, the Art of Editing, New York: Macmillan Publishing Co, 1986
- Jerry Lanson and Mitchell Stephens, Writing and Reporting the News, New York: Oxford University Press, 2008
- Sunil Saxena, Headline Writing, New Delhi: Sage Publications, 2006
- Ambrish Saxena, Fundamentals of Reporting and Editing, New Delhi: Kanishka Publishers, 2007
- T.J.S. George, Editing: A handbook for Journalists, New Delhi: Indian Institute of
- Mass Communication, 1989

Paper XIII Fundamentals of Advertising and Public Relations

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Definition and Concept of Advertising and its Functions Growth of Advertising with special reference to India Evaluation and Development of Advertising with special reference to India Advertising in Indian Society

Unit-II

Media for advertising: newspaper, magazine, radio, television, outdoor, transit, point of purchase, direct mail and internet etc..

Advertising appeals, definition and types

Advertising campaign, concept and importance

Advertising agency, structure and functions

Unit-III

Definition and Concept of Public relations.

Growth and development of PR with special reference to India

Functions of PR, Qualities and functions of a PRO

PR tools; press release, press conference, press note, press briefing, meet the press, press tours, exhibitions.

Unit-IV

Differences and similarities between advertising and PR

Public opinion, Propaganda and its techniques, Publicity

Public relations departments in Public and Private sector

Structure and functions of a PR agency

Concept of Corporate Communication and Corporate Social Responsibility

PR campaigns

- Reader in Public Opinion & Mass Communication: Morris, Janowitz and Paul Hirsch (ed.).
- Public Relations- A Scientific Approach: Sahai, Baldeo.
- Handbook of Public Relations in India: Mehta, D.S. Crporate Public Relations: Balan K.R.
- Public Relations Principles Cases and Problems: Moore, Frazier H., Kalupa, frank B. Jan Sampark (Punjabi) :Dilgir, H.S.
- Public Relations Concept: J. Shri, N. Jethu, Sterling Publishers Pvt. Ltd. New Delhi.
- Advertising Principles & Practice : Chunawala and Sethia, K.C.
- Mass Communication in India :Kumar, Kewal J.
- Principles of Advertising :Monle Lee, Johnson, Viva Books Pvt. Ltd.
- Advertising Management :DavidA.Parker,RajivBatra, Practice Hall M97,Connaught Circus, New Delhi.
- Reading in Advertising: Bellur V.V. Himalaya Publishing Management House, Bombay.

Paper-XIV Introduction to photography

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Introduction to photography, meaning, definition scope, purpose, History of Photography, Development of Photography with special reference to India, Invention of first camera, photojournalism, Similarities and differences between human eye and camera

Unit-II

Concept of lighting, design or composition in photography, Basics of composition, how to get camera angles, Language of photography, contrast, motion, depth and space, importance of colour lighting in photography.

Unit-III

Camera basics, camera types, parts of camera, lenses, types and functions of lens, shutter speed, aperture, zoom, focal length Camera modes, white balance, Depth of field, rule of third.

Unit-IV

Art of caption writing, Landscape photography, Portraits, night photography, children, animals and birds, Factors influencing a photograph, Geners of Photography, Photo feature, Photo Journalism its growth and significance.

- O.P. Sharma Practical Photography, Hind Pocket Books
- Michael Langford Basic Photography, Focal Press
- James A. Folts Ronald P. Lovell Handbook of Photography,
- Fred C. Zwahlen, Jr. Delmal Thomsan learning
- Lee Frost Photography, Hodder Headline
- Mr. Subhash Sparru, Photo Patarkarita,
- James C. Kartz, Phtography

Paper-XV Introduction to Audio-Visual Media

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Broadcasting policy and code, Definition concept characteristics need and scope of Audio Media, Earlier History of Audio Media: Phonograph, Gramophone, Magnetic Recording, Electrical Recording and Digital Recording.

Unit-II

History of Radio, Radio as a Mass Media, Radio in India, Need and Scope of Radio, Types of Radio: Public Private, Community, Internet Radio,

Unit-III

Concept definition and Characteristics of Visual Media, Earlier History of Visual Media, Types of Visual Media: Magnetic Recording, Electrical Recording and Digital Recording.

Unit-IV

History of Television, Television in India, Doordarshan, Private Channels, Cable TV, Internet Television, Popular Channels, News, Entertainment, Sports, Films, Lifestyle, Regional, Musical etc..

- H.R. Luthra Indian Broadcasting, Publications Division
- Robert Mc Liesh Radio Production, Focal Press
- James R. Alburger The Art of Voice Acting, Focal Press
- Ralph Donald, Thomas Spann Fundamentals of TV Production, Surjeet Publications, New Delhi
- Herbert Zettl TV production Handbook, Thomas Wards worth Publishing
- Grenald Milarson, Television Production
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(Fourth Semester-IV) Paper-XVI Language and Media (English-II)

Time: 3 Hrs.

Theory Marks: 80

Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. **"Students have to answer question in English."**.

Unit-I

Growth and development of English language Introduction to written and spoken English Different types of spoken English - British, American and Indian

Unit-II

Usage of dictionary and thesaurus Diction - words meaning and usage Spelling rules, verb patterns Idioms and phrases

Unit-III

Common errors in spellings and sentences Human organs of articulation Main problems in pronunciation Translation: Rules of Translation, Common Errors in Translation, Translation of English News Story in Hindi

Unit-IV

Voice analysis Pitch and tempo for effective presentation Exercising right pronunciation of difficult words

- Jimmy Sharma, Communicative English : For Professional Graduates. Arihant Prakashan Pvt Ltd: New Delhi, 2012
- Robert M. Knight, A Journalistic Approach to Good Writing: The Craft of Clarity, Surjeet Publications: Delhi, 2003.
- Lauren Kessler and McDonald Duncan, When Words Collide. 4th ed., Belmont Calfornia: Wadsworth Publishing Co. 1996.
- Phil Williams, Bob Wright, The English Tenses: Practical Grammar Guide, Kindle edition
- L.G Alexander, *Longman English Grammar Practice* Longman Publishing Group, 1988
 <u>http://hotfile.com/dl/50867818/7a336d6/Longman_English_Grammar_0582558921.rar.html</u>

Paper-XVII New Media

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit-I

Internet as a medium of communication History and evolution of internet Reach and access of Internet in India Various applications of Internet

Unit-II

Growth and development of online journalism in India. Important news websites and their characteristics Characteristics of online journalism- hypertext, multimedia; online aesthetics — content, design, colours, font, templates, navigation bars, and hyperlinks

Unit-III

Online Writing & Editing: do's and don'ts Live writing Participatory journalism; portals; Blogging, podcasting, video casting, micro blogging.

Unit- IV

Web team members – project manager, visualizer, graphics designer, animator, audio-video expert, web site manager Web and its uses in different media

Web as a medium of communication

Social impact of Web and Various Social Media Platform

- Online Journalism: A Basic Text, Tapas Ray, Cambridge University Press
- The New Media Handbook Andrew Dewdney and Peter Ride
- The Cyberspace Handbook Jason Whittaker
- Breaking News, Sunil Saxena, Tata McGraw-Hill
- Media and Power James Curran Media, Technology
- New Media : A critical Introduction, Martin Lister, Jon Dovey, Seth Giddings, Ian Grant, Kieran Kelly, Routledge, Tayolor & Francis Group, 2007
- Mapping New Media in India, Sunita Naryanan, Sage Publication, 2017

Paper-XVIII Media Law& Ethic

Time: 3 Hrs.

Theory Marks: 80

Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Freedom of Speech and Expression: Main features, Scope and Importance of Article 19 Interpretation of Article 19: Defining the freedom of the Press and Media Supreme Court Judgments related to Article 19 Fundamental Rights and Duties

Unit-II

Official secrets act 1923 Law of defamation Contempt of court act 1971 Copyright act. Right to privacy Cable TV network regulation Act 1995 Information technology Act 2000

Unit-III

Ethics in journalism, freedom and responsibility of press RTI act, 2005 with its importance and background Law relating to covering of election Guidelines for parliamentary coverage AIR code for election coverage.

Unit-IV

Press commissions Press Council of India, The Editor build of India, NBA, BCC of India Working Journalist Act Autonomy of public broadcasting **Reference Books:**

- Universal Publishers Criminal Law Manual (relevant Sections of IPC)
- Universal Publishers Law Dictionary [Constitution of India (Article 19 (1) and 19 (2) 105, 194)]
- D D Basu Law of the Press, Wadhwa & Company, Nagpur
- Vidisha Barua Press and Media Law Manual, Universal Law Publishing Co. Pvt. Ltd. New Delhi
- P.K. Ravindranath Press Laws and Ethics of Journalism, Author Press, Delhi
- Pranjay Guha Takhurata, Media Law & Ethics, Sage Publication

Paper-XIX Development communication

Time: 3 Hrs.

Theory Marks: 80

Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Definition, meaning and process of development Concept of Development: Evolution, Historical perspectives and debates Various Models of Development

Unit-II

Role of Government in Development: Evolution of Planning process and new approaches, Rightsbased Approach to Development: Education, Food, Employment and Health Development and Marginal communities: Women, Dalit, Adivasis, Minorities, Economic and social indicators of development, Other indicators: Communication as an indicator, Democracy as an indicator, Human Rights as an indicator

Unit-III

Communication for rural development Strengthening of Panchayat Raj Advancement in farming and alternative employment Conservation of rural culture – tradition

Unit-IV

Communication for urban development: Urban sanitation Consumer awareness Slum development Communication for Tribal development Wild life and forest conservation

- Narula Uma development Communication Theory and Practice, Har Anand
- Gupta V.S. Communication and Development Concept, New Delhi
- Tewari, I P Communication Technology and Development, Publication Division,
- Govt. of India Joshi Uma Understanding Development Communication, Dominant Publications, New Delhi
- Srinivas R. Melkote Communication for Development in the Third World, Sage, New Delhi
- Lerner Daniel & Schramm Wilbur Communication and Changes in Developing
- Countries, East West Communication Centre, Honolulu
- Rogers Everett M Communication and Development: Critical Perspective, Sage, New Delhi
- Todaro, Michael P Economic Development in the Third World, Longman, New York

Paper-XX Current Affair & Media Issues-II

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit –I

Major current international, national & regional developments and issues during the semester Major Political, social, cultural, Media & Economic issues.

Unit-II

Important people and their positions people in news. Important issues covered by print/ radio/ television and web & Social media Follow up of major stories and editorials, during the semester.

Unit-III

Follows up/ discussion of popular columns write ups, articles, features middles, letter to editors and blogs. Important talk shows, Interview, Discussion.

Unit-IV

Comparative study of issues covered by various media platforms, Discussion on photo feature, photo journalism, cartoons and other material of print media, Discussion on content/ footage/style/presentation etc. Discussion on the issue taken up by various television channel radio stations/news and other platforms

Reference Books:

Note : Maintain a file on current affair issues Article and editorial during the semester

- Shyam Benegal Bharat Ek Khoj (Series)
- Ram Chander Guha India After Gandhi: The History of the World's Largest Democracy, Perennial
- D.B. Vohra History of Freedom Movement, Delhi Admin
- A.N. Aggarwal Indian Economy
- Rajni Kothari Caste in Indian politics
- Ministry of I &B Facts about India
- Pandit Jawahar Lal Nehru The Discovery of India
- India after Gandhi, Ramchander Guha
- Mathrubhumi year book-Respective year
- Concise General Knowledge Manual- Barry O Brien
- India year book- Publication Division- Respective year
- Yojna Magazine
- Kurukshetra Magazine

(Fifth Semester) Paper-XXI Media Management

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit –I

Management – Definition & Concept Principles and Need of Management Management Functions Ownership patterns in media Inflow of capital in Indian media

Unit-II

Structure and functioning of radio and television channel Role of editorial, technical, marketing and HR sections Recruitment, hiring and training of staff

Unit-III

Media marketing techniques Ad collection and corporate strategies Space and time selling

Unit-IV

Introduction to media houses: Times group, Hindustan times group, Pioneer group, Express group, Hindu Group, India Today group, Bhaskar group, Jagran group, Sahara group, Tribune group, Malayalam Manorama group, Enadu group, Aanand Bazar Patrika Group, Rajasthan Patrika group. Prasar Bharti, Zee networks, Star India, NDTV group, Enadu Group, Sun Network, TV18 and other media groups . Media as an industry & profession

- Hargie O, Dickson D, Tourish Communication Skills for Effective
- Denis Management, Palgrave Macmillan,India
- Dr. Sakthivel Murughan M Management Principles & Practices, New Age International Publishers, New Delhi
- Redmond, J, Trager R Media Organisation Management, Biztantra, New Delhi
- Albarran, Alan B Media Economics, Surjeet Publication, New Delhi
- Dr Sudhir Soni Media Prabandhan, University Publication, Jaipur

Paper-XXII Basics of Radio Production

Time: 3 Hrs.

Theory Marks: 50 Practical :30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Radio Station Structure, Functions and duties of Team Members: show producer, Radio jockey, copy writer, casual announcer and show composer etc.. Different Types of Radio Programme and Radio Scripts

Unit-II

Types of Studio, Basics of Studio Setup, Different types of Equipments, Basics of Sound Recording, Audio Flow Chart, Rehearsal, Techniques, Do's & Don'ts

Unit-III

Meaning & Process of Audio Editing, Basics Principles of Audio Editing, Types of Audio Editing, Editing Software's

Unit-IV

Development of Voice Skills, Voice Modulation Techniques, Qualities of RJ and Voice of Artiest, Practice of Indoor and Outdoor Recording Practice of Radio Programme Production

- H.R. Luthra Indian Broadcasting, Publications Division
- Robert Mc Liesh Radio Production, Focal Press
- James R. Alburger The Art of Voice Acting, Focal Press
- Jan R. Hakemulder, Broadcast Journalism, Anmol Publications, Ray AC de Jonge, PP Singh New Delhi
- Janet Trewin Presenting on TV and Radio, Focal Press, New Delhi
- Stuart W. Hyde TV & Radio Announcing, Kanishka Publishers
- Andrew Boyd Techniques of Radio and Television News Publisher: Focal Press, India.
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Paper-XXIII Writing for Radio and Television

Time: 3 Hrs.

Theory Marks: 50 Practical : 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Objectives and principles of Radio Broadcasting Basics Principles of Writing Introduction to Radio Writing and its Process Radio's Characteristics and Limitations as Mass Media Radio Programme Production Terminology Rule and Regulation

Unit-II

Various formats of Radio writing: Meaning & Importance Radio news Radio talks Radio features Radio Drama, Entertainment and Advertisements Current affairs Programs

Unit-III

Objectives and principles of TV Broadcasting Television as a medium of mass communication Understanding the medium – Nature & Importance and Limitations Basics Principles of TV Writing Production Team Members Rule and Regulations

Unit-IV

Various Formats of Television Writing: Meaning & Scope News, Documentary, Advertisements Voice Over, Short Films, Serials, Reality Shows, Shop Operas Etc...

- H.R. Luthra Indian Broadcasting, Publications Division
- Robert Mc Liesh Radio Production, Focal Press
- James R. Alburger The Art of Voice Acting, Focal Press
- Jan R. Hakemulder, Broadcast Journalism, Anmol Publications, Ray AC de Jonge, PP Singh New Delhi
- Janet Trewin Presenting on TV and Radio, Focal Press, New Delhi
- Stuart W. Hyde TV & Radio Announcing, Kanishka Publishers
- Andrew Boyd Techniques of Radio and Television News Publisher: Focal Press, India.
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Paper-XXIV Reporting skills & Practice Paper-XIX (Forth Semester)

Time: 3 Hrs.

Theory Marks: 50 Practical : 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct.

Unit I

News story structure, headlines, lead and body; various formats of news writing, inverted pyramid, chronological, Circle style of news writing; beats, News sources, Research and References, Story Idea and its importance, Types of Reporting: investigative Reporting; Interpretative reporting, Principles of Reporting

Unit II

Duties & Responsibilities of a reporter in a news organisation, Skills required for a reporter, Role of Bureau chief; Special correspondent, stringers, Press conference. Interview--types, purpose, technique; Press release. News Agencies: Role and importance;

Unit III

Specialized Reporting:

- Health
- Science
- Sports
- Political
- Election
- Business
- Agriculture
- Life style & Culture
- Seminar, workshop & Social events

Unit IV

Editorials: editorial page versus news pages: editorials, types of editorials; middles, features, columns and Letters to the editor; qualities and responsibilities of and Editorial Writer. Difference between Article, Feature and News feature.

- News Reporting and Editing :K.M. Srivastava Sterling Publishers, New Delhi.
- Modern News Reporting :Care H. Warren, Harper, New York.
- Mass Communication and :D.S. Mehta, Allied Publishers Ltd., New Delhi, Journalism in India
- The Professional Journalist :JohnHobenberg Oxford IEH Publishing Company, New Delhi
- Professional Journalism : VikasPublising House, Sahibabad, Ghaziabad.
- Functions and areas of Journalism: Y.K.D. Souza
- Good news bad news:Tharyan
- News Writin :Haugh George A.
- The Journalism Handbook :M.V. Kamath
- Handbook of Journalism :AggarwalVirBala, Gupta V.S.
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Paper-XXV Current Affairs & Media Issues-III

Time: 3 Hrs.

Theory Marks: 80

Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit –I

Major current international, national & regional development and issues during the term

Unit-II

Important people and their positions people in news.

Important issues covered by print/ radio/ television and new media.

Follow up of major stories and editorials during the term.

Unit-III

Follows up/ discussion of popular columns write ups, articles, features middles, letter to editors and blogs. Readings from popular magazines, news and infotainment

Unit-IV

Comparative study of issues covered by media, Discussion on photo feature, photo journalism, cartoons and other material of print media, Discussion on content/ footage/style/presentation etc. on the issue taken up by various television channel radio stations/news and other platforms.

Note: Maintain a file on current affair issues Article and editorial during the semester

- Shyam Benegal Bharat Ek Khoj (Series)
- Ram Chander Guha India After Gandhi: The History of the World's Largest Democracy, Perennial
- D.B. Vohra History of Freedom Movement, Delhi Admin
- H.R. Ghosal An Outline History of Indian People
- A.L. Basham A Cultural History of India: The Wonder that is India: Volume-1 & 2
- A.N. Aggarwal Indian Economy
- Rajni Kothari Caste in Indian politics
- Ministry of I &B Facts about India
- Pandit Jawahar Lal Nehru The Discovery of India
- India after Gandhi, Ramchander Guha
- Manorama year book –Respective Yeear
- Mathrubhumi year book-Respective year
- Concise General Knowledge Manual- Barry O Brien
- India year book- Publication Division- Respective year
- Yojna Magazine
- Kurukshetra Magazine

(Sixth Semester) Paper-XXVI Print Production

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Design concept & importance Basic principles of layout designing Tools of layout designing Terms in layout planning : Press layout, page layout, dummy, cover layout, make up,4 model, story board Stages in layout, Types of layout Principles of design

Unit-II

Introduction to page maker and its features Introduction to quark express and its applications Introduction to In-design and its applications Introduction to photoshop and its various applications Desk Top Publishing

Unit-III

Visual importance and functions Categories of visual Selection and placement of photos Introductions to Photoshop and its various applications Photo cropping & caption writing. Basic principles of photo editing

Unit-IV

Newspaper designing, design principles

Newspaper format, Various design elements, page make up, front page, editorial page, section page, colour pages

Process of Producing a Lab Journal, News letter, Newspaper, Magazine

- Bruce Westley, News Editing, Boston: Houghton Mifflin Company, 1972
- Harold Evans, Newsman's English, Handling Newspaper Text, News Headlines, Pictures on a Page, Newspaper Design (A *Five-Volume Manual of English, Typography and Layout*) London: National Council for the Training of Journalists, 1984.
- Floyd Baskette and Jack Sissors, The Art of Editing, New York: Macmillan Publishing Co, 1986
- Jerry Lanson and Mitchell Stephens, Writing and Reporting the News, New York: Oxford University Press, 2008
- Sunil Saxena, Headline Writing, New Delhi: Sage Publications, 2006
- AmbrishSaxena, Fundamentals of Reporting and Editing, New Delhi: Kanishka Publishers, 2007
- Carl Sessions Stepp, Writing as Craft and Magic, New York: Oxford University Press, 2007
- T.J.S. George, Editing: A handbook for Journalists, New Delhi: Indian Institute of Mass Communication, 1989
- M.L. Stein and Susan Paterno, The News Writer's Handbook, New Delhi: Surjeet Publications, 2003
- George Hough, News Writing, New Delhi: Kanishka Publishers, 2004
- Jan Hakemulder and Fay Jonge, News Reporting and Editing, New Delhi: Anmol Publications, 2002
- Ron Smith and Loraine O'Connell, Editing Today, New Delhi: Surjeet Publications, 2004
- M.K. Joseph, Outline of Editing, New Delhi: Anmol Publications, 2002
- N.N. Sarkar, Art and Production, Sage Publication, New Delhi.

Paper-XXVII Television Production

Time: 3 Hrs.

Theory Marks: 50 Practical :30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Introduction to Television Production Various stages of T.V. Production Different Television Programme formats Television Station Structure Functions and duties of Team Members

Unit-II

Idea Generation, Synopsis, Proposal, Different types of Script formats Style and techniques of script writing How television script is different from newspaper and radio Creativity and Television Writing

Unit-III

Types of Studio , Basic of Studio Setup, Basic of Recording Different types of Equipments: light, Camera, Sound Different types of Video formats,

Unit-IV

Introduction of Video Editing, Importance of video editing, Types of video editing: Linear editing, Non-linear editing, live editing, Introduction to the equipment's of editing Different software's for Non Linear Editing Practice of Making Television Programmes **Reference Books:**

- Television Production Handbook, 7th Edition Herbert Zettl
- Directing and Producing for Television, A Format Approach Ivan Cury
- Writing for Visual Media, rd Edition Anthony Friedmann
- Fundamentals of Television Production Ralph Donald and Thomas Spann
- The Art of the Storyboard, 21111 Edition John Hart
- Cinematography, Theory and Practice Blain Brown
- The Technique of Film and Video Editing-History, Theory, and Practice, 4th Edition Ken Dancyger
- Writing TV Scripts Steve Wetton
- ys[ku dyk% tulapkj ,oe~ l`tukRed ,oe~ tulapkj ys[ku fof/k;ka- MkW vkfcn vyh- fueZy iCyhds"ku

Paper-XXVIII Research Methodology

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit-I

Communication research: Meaning & Concept Scope and importance of communication research Development of Media Research Ethics of Media Research

Unit-II

Research Process Research Method: Survey, Interview Research Design – Experimental, Descriptive, Exploratory Sampling Method– Probability and Non- Probability

Unit-III

Primary and Secondary data Data Collection Tools Questionnaire Preparation Research Questions

Unit-IV

Writing research report Analysis and interpretation of data Basics of Research Writing Role of computer in communication research

Reference Books

- C.R. Kothari Research Methodology: Methods and Techniques, Wishwa Parkashan, New Delhi
- S.R. Sharma & Anil Chaturvedi Research in Mass Media, Radha Publications,
- New Delhi
- G.R. Basotia & K.K. Sharma Research Methodology, Mangal Deep Publications
- Sadhu Singh Research Methodology in Social Science, Himalaya Publishing House, Mumbai
- Dr.S.Munjal Research Methodology, Raj Publishing House, Jaipur

Practical:-

Prepare questionnaire Conduct Survey Conduct Interview Data Collection & Analysis

Paper-XXIX Personality Development and Presentation

Time: 3 Hrs.

Theory Marks: 80 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

UNIT-I

Introduction to Personality Development The concept of personality–Significance of personality development. The concept of success and failure: What is success? - Hurdles in achieving success - Overcoming hurdles - Factors responsible for success – What is failure - Causes of failure. SWOT analysis.

UNIT II

Attitude & Motivation Attitude, Concept, Significance, Factors affecting attitudes, Positive attitude – Advantages –Negative attitude, Disadvantages - Ways to develop positive attitude - Differences between personalities having positive and negative attitude. Concept of motivation, Significance, Internal and external motives, Importance of self- motivation- Factors leading to de-motivation

UNIT III

Self-esteem Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem - Low self esteem - Symptoms - Personality having low self esteem - Positive and negative self esteem. Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviours - Lateral thinking.

UNIT IV

Development Body language, Problem-solving, Conflict and Stress Management - Decision-making skills, Leadership and qualities of a successful leader, Character building, Team-work, Time management, Work ethics, Good manners and etiquette, Employability Quotient Resume building- The art of participating in Group Discussion – Facing the Personal (HR & Technical) Interview -Frequently Asked Questions, Mock Interview Sessions. Power point Presentation.

- Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.
- Stephen P. Robbins and Timothy A. Judge(2014), Organizational Behavior 16th Edition: Prentice Hall.
- Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi.Tata McGraw-Hill 1988.
- Heller, Robert.Effective leadership. Essential Manager series. Dk Publishing, 2002
- Hindle, Tim. Reducing Stress. Essential Manager series. Dk Publishing, 2003
- Lucas, Stephen. Art of Public Speaking. New Delhi. Tata Mc-Graw Hill. 2001
- Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
- Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House. 2005.

Paper-XXX Current Affairs and Media Issues-IV

Time: 3 Hrs.

Theory Marks: 50 Practical: 30 Internal Assessment: 20

Question paper for each theory paper will have two questions from each of the four units. Student will be required to answer any one question from each unit. Unit V of the question paper will have six questions out of which the student will be required to answer any four questions. Each unit will carry equal marks. Students have the option to answer some questions in Hindi and others in English but within an answer to a question the language should be pure (not bilingual) and correct

Unit –I

Major current international, national & regional development and issues during the term

Unit-II

Important people and their positions people in news.

Important issues covered by print/ radio/ television and new media.

Follow up of major stories and editorials during the term.

Unit-III

Follows up/ discussion of popular columns write ups, articles, features middles, letter to editors and blogs. Readings from popular magazines, news and infotainment

Unit-IV

Comparative study of issues covered by media, Discussion on photo feature, photo journalism, cartoons and other material of print media, Discussion on content/ footage/style/presentation etc.on the issue taken up by various television channel radio stations/New Media and other platforms.

Note : Maintain a file on current issues Article and editorial during the semester

- Manorama year book –Respective Yeear
- Mathrubhumi year book-Respective year
- Concise General Knowledge Manual- Barry O Brien
- India year book- Publication Division- Respective year
- Yojna Magazine
- Kurukshetra Magazine

DEPARTMENT OF PHILOSOPHY KURUKSHETRA UNIVERSITY KURUKSHETRA

Certificate Course in Bhagavadgita Scheme, Syllabus and Courses of Reading (Effective from the Academic- Session: 2018-2019)

Scheme of Examination For Certificate Course in Bhagavadgita

Sr. No.	Paper No.	Nomenclature of the Paper	Max. Marks	Time	Month & Year of Examination	
1.	I. Fun	damental Concepts of Bhagavadgit	a Theory - 80 Marks	03 Hours	April, 2019	
	Internal Assessment - 20 Marks Total - 100 Marks					
2.	II. Bhag (Appl	avadgita and Art of Meditation ied aspect of Bhagavadgita)		03 Hours	April, 2019	
		Part – A: Part – B:	Practical - 50 Marks Viva-Voce - 50 Marks			
			Total - 100 Marks			

N.B.: Practical and Viva-Voce will be conducted by the external & internal examiners as per University rules.

(**Prof. R.K. Deswal**) Chairman, U.G.B.O.S.& Dept. of Philosophy Kurukshetra University, Kurukshetra.

Certificate Course in Bhagavadgita Paper – I: Fundamental Concepts of Bhagavadgita (w.e.f. 2018-19)

Theory – 80 Marks Internal Assessment – 20 Marks Total – 100 Marks Time Allowed – 03 Hours

Objectives: The course is designed in order to create awareness in Society about the Universal teachings of Bhagavadgita and Socio-ethical relevance of Gita's teachings in modern times.

- Instructions: The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.
- **Unit I.** Meaning, History and Background of Srimadbhagavadgita. Necessity of Gita's teachings. Jnana Yoga, Understanding the Truth about self and supreme, Characterisrics of individual soul (Jiva). Sthitaprajna as an Ideal Person of Gita.
- Unit II. Karma; Kinds of Karma; Karma Yoga and its importance; Contemporary relevance of Karma Yoga; Sakama Karma and Niskama Karma Yoga. Karmyogi as an Ideal Person of Gita.Concept of Loksamgraha; Divine and demoniac qualities (Aasuri-sampad and daivi-sampad).
- Unit III. Nature of Purush(Self) and Prakriti and its three modes; Shardha and its Kinds; Dhyana Yoga; Instruction about flicker nature of mind. Science and ne-Science (Vidya and Avidya).
- Unit IV. Bhakti Yoga and its practices; Attaining the most confidential knowledge (raja guhya Yoga); Six qualities of God & realization of supreme person (God). Concept of Bhakti in Gita, Narada Bhakti Sutra in modern times. Enlightenment (Liberation) as the Ultimate goal of Man's Life.

Suggested Books:-

- I. Srimad-Bhagavadgita: Original Text.
- II. Srimadbhagavatam 10 Vols.: A.C. Prabhupada, BBT, Bombay, NewYork.
- III. Bhagavadgita as it is His Divine Grace: A.C. Bhaktivedanta Swami Prabhupada, Bhaktivedanta Book, Mumbai, 2009.
- IV. Srimadbhagavadgita Sankara Bhasya (Hindi), Gita Press, Gorakhpur.
- V. Srimadbhagavadgita Rahasaya: B.G. Tilak, Tilak Brothers Publication, Poona.
- VI. Essays in the Gita: Sri Aurobindo, Sri Aurobindo Ashram, Pandichery.
- VII. Kant and Gita: K.M.P. Verma, Classical Publication, New Delhi.
- VIII. Bhagavadgita for Executives: V. Ramanathan, Bhartiya Vidya Bhavan, Bombay.
- IX. The Gita in the light of modern Science:R.B.Lal, Somaiya Publication,Bombay

Certificate Course in Bhagavadgita Paper – II: Bhagavadgita & Art of Meditation (w.e.f. 2018-19)

Part - A: Practical - 50 Marks Part - B: Viva-Voce - 50 Marks Total - 100 Marks

Objectives: The Paper No. II is designed in order to enhance the inwardly development of Human Beings by attaining the mental peace and spiritual enlightenment through Bhagavadgita.

Instructions: There will be no written test in the Paper No.II .This paper is divided in Two Parts i.e.Part-A & Part-B .Part – A :Practical - 50 Marks & Part – B : Viva-Voce-50 Marks.

- Unit I. Meaning, Method and necessity of Meditation in the age of Globalization. Art of meditation. Meditation and its kinds. Background of Bhagavadgita. Setting of the scene. Arjuna's dilemma. Way to gain knowledge. Role and relevance of Sankirtana in our life as a form of meditation.
- Unit II. Different methods of Yoga according to Gita (i). Through control on mental modifications; (ii). Through awareness of mental modifications; (iii). Through perfection in actions; (iv). Through equanimity of mind; (v). Through meditating on God and depending on God only; (vi). Concentration method.
- Unit III. Importance of action(Karma) in life. One has to change himself / herself not Worldly circumstance. Importance of social service. Importance of doing one's actions according to one's capabilities. My station and its duties: Gita and Kant. Duty for the sake of World solidarity and its importance in contemporary times.
- Unit IV. Benefits of Meditation (Samadhi / Yoga): The practice of meditation is beneficial in the following problems: Mental Disorder, Memory-Loss, Psycho-Somatic diseases, Mental-Stress, Anger and other Psychic problems.

Suggested Books:-

- I. Srimad-Bhagavadgita: Original Text.
- II. Srimadbhagavatam 10 Vols.: A.C. Prabhupada, BBT, Bombay, NewYork.
- III. Bhagavadgita as it is His Divine Grace: A.C. Bhaktivedanta Swami Prabhupada, Bhaktivedanta Book, Mumbai, 2009.
- IV. Srimadbhagavadgita Sankara Bhasya (Hindi), Gita Press, Gorakhpur.
- V. Srimadbhagavadgita Rahasaya: B.G. Tilak, Tilak Brothers Publication, Poona.
- VI. Essays in the Gita: Sri Aurobindo, Sri Aurobindo Ashram, Pandichery.
- VII. Kant and Gita: K.M.P. Verma, Classical Publication, New Delhi.
- VIII. Bhagavadgita for Executives: V. Ramanathan, Bhartiya Vidya Bhavan, Bombay.

Department of Philosophy Kurukshetra University Kurukshetra

Scheme, Syllabus and Courses of Reading

Scheme of Examination for Diploma in Yoga through Directorate of Distance Education, K.U.K.

(Annual System) Effective from the Academic Session: 2018-19

Scheme of Examination for Diploma in Yoga

Paper	Nomenclature	Theory	Internal Assessment	Max.	Time	Examination
No	of the Paper			Marks	Allowed	w.e.f.
Ī	Yoga:	<u>80</u>	<u>20</u>	<u>100</u>	3:00 Hrs	April/ May,
	<u>Bahiranga Yoga</u>					<u>2019</u>
II	Yoga :	<u>80</u>	<u>20</u>	<u>100</u>	3:00 Hrs	April/ May,
	Antaranga					2019
	Yoga					
III	Practical	Practical	Practical Book-25	<u>100</u>		As per
		Exam-50	<u>Marks</u>			schedule
		Marks	Viva-Voce-25 Marks			notified by
						Course
						Coordinator
EVERY CANDIDATE IS REQUIRE TO COMPLETE ONE MONTH TRAINING PROGRAMME OF YOGA AND						
SUBMIT A CERTIFICATE TO BE ISSUED BY THE CONCEREND						
INSTITUTE/COLLECE/DEDADTMENT/LINIVEDSITV/SOCIETV/TOUSTETC						
<u>INSTITUTE/CULLEGE/DEFAKTIVIENT/UNIVEKSITT/SUCIETY/TKUSTETC.</u>						

(Prof. R.K.Deswal) Professor& Chairman Department of Philosophy, Kurukshetra University, Kurukshetra.

DIPLOMA IN YOGA Paper No. I Yoga: Bahiranga Yoga (w.e.f 2018-19)

Theory – 80 Marks Internal Assessment – 20 Marks Total – 100 Marks Time Allowed – 03 Hours

Note : Instruction The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.

Unit-1 Meaning, Definition, History, Development, Literature and Doctrine of Yoga; Chitta, Chitta Vrittiyan, Chitta Bhumian, Chitta Vrittinirod and Antrayas of yoga. Kinds of yoga: Astangyoga, Jyanyoga, Karmyoga,Bhaktiyoga, Hathyoga, Layayoga, Mantrayoga, Tantrayoga. Misconceptions about Yoga and their solutions. Essentials factors about yogic practices: Diet, Dress, **Discipline**, Prayerfullness, **Place**, Bathing, Time, Fragrance & Yoga Psychology.

Unit-2 Introduction to human body and its systems: Definition of Anatomy; Physiology and function; Respiratory system; Digestive system; Endocrine system; Blood circulation system; Nervous system.

Unit-3 Asana : Meaning, Definition, Kinds, Method and its Benifits of Yama: Meaning, Definition, Kinds, Method and its Benifits. Niyama: Meaning, Definition, kinds, method and its benefits. **Pranayama:** Meaning, Definition, kinds, method and its benifits **pranayama**; Meaning, Definition, kinds, method and its Benifit; Difference between asana and exercise, pranayama and deep breathing. Importance of yogic food.

Unit-4 Concept of **Bandha** in Hathyoga; Concept of **shatkarma** in hathyoga; Concept of Mudras in hathyoga; Concept of chakras in types of yoga; **Kundalini** yoga. Ten vayus, Ten Nadis and Ten indrivas.

Suggested Books :

- 1. Asana Pranayama, Dr. Devvarta Acharya
- 2. Bhirangayoga, Swami Yogeshewarananda
- 3. Yog Chikitsa, Kuvalyananda
- 4. Asana Pranayama mudra Bandha, Bihar school of yoga.
- 5. Kundalini yoga, mudra Bandha, Bihar school of yoga.
- 6. Bachho Ke Liye Yoga sihiksha, Mudra Bandha, Bihar school of yoga.
- 7. Pran Pranayama Pranvidhya, Mudra Bandha, Bihar school of yoga.
- 8. Rog Aur Yog, Mudra Bandha, Bihar school of yoga.
- 9. Ayurvediya Kriya Shrir, Vaidhya Ranjit Rai Dasie
- 10. Anatomy and Physiology of yogic sciences, Makarand Madhukar Gore
- 11. Kundlini Yoga, M. P. Pandit
- 12. Pranayama, Ranjit Sen Gupta

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DIPLOMA IN YOGA Paper No. II Yoga : Antaranga Yoga (w.e.f 2018-19)

Theory – 80 Marks Internal Assessment – 20 Marks Total – 100 Marks Time Allowed – 03 Hours

Instruction -The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.

Unit-1 Dharna : Meaning, Definition and Kinds of Dharna/Bahya/Abhayantr, Nasagra dharna, Bhrumadhya Dharna, Jyoti Dharna, Murti dharna, Bindu Dharna, Tara Dharna, Chadarma Dharna, Bhrumadhi Pralsashu Dharna, Shwas-Prashwas Dharna, Brahmnad Dharna, Omkar Dharna, Dharna and Hypnotism. Benifits of Dharna.

Unit-2 Dhyana : Meaning, Definition and Kinds of Dhyana; Concept of dhyata-Dhayan-Dhyeya; Ekagarta and Dhayan; yognidra and Jada Samadhi; Guru and shaktipata; Dhyana and Swami Dayananda; Dhyana and Swami Vivekananda; Dhyana and J. Krishna Murti, Osho and Shri Ram Sharma; Benifit of Dhyana in various fields.

Unit-3 Samadhi : Meaning, Definition and Kinds of Samadhi. Three types of Tapas : Adhyatmic, Adhidevic and Adhibhotic; Samadhi pada to Kaivlyapada: Patanjali. Swami Dayananda on Samadhi, Swami Vivekananda on samadhi; J. Krishnamurti on samadhi; Osho on Samadhi; & Shri Ram Sharma on Samadhi.

Unit-4 Towards Swadhayaya : Technique of Patanjali: Kriyayoga. Pran-Apan Gati Technique of Gita; Vipasyan a Technique of Sidharth Gautama; Aum Technique of Swami Dayananda; Jagran Technique of Jiddu Krishnamurti; Dynamic Technique of Osho, Kundlini Technique of Osho, Nadbrahma Technique of Osho. Any five Techniques of vijaynabhairavtantra. Kaivalya, Prakriti-Purusha-Viveka, Apvarga, Mukti, Moksha, & Nirvana.

Suggested Books :

- 1. Yog Darshna (Vol. 1-4),Osho
- 2. Yog Pradeep, Swami Omananda Thirtha
- 3. Yog darshana, Swami Adgadananda
- 4. Yogsutra vidyadyobhasya, Achary Udayavir
- 5. Yog Sadhna, Shri Anandmurti
- 6. Yog Darshanam, Hariharananda Arnaya
- 7. Sanatna Bhartiya Yogsadhana Evam Uski Vividh Dhyan Vidhiyan, Acharya Shilak Ram
- 8. Goraksha Padhti, Gorkshanath
- 9. Atma Vijyan, Yogeshwarananda
- 10. Yog Visheshank, Gita Press
- 11. Sadhnank, Gita Press
- 12. Gherand Samhinta, Maharashi Gherand
- 13. Shiv Samhita
- 14. Vedon Mein Yogvidhya, Swami Divyananda
- 15. Yoga Psychology, Shri Anandamurti

DIPLOMA IN YOGA Paper No. III Practical (w.e.f 2018-19)

Practical – 50 Marks Practical Copy – 25 Marks Viva-Voce-25 Marks Total – 100 Marks

A) Selected Asanas

Pawanmuktasana Kukkutasana Chakrasana Sashtang Dandvatasana Mayurasana Ustrararana Nokasana Mandukasana Makrasana Markatasana Sarpasana Girvachaksana Dhanurasana Padprasaran Sarwang Tulasana Vistritpadhastsparshasana Suptuajrasana Halasana Tulasana kaamkidasana Sabandli sanchalanarana Ekpadasana Dwihastichakrarana Mustbandhastchakrasana Griwa Chakrasana Uthithhast padprasaranasana Sarwangasana Shirshasana Pravatasana Singhasana Trikonasana Tadasana Katichakrasona Sukhasana Sidhasana Padmasana Kamlasana Vajrarana

Virasana Gomukhasana Yogasana Mandulkarana Goraksharana

B. Selected Pranayamas

Patanjali - Bahyvritti, Abhyantaravrtti Stambhvritti, Bahyabhyantaravrtti.

Hathyoga - Ujjayee, Bhastrika, Bhrama, Sheetlee, Suryabhedi.

Traditional - Nadishudli, Anulom-Vilom, Rechak-Purak, Triband Rachak Kapalbhati.

C. Selected Kriyas

Jalneti Sutraneti Tratka Agnisara Kapalbhati

D. Selected Mudras

Mahamudra Mahabandha Mahavedha Vajroli Asvini

E. Bandhas

Moolabandha Jalandharbandha Uddiyanbandha

Department of Philosophy Kurukshetra University Kurukshetra

{Established by the state Legislature Act XII of 1956} ('A+' Grade, NAAC Accredited) Scheme, Syllabus and Courses of Reading

Scheme of Examination for Diploma in Gita through Directorate of Distance Education, K.U.K.

(Annual System) Effective from the Academic Session: 2018-19

Scheme of Examination for Diploma in Gita

Paper No	Nomenclature	Theory	Internal	Max. Marks	Time Allowed	Examination	
	of the Paper		Assessment			w.e.f.	
I	Fundamental	<u>80</u>	<u>20</u>	<u>100</u>	<u>3:00 Hrs</u>	April/ May,	
	Philosophical					<u>2019</u>	
	Concepts of						
	<u>Gita</u>						
II	Gita and Life	<u>80</u>	<u>20</u>	<u>100</u>	<u>3:00 Hrs</u>	April/ May,	
	Management					<u>2019</u>	

(Prof. R.K.Deswal) Professor& Chairman Department of Philosophy, Kurukshetra University, Kurukshetra.

Diploma in Gita (w.e.f. 2018-19)

Theory – 80 Marks **Internal Assessment – 20 Marks** Total – 100 Marks Time Allowed – 03 Hours

Paper No. I : Fundamental Philosophical Concepts of Gita

Instructions: The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.

Unit-1 Meaning, Basis and History of Gita. Meaning of eighteen chapters' names of Gita-Arjunavishad, Samkhya, Karma, Jyankarmasannyas, Karmasannyas, Atmasayam, Jyanvigyan, Aksharbrahma, Rajvidhyarajguhya, Vibhuti, Visavrupdarshna, Bhakti, Kshetrakshetrajvibhag, Guntrivavibhag, Purushotam, Devasurasampadvibhag, Shardhatryavibhag, Mokshasannyas; Gitapodesha-Jyanyoga of Acharya Shankra; Bhaktiyoga of Ramanuja and Bhakti yoga of Swami Prabhupada; Karamyoga of Tilak, Jagranyoga of Osho.(Gita Ch.1-18:Gitabhashya Sankra, Ramanuja, Tilak, Prabhupad and Osho).

Unit-2 Meaning and Philosophy of "Nasto vidyate bhavo nabhavo vidyate Satah". Philosophy of Ishwra; Philosophy of Atma; Philosophy of Prakriti; Philosophy of Moksha; Philosophy of Nishkama Karma and Sakama Karma. (Gita Ch. 2/16-17, Gita Ch. 2/19-3, Gita Ch. 7, Gita Ch. 3/20-24,).

Unit-3 Philosophy of Yajna, Philosophy of Avataras, Philosophy of Samatva; Philosophy of Swadharm and Paradharma; Philosophy of triguna : Satva, Rajas& Tamasa. Philosophy of vibhuti.(Gita Ch.4/24-32, Gita Ch. 7/7-8, Gita Ch.2/48, Gita 3/35, Gita Ch. 7/12-13, Gita Ch.10/1-7&19-42).

Unit-4 Philosophy of Sthitapragya; Philosophy of Karma, Akarma and Vikarma; Philosophy of 'Sanshayatma Vinashyati', Philosophy of Karma-Jyana-Bhakti; Philosophy of Yoga; Philosophy of Vishwarupadarshana.(Gita Ch4/40,Gita Ch. 1-18,Gita Ch. 6/11-47,Gita Ch.11/1-31).

.Suggested Books :

- Osho, Gita Darshna (Vol. 1-6) 1.
- 2. Shri Aurbind, Essays on Gita
- Swami Ramsukhdass, Gita Sadhaksanjivani Tika 3.
- 4. Shankaracharya, Gita Bhasya
- 5. Ramanujacharya, Gita Bhasya
- 6. Swami Prabhupada, Gita Yatharupa
- Swami Chinmayananda, Gita Bhasya 7.
- 8. Swami Adgadananda, Yatharth Gita
- 9. Radharkrishna, Gita
- Acharya Shilak Ram, Gita Rashtra Bhasya 10.

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Diploma in Gita (w.e.f. 2018-19)

Theory – 80 Marks Internal Assessment – 20 Marks Total – 100 Marks Time Allowed – 03 Hours

Paper No. II : Gita and Life Management

Instructions: The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.

Unit-1 Gita and socio-educational life problems :Varna system of Gita and contemporary world social system; Lokasamgraha of Gita and Contemporary world social service; Concept of yajyashesh food; Gita's four types of Bhakta and contemporary Teacher student relation; Concept of Buddhinash and ideal student; Arjuna-Krishna symbol of ideal student and teacher. (*Gita Ch. 18/41-48, Gita Ch.4, Gita Ch. 9/11-15, 20-24, Gita Ch 3/9-16, Gita Ch.2/62-63, Gita Ch. 1-18*).

Unit-2 : Gita and Political Life problems : Concept of Rajarishi and our political leaders; Gita's. Concept of Dharmayudha and contemporary world; Gita's solutions for terrorism, stress, tension, war, inferirity complex and superiority complex; Gita's Vishvarupdarshna, Krishna the International Leader and Arjuna the International warrior : Gita's concept of struggle and peace for contemporary world. (Gita Ch. 3/20-24, Gita Ch.9/33, Gita Ch. 2/31-38, Gita Ch.3/30-35, Gita Ch. 5, Gita Ch. 18/17 Gita Ch. 11/1-35, Gita Ch.14, Gita Ch.2/48-51).

Unit-3 Gita and Religious-Ethical life problems: Ideal man of Gita; Universal religion of Gita; Concept of Dhayan yoga of Gita; Concept of Dharma and Karmkanda; Ethical Values of Gita - Daivi and Asuri Sampad; Meaning of Pandita, yogastha purusha, Pragya Pratishthita, Atmarati, Atmatripta, Tattvaveita, Anasakta, Yatachittatma, yogayukta, yogabhrashta.(*Gita Ch.2,Gita Ch.4/23-30,Gita Ch.6/1-47, Gita Ch.3/35-43,Gita Ch. 16/1-20, Gita Ch.2/48, Gita Ch.2/50, Gita Ch.2/57-58, Gita Ch. 3/21,Gita Ch. 6/41*).

Unit-4 Gita Management and commerce : Concept of Yajnarth Karma; Gita, Management and commerce - Ethical values; Method of mind control in the field of management and commerce - 'Abhyasena tu kaontaya vairajyen ch Grihyate'; Concept of tapa - Kayika, Vachika and Manasika in the field of management and commerce; Triputi (jnana- bhakti - karma) of Gita in 18th chapter and their contribution in the field of management and commerce; Management, Commerce, Gita and Psychosomatic diseases.(*Gita Ch.2/8-18,Gita Ch. 2/61-65,Gita Ch.17/14-19,Gita Sadhaksanjivenitika, Gita Ch.2/68, Gita Ch. 9/27-28*). .Suggested Books :

- 1. Lata Jagtini, Bhagwadgita in 365 days.
- 2. Rohini Mehta, From Mind to supermind
- 3. Satya P. Agarwal, The Gita and Tulsidass Ramayana
- 4. R. S. Garg, Gita for success in Modern life
- 5. Vimla Thakar, Insights into the Bhagavadgita
- 6. P. V. Nath, Tat Tvam Asi (2 vols.)
- 7. Satya P. Aggarwal, The Social Role of the Gita

MODEL CURRICULUM for

UNDERGRADUATE DEGREE COURSES IN INSTRUMENTATION ENGINEERING (Engineering &Technology) [JULY 2018]

B.Tech Instrumentation Engineering SCHEME OF EXAMINATIONS



Department of Instrumentation (U.S.I.C) Kurukshetra University Kurukshetra

Model Curriculum for First Year Undergraduate Degree Courses in INSTRUMENTATION ENGINEERING Engineering & Technology

CONTENTS

Sl. No.	Chapter	Title
1	1	General, Course structure, Theme & Semester-wise credit
		distribution
2	2	Detailed First Year Curriculum Contents
		Chemistry-I (Theory & Lab.)
		Physics (Theory & Lab.)
		Mathematics –1
		Mathematics -2
		Programming for Problem Solving (Theory & Lab.)
		English
		Engineering Graphics & Design
		Workshop/Manufacturing Practices (Theory & lab.)
		Basic Electrical Engineering (Theory & Lab.)
3	Appendix –A	Guide to Induction program

Model Curriculum for First Year Undergraduate Degree Courses in Engineering & Technology Chapter -1

General, Course structure & Theme &

Semester-wise credit distribution

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credits
2 Hours Practical(Lab)/week	1 credit

B. Range of credits-

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. Structure of Undergraduate Engineering program:

S.	Category	Suggested Breakup
No		of Credits(Total 160)
1	Humanities and Social Sciences including Management courses	7
2	Basic Science courses	22
3	Engineering Science courses including workshop, drawing, basics of	22.5
	electrical/mechanical/computer etc	
4	Professional core courses	67
5	Professional Elective courses relevant to chosen specialization/branc	31.5
6	Open subjects – Electives from other technical and /or emerging	
	subjects	
7	Project work, seminar and internship in industry or elsewhere	10
8	Mandatory Courses	
	[Environmental Sciences, Induction training, Indian Constitution, Essen	(non-credit)
	of Indian Traditional Knowledge]	
	Total	160*

*Minor variation is allowed as per need of the respective disciplines.

D. Credit distribution in the First year of Undergraduate Engineering program:

		Lecture	Tutoria	Laboratory/Practica	Total credits
		(L)	(T)	(P)	(C)
Chemistry –I		3	1		5.5
Physics		3	1		5.5
Maths-1		3	1		4
Maths -2		3	1		4
Programming	for	3	0		5
Problem solving					
English		3	0	2	3

Engineering Graphics &	1	0	3
Design			
Workshop/ practical	1	0	3
Basic Electrical Engg.	3	1	5
*Biology	2	1	3
*Engg. Mechanics	3	1	4
*Maths-3	3	1	4

*These courses may be offered preferably in the 3^{rd} semester & onwards.

E. Course code and definition:

Course code	Definitions
L	Lecture
Т	Tutorial
Р	Practical
BS	Basic Science Courses
ES	Engineering Science Courses
HSM	Humanities and Social Sciences including
	Management courses
IN	Instrumentation Engineering
PC	Professional core courses
PE	Professional Elective courses
OE	Open Elective courses
LC/PR	Laboratory course
MC	Mandatory courses
PROJ	Project

F. Category of Courses: BASIC SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours per week		Credits	Preferred semester	
				Т	Р		
1	IN-BS-102	Chemistry-I		1	3	5.5	II
2	IN-BS-101	Physics		1	3	5.5	Ι
3	IN-BS-103	Mathematics –I		1	0	4	Ι
4	IN-BS-104	Mathematics –2		1	0	4	II

ENGINEERING SCIENCE COURSES

S1.	Course	Course Title	Hours per week		Credits	Preferred	
No.	Code						semester
			L	Т	Р		
1	IN-ES-105	Basic Electrical Engineering	3	1	2	5	Ι
2	IN-ES-107	Engineering Graphics & Design		0	4	3	Ι
3	IN-ES-106	Programming for Problem Solving	3	0	4	5	II
4	IN-PRWS-08	Workshop/Manufacturing	1	0	4	3	II
		Practices					
5	IN-ES-108	Basic Electronics Engineering		0	1	3	II
6	IN-ES-203	Basic Instrumentation Engineering	2	0	1	3	III

HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT

S1.	Course	Course Title	Hours per week			Credits	Preferred
No.	Code					Semester	
			L	Т	Р		
1	INS-HSM-109	English	3	0	2	3	Ι

G. Structure of curriculum

Mandatory Induction Program

•	Physical activity	
٠	Creative Arts	3 weeks duration
٠	Universal Human Values	
٠	Literary	
٠	Proficiency Modules	
٠	Lectures by Eminent People	
•	Visits to local Areas	
٠	Familiarization to Dept./Branch	& Innovations

	B. Tech. Instrumentation Engineering UG										
Sl.No	Category	Course No.	Course title	Credits	Т	Teaching		edule			
					L	Т	P	Total			
1	Basic Science Course	IN-BS-101	Physics-I	4	3	1	-	4			
2	Basic Science course	IN-BS-103	Mathematics-I	4	3	1	-	4			
3	Engineering Science Courses	IN-ES-105	Basic Electrical Engineering	4	3	1	-	4			
4	Engineering Science Courses	IN-ES-107	Engg. Graphics and Design	1	1	-	-	1			
5	Humanities courses	IN-HSM-109	English	3	3	-	-	3			
6	Physics Lab	IN-PRPH-01	Physics Lab	1.5	-	-	3	3			
7	Engineering Drawing lab	IN-PRED-03	Engineering Drawing lab	2	-	-	4	4			
8	Basic Electrical Lab	IN-PREE-05	Basic Electrical Lab	1	-	-	2	2			
9	Language Lab	IN-PRENG-07	Language Lab	0	-	-	2	2			
			Total	20.5	13	3	11	27			

Semester I (First year] B.Tech. Instrumentation Engineering UG

Semester II (First year] B.Tech. Instrumentation Engineering UG

S.No.	Category	Course No.	Course title	Credits]	ſeachi	ng Scł	edule
					L	Т	Р	Total
1	Basic Science courses	IN-BS-102	Chemistry	4	3	1		4
2	Basic Science courses	IN-BS-104	Mathematics-II	4	3	1		4
3	Engineering	IN-ES-106	Programming for	4	3	1		4
	Science Courses		Problem Solving					
4	Engineering Science	IN-ES-108	Basic Electronics	3	2	1		3
	Courses		Engineering					
5	Environmental	IN-EVS-110	Environmental		3	0		3
	Sciences MC		Science ^{**}					
6	Chemistry Lab	IN-PRCH-02	Chemistry Lab	1.5			3	3
7	Computer	IN-PRCP-04	Computer	1.5	-	-	3	3
	programming Lab		programming Lab					
8	Basic Electronic lab	IN-PREL-06	Basic Electronic lab	1	-	-	2	2
9	Workshop Practice	IN-PRWS-08	Workshop Practice	1	-	-	2	2
	Lab.		Lab.					
			Total		1			
				20	4	4	10	28

Chapter -2

Detailed first year curriculum contents

I. Mandatory Induction program

(Please refer **Appendix-A** for guidelines. Details of Induction program also available in the curriculum of Mandatory courses.)

[Induction program for students to be offered right at the start of the first year.]

Physical activity	3 weeks duration	
Creative Arts		
Universal Human Values		
Literary		
Proficiency Modules		
Lectures by Eminent Peop	ble	
Visits to local Areas		
Familiarization to Dept./B	Franch & Innovations	

Guide to Induction Program

1 Introduction

\

(Induction Program was discussed and approved for all colleges by AICTE in March 2017. It was discussed and accepted by the Council of IITs for all IITs in August 2016. It was originally proposed by a Committee of IIT Directors and accepted at the meeting of all IIT Directors in March 2016. ¹This guide has been prepared based on the Report of the Committee of IIT Directors and the experience gained through its pilot implementation in July 2016 as accepted by the Council of IITs. Purpose of this document is to help institutions in understanding the spirit of the accepted Induction Program and implementing it.)

Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond.

The graduating student must have knowledge and skills in the area of his study. However, he must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he would understand and fulfill his responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.

There is a mad rush for engineering today, without the student determining for himself his interests and his goals. This is a major factor in the current state of demotivation towards studies that exists among UG students.

The success of gaining admission in to a desired institution but failure in getting the desired branch, with peer pressure generating its own problems, leads to a peer environment that is demotivating and corrosive. Start of hostel life without close parental supervision at the same time, further worsens it with also a poor daily routine.

To come out of this situation, a multi-pronged approach is needed. One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding with in them, build relations between teachers and students, give a broader view of life, and build character.

¹A Committee of IIT Directors was setup in the 152nd Meeting of IIT Directors on 6th September 2015 at IIT Patna, on how to motivate undergraduate students at IITs towards studies, and to develop verbal ability. The Committee submitted its report on 19th January 2016. It was considered at the153rd Meeting of all IIT Directors

at IIT Mandi on 26 March 2016, and the accepted report came out on 31 March 2016. The Induction Program was an important recommendation, and its pilot was implemented by three IITs, namely, IIT (BHU), IIT Mandi and IIT Patna in July 2016. At the 50th meeting of the Council of IITs on 23 August 2016, recommendation on the Induction Program and the report of its pilot implementation were discussed and the program was accepted for all IITs.

2 Induction Program

When new students enter an institution, they come with diverse thoughts, back grounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days.

We propose a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, andnature.²

The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

(2) IIIT Hyderabad was the first one to implement a compulsory course on Human Values. Under it, classes were held by faculty through discussions in small groups of students, rather than in lecture mode. Moreover, faculty from all departments got involved in conducting the group discussions under the course. The content is non-sectarian, and the mode is dialogical rather than sermonizing or lecturing. Faculty were trained beforehand, to conduct these discussions and to guide students on issues of life.

(3) Counselling at some of the IITs involves setting up mentor-mentee network under which 1st year students would be divided into small groups, each assigned a senior student as a student guide, and a faculty member as a mentor. Thus, a new student gets connected to a faculty member as well as a senior student, to whom he/she could go to in case of any difficulty whether psychological, financial, academic, or otherwise.

The Induction Program defined here amalgamates all the three into an integrated whole, which leads to its high effectiveness in terms of building physical activity, creativity, bonding, and character. It develops sensitivity towards self and one's relationships, builds awareness about others and society beyond the individual, and also in bonding with their own batch-mates and a senior student besides a faculty member. Scaling up the above amalgamation to an intake batch of 1000 plus students was done at IIT (BHU), Varanasi starting from July 2016.

Physical Activity

This would involve a daily routine of physical activity with games and sports. It would start with all students coming to the field at 6 am for light physical exercise or yoga. There would also be games in the evening or at other suitable times according to the local climate. These would help develop team work. Each student should pick one game and learn it for three weeks. There could also be gardening or other suitably designed activity where labour yields fruits from nature.

²Induction Program as described here borrows from three programs running earlier at different institutions: (1) Foundation Program running at IIT Gadhinagar since July 2011, (2) Human Values course running at IIIT Hyderabad since July 2005, and (3) Counselling Service or mentorship running at several IITs form any decades. Contribution of each one is described next.

⁽¹⁾ IIT Gandhinagar was the first IIT to recognize and implement a special 5-week Foundation Program for the incoming 1st year UG students. It took a bold step that the normal classes would start only after the five week period. It involved activities such as games, art, etc., and also science and other creative workshops and lectures by resource persons from outside.

Creative Arts

Every student would chose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program.

These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, flow into engineering design later.

Universal Human Values

It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting staff in the hostel and department, be sensitive to others, etc. Need for character building has been underlined earlier. A module in Universal Human Values provides the base.

Methodology of teaching this content is extremely important. It must not be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be over emphasized. It is essential for giving exposure, guiding thoughts, and realizing values.

The teachers must come from all the departments rather than only one department like HSS or from outside of the Institute. Experiments in this direction at IIT (BHU) are noteworthy and one can learn from them.³

Discussions would be conducted in small groups of about 20 students with a faculty Mentor each. It is to open thinking towards the self. Universal Human Values discussions could even continue for rest of the semester as a normal course, and not stop with the induction program.

Besides drawing the attention of the student to larger issues of life, it would build relationships between teachers and students which last for their entire 4-year stay and possibly beyond.

Literary

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

Proficiency Modules

This period can be used to overcome some critical lacunas that students might have, for example, English, computer familiarity etc. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially. We hope that problems arising due to lack of English skills, wherein students start lagging behind or failing in several subjects, for no fault of theirs, would, hopefully, become a thing of the past.

Lectures by Eminent People

This period can be utilized for lectures by eminent people, say, once a week. It would give the students exposure to people who are socially active or in public life.

Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

Familiarization to Dept./Branch & Innovations

The students should be told about different method of study compared to coaching that is needed at IITs. They should be told about what getting into a branch or department means what role it

³The Universal Human Values Course is a result of a long series of experiments at educational institutes starting from IIT-Delhi and IIT Kanpur in the 1980s and 1990s as an elective course, NIT Raipur in late 1990s as a compulsory one-week off campus program. The courses at IIT (BHU) which started from July 2014, are taken and developed from two compulsory courses at IIIT Hyderabad first introduced in July 2005.

plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

3 Schedule

The activities during the Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The Initial and Closing Phases would be two days each.

3.1 Initial Phase

Time	Activity
Day 0	
Whole day	Students arrive - Hostel allotment. (Preferably do pre- allotment)
Day 1	
09:00am-03:00pm	Academic registration
04:30 pm -06:00pm	Orientation
Day 2	
09:00 am -10:00am	Diagnostic test (for English etc.) 10:15 am -12:25pm
	Visit to respective depts.
12:30pm-01:55pm	Lunch
02:00 pm -02:55pm	Director's address
03:00 pm -05:00pm	Interaction with parents
03:30 pm -05:00pm	Mentor-mentee groups - Introduction within group.
	(Same as Universal Human Values groups)

3.2 Regular Phase

After two days is the start of the Regular Phase of induction. With this phase there would be regular program to be followed every day.

3.2.1 Daily Schedule

Some of the activities are on a daily basis, while some others are at specified periods Within the Induction Program. We first show a typical daily timetable.

Ses	rsn. Time	Activity	Remarks
	Day 3 onwards		
	06:00 am	Wake up call	
I	06:30 am - 07:10am	Physical activity (mild exercise/yoga)	
	07:15am - 08:55am	Bath, Breakfast, etc.	
	09:00 am -10:55am	Creative Arts/Universal Human Values	Half the groups
	11:00 am -12:55pm /Creative	Universal Human Values	do Creative Arts Complementary
		Arts	alternate
	01:00pm - 02:25pm	Lunch	

Ι	02:30 pm -	Afternoon Session	See
V	03:55 pm		below.
V	04:00 pm -	Afternoon Session	See
_	05:00 pm		below.
	05:00 pm -	Break / light tea	
	05:25 pm		
V	05:30 pm -	Games / Special Lectures	
Ι	06:45 pm		
	06:50 pm -	Rest and Dinner	
	08:25 pm		
V	08:30 pm -	Informal interactions (in	
Ι	09:25 pm	hostels)	
T	-		

Sundays are off. Saturdays have the same schedule as above or have outings.

3.2.2 Afternoon Activities (Non-Daily)

The following five activities are scheduled at different times of the Induction Program, and are not held daily for everyone:

- 1. Familiarization to Dept./Branch & Innovations
- 2. Visits to Local Area
- 3. Lectures by Eminent People
- 4. Literary
- 5. Proficiency Modules

Here is the approximate activity schedule for the afternoons (may be changed to suit local needs):

Activity	Session	Remarks	
Familiarization with	IV	For 3 days (Day 3 to5)	
Dept/Branch &Innovations			
Visits to Local Area	IV, V and	For 3 days -interspersed (e.g.,	3 Saturdays)
	VI		
Lectures by Eminent People	IV	As scheduled - 3-5lectures	
Literary (Play / Book	IV	For 3-5days	
Reading /Lecture)			

Time	Activity	
Last But One Day		
08:30 am -12noon	Discussions and finalizat tation within each	ion of presen- n group
02:00 am -05:00pm	Presentation by each grou other groups besides thei	up in front of4 r own (about 100 students)
Last Day		
Whole day	Examinations (if any).	May be ex - panded to last 2 days,
	in case needed.	

3.3 Closing Phase

3.4 Follow Up after Closure

A question comes up as to what would be the follow up program after the formal 3-week Induction Program is over? The groups which are formed should function as mentor- mentee network. A student should feel free to approach his faculty mentor or the student guide, when facing any kind of problem, whether academic or financial or psychological etc. (For every 10 undergraduate first year students, there would be a senior student as a *student guide*, and for every 20 students, there would be a *faculty mentor*.) Such a group should remain for the entire 4-5 year duration of the stay of the student. Therefore, it would be good to have groups with the students as well as teachers from the same department/discipline⁴.

Here we list some important suggestions which have come up and which have been experimented with.

3.4.1 Follow Up after Closure – Same Semester

It is suggested that the groups meet with their faculty mentors once a month, with in the semester after the 3-week Induction Program is over. This should be a scheduled meeting shown in the timetable. (The groups are of course free to meet together on their own more often, for the student groups to be invited to their faculty mentor's home for dinner or tea, nature walk, etc.)

3.4.2 Follow Up – Subsequent Semesters

It is extremely important that continuity be maintained in subsequent semesters.

It is suggested that at the start of the subsequent semesters (upto fourth semester), three days be set aside for three full days of activities related to follow up to Induc- tion Program. The students be shown inspiring films, do collective art work, and group discussions be conducted. Subsequently, the groups should meet at least once a month.

4 Summary

Engineering institutions were set up to generate well trained manpower in engineering with a feeling of responsibility towards oneself, one's family, and society. The incoming undergraduate students are driven by their parents and society to join engineering without understanding their own interests and talents. As a result, most students fail to link up with the goals of their own institution.

The graduating student must have values as a human being, and knowledge and meta- skills related to his/her profession as an engineer and as a citizen. Most students who get demotivated to study engineering or their branch, also lose interest in learning.

The *Induction Program* is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and building of character.

The Universal Human Values component, which acts as an anchor, develops awareness and sensitivity, feeling of equality, compassion and oneness, draw attention to society and nature, and character to follow through. It also makes them reflect on their relationship with their families and extended family in the college (with hostel staff and others). It also connects students with each other and with teachers so that they can share any difficulty they might be facing and seek help.

References:

Motivating UG Students Towards Studies, Rajeev Sangal, IITBHU Varanasi, Gautam Biswas, IIT Guwahati, Timothy Gonsalves, IIT Mandi, Pushpak Bhattacharya, IIT Patna, (Committee of IIT Directors), 31 March 2016, IIT Directors' Secretariat, IIT Delhi.

Contact:

Prof. Rajeev Sangal Director, IIT (BHU), Varanasi (director@iitbhu.ac.in)

⁴We are aware that there are advantages in mixing the students from different depts. However, in mixing, it is our experience that the continuity of the group together with the faculty mentor breaks down soon after. Therefore, the groups be from the same dept. but hostel wings have the mixed students from different depts. For example, the hostel room allotment should be in alphabetical order irrespective of dept.

II.

Undergraduate Degree courses B. Tech Instrumentation Engineering SCHEME OF EXAMINATIONS B. Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19)

Course No.	Course title	Credits	Teaching Schedule			chedule	A	Duration			
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	Exams
IN-BS-101	Physics-I	4	3	1	-	4	40	60		100	3 Hrs
IN-BS-103	Mathematics-I	4	3	1	-	4	40	60		100	3 Hrs
IN-ES-105	Basic Electrical Engineering	4	3	1	-	4	40	60		100	3 Hrs
IN-ES-107	Engg. Graphics and Design	1	1	-	-	1	20	30		50	3 Hrs
IN-HSM-109	English	3	3	-	-	3	40	60		100	3 Hrs
IN-PRPH-01	Physics Lab	1.5	-	-	3	3	30		45	75	3 Hrs
IN-PRED-03	Engineering Drawing lab	2	-	-	4	4	40		60	100	3 Hrs
IN-PREE-05	Basic Electrical Lab	1	-	-	2	2	20		30	50	3 Hrs
IN-PRENG-07	Language Lab	0	-	-	2	2					
	Total	20.5	13	3	11	27	270	270	135	675	

B.Tech. 1ST YEAR (SEMESTER-II) (w.e.f.2018-19)

Course No.	Course title	Credi	Teaching Schedule			edule	A	Duration			
		ts	L	T	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-BS-102	Chemistry	4	3	1		4	40	60		100	3 Hrs
IN-BS-104	Mathematics-II	4	3	1		4	40	60		100	3 Hrs
IN-ES-106	Programming for Problem Solving	4	3	1		4	40	60		100	3 Hrs
IN-ES-108	Basic Electronics Engineering	3	2	1		3	40	60		100	3 Hrs
IN-EVS-110	Environmental Science ^{**}		3	0		3	30+10	60		100 [@]	3 Hrs
IN-PRCH-02	Chemistry Lab	1.5			3	3	30		45	75	3 Hrs
IN-PRCP-04	Computer programming Lab	1.5	-	-	3	3	30		45	75	3 Hrs
IN-PREL-06	Basic Electronic lab	1	-	-	2	2	20		30	50	3 Hrs
IN-PRWS-08	Workshop Practice Lab.	1	-	-	2	2	20		30	50	3 Hrs
	Total				1						
		20	14	4	0	28	320	330	150	650	
@ IN-EVS-110 Envir	ronmental Science is an	Audit Pas	s/ Non-	credit	course) work (to h	a conducted by the		anant		

Subject is qualifying. It shall carry 15 sessional marks for field work (to be conducted by the institute) report.

B.Tech Instrumentation Engineering SCHEME OF EXAMINATIONS B.Tech. 2NDYEAR (SEMESTER–III) (w.e.f.2019-20)

Course No.	Course title	Credits	Те	Teaching Schedule Allo			llotment of	Duration			
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-HSM-201	Project Planning Estimation and Management	2	2			2	40	60		100	3 Hrs
IN-ES-203	Basic Instrumentation Engineering	3	2	1		3	40	60		100	3 Hrs
IN-PC-205	Network Analysis	3	2	1		3	40	60		100	3 Hrs
IN-PC-207	Transducers and Applications	3	2	1		3	40	60		100	3 Hrs
IN-PC-209	Linear Integrated Circuits	3	2	1		3	40	60		100	3 Hrs
IN-PRIE-09	Instrumentation Lab	1			2	2	20		30	50	3 Hrs
IN-PRNA-11	Network Analysis Lab	1		-	2	2	20		30	50	3 Hrs
IN-PRTR-13	Transducer lab	1.5			3	3	30		45	75	3 Hrs
IN-PRLIC-15	Linear Integrated Circuits Lab	1.5			3	3	30		45	75	3 Hrs
	Total	19	10	4	10	24	300	300	150	750	

B.Tech. 2NDYEAR (SEMESTER–IV) (w.e.f.2019-20)

Course No.	Course title	Credits	Teaching Schedule			ule	Al	Duration			
			L	Т	Р	Tota l	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PC-202	Power Electronics-I	3	2	1		3	40	60		100	3 Hrs
IN-BS-204	Mathematics -III	3	2	1		3	40	60		100	3 Hrs
IN-PE-206	Control System Components	3	2	1		3	40	60		100	3 Hrs
IN-PC-208	Electrical Machines	3	2	1		3	40	60		100	3 Hrs
IN-PC-210	Digital Techniques	3	2	1		3	40	60		100	3 Hrs
IN-PRPE-10	Power Electronics Lab-I	1.5			3	3	30		45	75	3 Hrs
IN-PRCS-12	Control System Lab-1	1.5			3	3	30		45	75	3 Hrs
IN-PRDT-14	Digital Lab	1			2	2	20		30	50	3 Hrs
IN-PRSIM-16	Simulation Lab	1			2	2	20		30	50	3 Hrs
	Total	20	10	5	10	25	300	300	150	750	

B.Tech Instrumentation Engineering SCHEME OF EXAMINATIONS B.Tech. 3RDYEAR (SEMESTER-V) (w.e.f.2020-21)

Course No.	Course title	Credits	T	eachi	ng Sch	edule	A	llotment of	marks		Duration
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-HSM-301	Ethics and Values	2	2			2	40	60		100	3 Hrs
IN-PC-303	Power Electronics-II	4	3	1		4	40	60		100	3 Hrs
IN-PC-305	Microprocessors	4	3	1		4	40	60		100	3 Hrs
IN-PC-307	Analogue Communication Engineering	4	3	1		4	40	60		100	3 Hrs
IN-PE-309	Linear Automatic Control System	4	3	1		4	40	60		100	3 Hrs
IN-PRPE-17	Power Electronic Lab-II	1.5			3	3	30		45	75	3 Hrs
IN-PRCOM-19	Analogue Communication Lab	1.5			3	3	30		45	75	3 Hrs
IN-PRMP-21	Microprocessor Lab	1.5			3	3	30		45	75	3 Hrs
IN-PRCS-23	Control System Lab- 2	1.5			3	3	30		45	75	3 Hrs
IN-PROJ-01	Industrial Training**	**					40	60		100^{**}	3 Hrs
	Total	24	14	4	12	30	360	360	180	800	
** IN-PROJ-01 Industrial Training is an Audit Pass/ Non-credit course											
** 4-6 weeks hand	on training to be done	after IVth	Sem. F	xams	-						

B.Tech. 3RDYEAR (SEMESTER-VI) (w.e.f.2020-21)

Course No.	Course title	Credits	Теа	achi	ng Sche	dule	A	llotment of	marks		Duration
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PC-302	Instrument & System Design	3	2	1		3	40	60		100	3 Hrs
IN-PC-304	Digital Communication Engineering	3	2	1		3	40	60		100	3 Hrs
IN-PE-306	Fuzzy Logic Control	3	2	1		3	40	60		100	3 Hrs
IN-PC-308	Digital Signal Processing	4	3	1		4	40	60		100	3 Hrs
IN-PC-310	Microcontroller & Embedded System	4	3	1		4	40	60		100	3 Hrs
IN-PRCOM-20	Digital Communication Lab.	1		-	2	2	30		45	75	3 Hrs
IN-PRMC-22	Micro-controller Lab	1		-	2	2	30		45	75	3 Hrs
IN-PRDSP-24	Signal Processing Lab	1.5		-	3	3	30		45	75	3 Hrs
IN-PROJ-02	Minor Project	3		-	6	6	40		60	100	3 Hrs
	Total	23.5	12	5	13	30	330	300	195	825	

B.Tech Instrumentation Engineering SCHEME OF EXAMINATIONS B.Tech. 4TH YEAR (SEMESTER-VII) (w.e.f.2021-22)

Course No.	Course title	Credits	Te	eachi	ng Sch	edule	A	llotment of	marks		Duration
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PE-401	Optional - I*	3	2	1		3	40	60		100	3 Hrs
IN-PE-403	Biomedical Instrumentation	3	2	1		3	40	60		100	3 Hrs
IN-PC-405	Computer Graphics & CAD CAM	3	2	1		3	40	60		100	3 Hrs
IN-PC-407	Advance Process dynamics and Control	3	2	1		3	40	60		100	3 Hrs
IN-PROP-25	Option – I Lab.	1			2	2	30		45	75	3 Hrs
IN-PRCAD-27	Computer Graphics & CAD CAM Lab.	1.5			3	3	30		45	75	3 Hrs
IN-PROJ-03	Project Work Case Study	2			4	4	40		60	100	3 Hrs
IN-PROJ-05	Industrial Training ^{**}						40		60	100**	3 Hrs
	Total	16.5	8	4	9	21	300	240	210	650	
** IN-PROJ-05 Ind	ustrial Training is an Au	tit Pass/ Nor	-credi	t cou	rse						

** 4-6 weeks hand on training to be done after VIth Sem. Exams.

* Option to be offered will be decided by the department each year depending on the facilities available. Optional- II*

Optional - I*

1. Flight Instrumentation

2. Nuclear Instrumentation

- 3. Remote Sensing
- 4. Artificial Intelligence

Instrumental Methods of Analysis 5.

6. Computer Controlled Instrumentation

- 7. Optical Instrumentation
- Inertial Navigation & Control 8.

9. Robotics

10. Environmental Instrumentation Monitoring

- 11. Safety and Reliability
- 12. Advance Control System
- 13. Computer Control of Systems
- 14. Pneumatic and Hydraulic Instrumentation and Fluidics
- 15. Parallel Process & real Time Operating System
- 16. Power Plant Instrumentation

B.Tech. 4THYEAR (SEMESTER-VIII) (w.e.f.2021-22)

Course No.	Course title	Credits	Т	each	ing Sche	edule	A	llotment of	marks		Duration
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PE-402	Optional-II*	3	2	1		3	40	60		100	3 Hrs
IN-PE-404	Analytical Instrumentation	3	2	1		3	40	60		100	3 Hrs
IN-PC-406	Industrial Process Control	3	2	1		3	40	60		100	3 Hrs
IN-PRPC-28	Process Control Lab	1.5		-	3	3	30		45	75	3 Hrs
IN-PROP-30	Optional-II Lab	1		-	2	2	30		45	75	
IN-PROJ-04	Seminar	1		-	2	2	20		30	50	
IN-PROJ-06	Major Project	4		-	8	8	40		60	100	3 Hrs
	Total	16.5	6	3	15	24	240	180	180	600	
* Option to be offered will be decided by the department each year depending on the facilities available.											

Optional - I*

- Flight Instrumentation 1.
- 2. Nuclear Instrumentation
- 3. Remote Sensing
- 4. Artificial Intelligence
- Instrumental Methods of Analysis 5.
- Computer Controlled Instrumentation 6.
- Optical Instrumentation 7.
- Inertial Navigation & Control 8.
- Optional- II* 9.
- Robotics
- 10. Environmental Instrumentation Monitoring
- Safety and Reliability 11.
- Advance Control System 12.
- 13. Computer Control of Systems 14.
- Pneumatic and Hydraulic Instrumentation and Fluidics 15. Parallel Process & real Time Operating System
 - 10(742)

16. Power Plant Instrumentation

B.Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19)

IN-BS-101 Physics-I

Course Outcomes

It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of physical problems and applications that they would find useful in their disciplines. The student will learn

- Basic concepts of EM theory application to EM-Waves
- Basic Concepts of Quantum theory application to solids
- Further fallouts like energy band structures in solids classification
- Basic concepts of Optics applications in Fiber optics and lasers

CO/F	O Maj	oping										
(S/M/	/W indi	cates st	rength o	of corre	lation)	S-Strong	g, M-M	edium,	W-Wea	k		
COs	Program	nme Outco	omes (POs))								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

Course Assessment methods:

Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

Course No.	Course title	Credits	Tea	Teaching Schedule			Allotment of m	arks			Duration
			L	Т	P Total		Minor test + Curricular activities	Major test	Practical	Total	Exams
IN-BS-101	Physics-I	4	3	1	-	4	40	60		100	3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C. Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the entire syllabus, asking for the derivations, numericals and applications of the various topics covered therein. The student has to answer/ attempt 4-questions out of 4-questions in Section-A, 2-questions out of 4-questions in Section-B and2-questions out of 4-

questions in Section-C. Section-A carry12 marks. Section-B and Section-C carry 24 marks each.

Detailed Course contents:

Module 1: Electrostatics and Magnetostatics (5 lectures)

Electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; Solving simple electrostatics problems in presence of dielectrics. Bio-Savart law, Divergence and curl of static

magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities. Magnetization and associated bound currents; auxiliary magnetic field \vec{H} ; Boundary conditions on \vec{B} and \vec{H} .

Moddule:2 Electromagnetic Theory (5 lectures)

Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law; to satisfy continuity equation; displace current and magnetic field arising from time- dependent electric field; calculating magnetic field due to changing electric fields in quasi- static approximation. Maxwell's equation in vacuum and non-conducting medium; Energy in an electromagnetic field; Flow of energy and Poynting vector with examples. The wave equation; Plane electromagnetic waves in vacuum, their transverse nature and polarization; relation between electric and magnetic fields of an electromagnetic wave.

Module 3: Wave nature of particles and the Schrodinger equation (5 lectures)

Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and timeindependent Schrodinger equation for wavefunction, Expectation values, Free-particle wavefunction and wave-packets, Uncertainty principle. Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box, Numerical solution of stationary-state Schrodinger equation for one dimensional problems for different potentials.

Module: 4 Introduction to solids. (6 lectures)

Free electron theory of metals, Fermi level, density of states, Application to white dwarfs and neutron stars, Bloch's theorem for particles in a periodic potential, Kronig-Penney model and origin of energy bands Numerical solution for energy in one-dimensional periodic lattice by mixing plane waves.

Module 5: Optics (6 lectures)

Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power. Polarization, quarter wave plate, half wave plate, Nicol prism, Polarimeter.

Module 6: Lasers and Fibre Optics (6 lectures)

Mechanical and electrical simple harmonic oscillators, complex number notation and phasor representation of simple harmonic motion, quality factor, power absorbed by oscillator.

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO_2), solid-state lasers(ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

FIBRE OPTICS: Propagation of light in fibres, numerical aperture, single mode and multi-mode fibres, applications.

Suggested Text Books

- 1. David Griffiths, Introduction to Electrodynamics
- 2. Eisberg and Resnick, Introduction to Quantum Physics
- 3. D. J. Griffiths, Quantum mechanics
- 4. A. Ghatak, Optics

Suggested Reference Books:

- 1. Halliday and Resnick, Physics
- 2. W. Saslow, Electricity, magnetism and light
- 3. Ian G. Main, Oscillations and waves in physics
- 4. H.J. Pain, The physics of vibrations and waves
- 5. E. Hecht, Optics
- 6. O. Svelto, Principles of Lasers

B.Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19)

IN-BS-103 Mathematics-I

Course Outcomes

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

• To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.

• The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.

• To deal with functions of several variables that are essential in most branches of engineering.

CO/I	O Maj	pping										
(S/M	/W indi	cates st	rength o	of corre	lation)	S-Stron	g, M-M	ledium,	W-Wea	ık		
COs	Program	mme Outco	omes (POs))								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

Course Assessment methods:

Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

B.Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19)

Course No.	Course title	Credits	Tea	Teaching Schedule			Allotment of m	arks			Duration o
			L	L T P Total I		Minor test +	Major te	Practical	Total	Exams	
						Curricular acti					
IN-BS-103	Mathematics-I	4	3 1 - 4			4	40	60		100	3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C. Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the entire syllabus, asking for the derivations, numericals and applications of the various topics covered therein. The student has to answer/ attempt 4-questions out of 4-questions in Section-A, 2-questions out of 4-questions in Section-B and2-questions out of 4-questions in Section-C. Section-A carry12 marks. Section-B and Section-C carry 24 marks each.

Course code IN-BS-103

Category	Basic	c Science	e Course		
Course title	Mat	themat	ics -1		
Scheme and Credits	L	Т	Р	Credits	Semester - I
	3	1	0	4	
Pre-requisites (if	-				
any)					

Detailed contents:

MODULE-I

<u>Applications of Differentiation</u>: Taylor's & Maclaurin's series, Expansion by use of known series, Expansion by forming a differential equation, Asymptotes, Curvature, Radius of Curvature for Cartesian, Parametric & polar curves, Centre of curvature & chord of curvature, Tracing of Cartesian & polar curves (standard curves).

MODULE – II

<u>Partial Differentiation & its Applications</u>: Functions of two or more variables Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, change of variables.

Homogeneous functions, Euler's theorem, Jacobian, Taylor's & Maclaurin's series for functions of two variables (without proof), Errors and approximations, Maxima-minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign.

MODULE – III

<u>Multiple Integrals and their Applications</u>: Double integral, change of order of integration Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

MODULE-IV

<u>Vector Calculus</u>: Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations, Del applied twice to point functions, Del applied to product of point functions. Integration of vectors, line integral, surface integral, volume integral, Green's, Stoke's and Gauss divergence theorems (without proof), and their simple applications.

TEXT BOOKS:

- 1. Advanced Engineering Mathematics : F. Kreyszig.
- 2. Higher Engineering Mathematics : B.S. Grewal.

REFERENCE BOOKS:

- 1. Engineering Mathematics Part-I: S.S. Sastry.
- 2. Differential and Integral Calculus :Piskunov.
- 3. Advanced Engineering Mathematics : R.K. Jain and S.R.K. Iyengar
- 4. Advanced Engg. Mathematics : Michael D. Greenberg

B.Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19)

IN-ES-105 Basic Electrical Engineering

Course Outcomes

- To understand and analyze basic electric and magnetic circuits
- To study the single phase and three phase electric circuits.
- To study the working principles of electrical machines.
- To introduce the components of low voltage electrical installations

					CO/I	PO Maj	pping					
	(S/I	M/W in	dicates	strengtl	h of cor	relation) S-Stro	ong, M-	Mediur	n, W-W	'eak	
COs		Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

Course Assessment methods:

Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

Course No.	Course title	Credits	Teaching Schedule			hedule	Al		Duration		
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-ES-105	Basic Electrical Engineering	4	3	1	-	4	40	60		100	3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C. Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the entire syllabus, asking for the derivations, numericals and applications of the various topics covered therein. The student has to answer/ attempt all questions in Section-A, 2-questions out of 4-questions in Section-B and2-questions out of 4-questions in Section-C. Section-B and Section-B and Section-C carry 24 marks each.

IN-ES-105 Basic Electrical Engineering Details of the Course Contents:

DC Circuits (6 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

AC Circuits (7 hours)

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.3-phase power equation, measurement of power by two wattmeter method,

Transformers (6 hours)

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Electrical Machines (8 hours)

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

Electrical Installations (5 hours)

Components of domestic wiring and earthing system. Elementary calculations for energy consumption, power factor improvement.

Suggested Text / Reference Books

- 1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
- 2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- 3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
- 4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
- 5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
- 6. Electrical Technology (Vol-I) : B.L Theraja & A K Theraja, S.Chand

B.Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19) IN-ES-107 Engineering Graphics and Design

Course Outcomes

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

The student will learn :

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

PROGRAM EDUCATIONAL OBJECTIVES

- 1. To prepare graduates for a successful technical and/or professional career.
- 2. To prepare graduates for higher education and research.
- 3. To prepare graduates to engage in resolving industrial and social issues.

	CO/PO Mapping												
	(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	COs Programme Outcomes (POs)												
	PO1	PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11										PO12	
CO1													
CO2													
CO3													
CO4													
CO5													

Course Assessment methods:

Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

Course No.	Course title	Credits	Teaching Schedule			hedule	Al		Duration of Evone		
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-ES-107	Engg.	1	1	-	-	1	20	30		50	3 Hrs

Graphics and					
Design					

Note: The Examiner(s) will set the question paper in three sections, Section-A and Section-B, Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 2-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and applications etc. of the various topics covered therein. The student has to **answer/ attempt 4-questions out of 4-questions in Section-A, 1-question out of 2-questions in Section-B Section-A carries 16 marks. Section-B carries 14 marks.**

Course code	IN-E	S-107											
Category	Engir	Engineering Science Courses											
Course title	Eng	Engineering Graphics & Design (Theory & Lab.)											
Scheme and Credits	L	L T P credits Semester - I											
	1	0	0	1									
Pre-requisites (if	-												
any)													

Engineering Graphics & Design [A total of 10 lecture hours & 60 hours of lab.] [[L : 1; T:0; P : 4 (3 credits)]

Detailed contents

Traditional Engineering Graphics:

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

Computer Graphics:

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation; Spatial Manipulation; Surface Modelling; Solid Modelling; Introduction to Building Information Modelling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)

B.Tech. 1ST YEAR (SEMESTER-I) (w.e.f.2018-19)

Course	Course title	Credits	Т	Teaching Schedule			Al		Duration		
110.			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	Exams
IN- HSM- 109	English	3	3	-	-	3	40	60		100	3 Hrs

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

Course code	IN-HSM-1	09										
Category	Humanities	Humanities and Social Sciences including Management										
	courses	courses										
Course title	English	English										
Scheme and Credits	L	Т	Р	Credits	Semester							
	3	3 0 2 3 - I										
Pre-requisites (if any)	-											

English Detailed contents

1. Vocabulary Building

- 1.1 The concept of Word Formation
- 1.2 Root words from foreign languages and their use in English
- 1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
- 1.4 Synonyms, antonyms, and standard abbreviations.
- 2. Basic Writing Skills
- 2.1 Sentence Structures
- 2.2 Use of phrases and clauses in sentences
- 2.3 Importance of proper punctuation
- 2.4 Creating coherence
- 2.5 Organizing principles of paragraphs in documents
- 2.6 Techniques for writing precisely

3. Identifying Common Errors in Writing

- 3.1 Subject-verb agreement
- 3.2 Noun-pronoun agreement
- 3.3 Misplaced modifiers
- 3.4 Articles
- **3.5 Prepositions**
- 3.6 Redundancies
- 3.7 Clichés

4. Nature and Style of sensible Writing

- 4.1 Describing
- 4.2 Defining
- 4.3 Classifying
- 4.4 Providing examples or evidence
- 4.5 Writing introduction and conclusion

5. Writing Practices

5.1 Comprehension

- 5.2 Précis Writing
- 5.3 Essay Writing

6. Oral Communication

(This unit involves interactive practice sessions in Language Lab)

- Listening Comprehension
- Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations

Suggested Readings:

- (i) Practical English Usage. Michael Swan. OUP.1995.
- (ii) Remedial English Grammar. F.T. Wood. Macmillan.2007 (iii) On Writing

Well. William Zinsser. Harper Resource Book.2001

- (iv) *Study Writing*. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
- (v) *Communication Skills*. Sanjay Kumar and PushpLata. Oxford University Press.2011.
- (vi) *ExercisesinSpokenEnglish*.Parts.I-III.CIEFL,Hyderabad.OxfordUniversityPress

Physics Lab IN-PRPH-01

Course Outcomes

It aims to get the practical ability to the students with standard concepts and tools at an intermediate to advanced level to perform the experiments related to the theory paper INE-BSC-101 Physics. **The student will learn**

- 1. Experiments in Optics/ principles
- 2. Experiments in acoustics/ applications
- 3. Experiments in Lasers/ optical principles
- 4. Experiments in Magnetism/ applications
- 5. Experiments in Semiconductor conductivity/ properties

Course No.	Course title	Credits	Teaching Schedule			hedule	Al		Duration		
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	or Exams
IN-PRPH-01	Physics Lab	1.5	-	-	3	3	30		45	75	3 Hrs

Suggested list of experiments from the following:

- 1. Frank-Hertz experiment; photoelectric effect experiment; recording hydrogen atom spectrum
- 2. LC circuit and LCR circuit;
- 3. Resonance phenomena in LCR circuits;
- 4. Magnetic field from Helmholtz coil; To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus
- 5. To find the wavelength of sodium light by Newton's rings experiment.
- 6. To find the wavelength of sodium light by Fresnel's biprism experiment.
- 7. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
- 8. To find the wavelength of sodium light by Michelson interferometer.
- 9. To find the resolving power of a telescope.
- 10. To find the specific rotation of sugar solution by using a polarimeter.
- 11. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.
- 12. To find the frequency of A.C. mains by using sonometer.
- 13. To Find Value of high Resistance by substitution method
- 14. To Find the value of high resistance by leakage method
- 15. To Convert a galvenometer in to an Ammeter of given range.
- 16. To study He Ne laser
- 17. To find the value of e/m for electrons by Helical method, Measurement of Lorentz force in a vacuum tube.
- 18. To find the ionization potential of Argon/Mercury using a thyratron tube..
- 19. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
- 20. To find the value of Planck's constant by using a photo electric cell.
- 21. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
- 22. To find the value of Hall Co-efficient of semi-conductor.
- 23. To find the band gap of intrinsic semi-conductor using four probe method.
- 24. To calculate the hysteresis loss by tracing a B-H curve.
- 25. To find the temp coeff. of resistance by using Pt resistance thermometer by post office box **RECOMMENDED BOOKS:**
 - 1. Advanced Practical Physics B.L. Worshnop and H.T. Flint (KPH)
 - 2. Practical Physics S.L.Gupta & V.Kumar (Pragati Prakashan).
 - 3. Advanced Practical Physics Vol.I & II Chauhan & Singh (Pragati Prakashan).

IN-PRED-03 Engineering Drawing lab

Course No.	Course title	Credits	Teaching Schedule			hedule	Allotment of marks				Duration
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PRED-03	Engineering Drawing lab	2	-	-	4	4	40		60	100	3 Hrs

IN-PRED-03 Engineering Drawing lab: Course Contents

Module 1: Introduction to Engineering Drawing covering,

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

Module 2: Orthographic Projections covering,

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;

Module 3: Projections of Regular Solids covering,

those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 4:Sections and Sectional Views of Right Angular Solids covering,

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

Module 5: Isometric Projections covering,

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

Module 6: Overview of Computer Graphics covering,

listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

Module 7: Customisation & CAD Drawing

consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module 8: Annotations, layering & other functions covering

applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

Module 9: Demonstration of a simple team design project that illustrates

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).

Suggested Text/Reference Books:

- 1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- 2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- 3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- 4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- 5. (Corresponding set of) CAD Software Theory and User Manuals

IN-PREE-05 Basic Electrical Lab

Laboratory Outcomes

- Get an exposure to common electrical components and their ratings.
- Make electrical connections by wires of appropriate ratings.
- Understand the usage of common electrical measuring instruments.
- Understand the basic characteristics of transformers and electrical machines.

• Get an exposure to the working of power electronic converters.

Course No.	Course title	Credits	Teaching Schedule			hedule	Al	Duration			
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PREE-05	Basic Electrical Lab	1	-	-	2	2	20		30	50	3 Hrs

INE-PREE-05 Basic Electrical Lab

Basic Electrical Engineering Laboratory [L:0;T:0;P:2(1credit)] LIST OF EXPERIMENTS

- 1. To verify KCL and KVL.
- 2. To verify Thevenin's & Norton's Theorems.
- 3. To verify Superposition theorems.
- 4. To study frequency response of a series R-L-C circuit and determine resonant frequency& Q- factor for various Values of R,L,C.
- 5. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R,L,C.
- 6. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
- 7. To perform O.C. and S.C. tests on transformer.
- 8. To perform speed control of DC motor.
- 9. To perform O.C. and S.C. tests of a three phase induction motor.
- 10.Measurement of power in a 3 phase system by two watt meter method.

Demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments voltmeter, ammeter, multimeter, oscilloscope. Real-life resistors, capacitors and inductors.
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope). Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.
- Transformers: Observation of the no-load current waveform on an oscilloscope (non- sinusoidal waveshape due to B-H curve nonlinearity should be shown along with a discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
- Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents). Phase-shifts between the primary and secondary side. Cumulative three-phase power in balanced three-phase circuits.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winging slip ring arrangement) and single-phase induction machine.
- Torque Speed Characteristic of separately excited dc motor.
- Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change
 of phase-sequence of connections. Torque-Slip Characteristic of an induction motor. Generator
 operation of an induction machine driven at super- synchronous speed.
- Synchronous Machine operating as a generator: stand-alone operation with a load. Control of voltage through field excitation.
IN-PRENG-07 COMMUNICATION SKILLS LABORATORY

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Imparting the role of communicative ability as one of the soft skills needed for placement

CO2: Developing communicative ability and soft skills needed for placement

CO3: Making students Industry-Ready through inculcating team-playing capacity

Pre-requisite courses:

- Functional English I

- Functional English II

PROGRAM OUTCOMES

1. Graduates will attain skills to conduct experiments/investigations and interpret data with reference to systems and standards

2. Graduates will have ability to communicate effectively in written, oral and instrumentation formats to put forth solutions and prepare detailed engineering report in the process and automation industries.

3. Graduates will be able to apply the knowledge, skill and attitude as a team player in initiating, executing and managing projects in the areas of design, manufacture, marketing and entrepreneurship in multi-disciplinary environments.

	CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak											
COs		Programme Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				Μ							Μ	
CO2				W						Μ	S	
CO3				S						W	S	

Course Assessment methods:

Direct Presentation, Role Play, Mock interview, GD etc. Indirect

Course end survey

GRAMMAR IN COMMUNICATION 9 periods

Grammar and Usage – Building Blocks, Homonyms, Subject and Verb Agreement, Error Correction - Grammar Application, Framing Questions – Question words, Verbal Questions, Tags, Giving Replies –Types of Sentences, Listening Comprehension –Listening and Ear training.

ASSERTIVE COMMUNICATION 9 periods

Listening Comprehension in Cross–Cultural Ambience, Telephonic Conversations/Etiquette, Role Play Activities, Dramatizing Situations- Extempore – Idioms and Phrases

CORPORATE COMMUNICATION 9 periods

Video Sensitizing, Communicative Courtesy – Interactions – Situational Conversations, Time Management, Stress Management Techniques, Verbal Reasoning, Current Affairs – E Mail Communication / Etiquette.

PUBLIC SPEAKING 9 periods

Giving Seminars and Presentations, Nuances of Addressing a Gathering - one to one/ one to a few/ one to many, Communication Process, Visual Aids & their Preparation, Accent Neutralization, Analyzing the Audience, Nonverbal Communication.

CHAPTER TITLE 5 INTERVIEW & GD TECHNIQUES 9 periods

Importance of Body Language –Gestures & Postures and Proxemics, Extempore, Facing the Interview Panel, Interview FAQs, Psychometric Tests and Stress Interviews, Introduction to GD,

Mock GD Practices. Total Hrs: 45 **REFERENCES**

1. Bhatnagar R.P. & Rahul Bhargava, "English for Competitive Examinations", Macmillian Publishers, India, 1989, ISBN: 9780333925591

2. Devadoss K. & Malathy P., "Career Skills for Engineers", National Book Publishers, Chennai, 2013.

3. Aggarwal R.S., "A Modern Approach to Verbal & Non–Verbal Reasoning", S.Chand Publishers, India, 2012, ISBN : 8121905516

B.Tech. 1ST YEAR (SEMESTER-II) (w.e.f.2018-19)

Course No.	Course title	Cred	Teaching Schedule			edule	Al	Duration of Evons			
		ns	L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-BS-102	Chemistry	4	3	1		4	40	60		100	3 Hrs

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

• Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.

• Rationalise bulk properties and processes using thermodynamic considerations.

- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalise periodic properties such as ionization potential,
- electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

CO/PO M	I apping
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(S/M/W indica	tes strength of co	orrelation) S-Strong	M-Medium,	W-Weak
(,,	

COs	Program	nme Outco	omes (POs))								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

Course Assessment meth	ods:
Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

Course No.	Course title	Cred	Tea	nchin	g Sch	edule	Allotment of marks				Duration of Evore
		ns	L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	OI Exams
IN-BS-102	Chemistry	4	3	1		4	40	60		100	3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C.

Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the entire syllabus, asking for the derivations, numericals and applications of the various topics covered therein. The student has to **answer/ attempt 4-questions out of 4-questions in Section-A**, 2-questions out of 4-questions in Section-A carry12 marks. Section-B and Section-C carry 24 marks each.

Course code	IN-BS-	IN-BS-102									
Category	Basic S	cience Co	ourse								
Course title	Chem	Chemistry-I (Theory & Lab.)									
	Conter	Contents									
	(i)	(i) Chemistry-I (Concepts in chemistry for engineering)									
	(ii)	(ii) Chemistry Laboratory									
Scheme and Credits	L	Т	Р	Credits	Semester –II						
	3	1	3	5.5							
Pre-requisites (if any)	-										

(i) IN-BS-102 Chemistry-I (Concepts in chemistry for engineering) [L : 3; T:1; P : 0 (4 credits)]

Detailed contents

(i) Atomic and molecular structure (12lectures)

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomic. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

(ii) Spectroscopic techniques and applications (8lectures)

Principles of spectroscopy and selection rules. Electronic spectroscopy .Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques. Diffraction and scattering.

(iii) Intermolecular forces and potential energy surfaces (4lectures)

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3 , H_2F and HCN and trajectories on these surfaces.

(iv) Use of free energy in chemical equilibria (6lectures)

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Water chemistry. Corrosion.

Use of free energy considerations in metallurgy through Ellingham diagrams.

(v) Periodic properties (4Lectures)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation

states, coordination numbers and geometries, hard soft acids and bases, molecular geometries

(vi) Stereochemistry (4lectures)

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds

(vii) Organic reactions and synthesis of a drug molecule (4lectures)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.

Suggested Text Books

(i) University chemistry, by B. H.Mahan

(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane (iii)Fundamentals of Molecular Spectroscopy, by C. N.Banwell

(v) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M.S.

Krishnan

(vi) Physical Chemistry, by P. W. Atkins

(vii) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

IN-BS-104 Mathematics -2

Course Outcomes

The objective of this course is to familiarize the prospective engineers with techniques in matrices/ linear algebra, ordinary and partial differential equations. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. The students will learn:

• The mathematical tools needed in matrices and their usage.

• The effective mathematical tools for the solutions of differential equations that model physical processes.

• The tools of differentiation and functions of PDE variables that are used in various techniques dealing engineering problems.

	CO/PO Mapping											
		(S/M/W	V indica	tes strei	ngth of	correlat	ion) S-	Strong,	M-Mee	lium, W	-Weak	
CO	CO: Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO												
CO												
CO3												
CO4												
CO												

(ix) (x)

(xi) Course Assessment methods:										
Indirect Course end survey										

Course No.	Course title	Credits	Teaching Schedule			nedule	Al	Duration			
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-BS-104	Mathematics-II	4	3	1		4	40	60		100	3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C. Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the entire syllabus, asking for the derivations, numericals and applications of the various topics covered therein. The student has to answer/ attempt 4-questions out of 4-questions in Section-A, 2-questions out of 4-questions in Section-B and2-questions out of 4-questions in Section-C. Section-A carry12 marks. Section-B and Section-C carry 24 marks each.

Course code	IN-BS-104
Category	Basic Science Course
Course title	Mathematics -2 (Calculus, Ordinary Differential Equations and

	Com	Complex Variable)									
Scheme and	L	Т	Р	Credits	Semester-II						
Credits	3	1	0	4							
Pre-requisites (if	-										
any)											

Module-I

<u>Matrices & its Applications</u> : Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and in dependence of vactors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values.

Module -II

<u>Ordinary Differential Equations & its Applications</u> : Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legender's linear equations, simultaneous linear equations with constant co-efficients.

Module -III

<u>Laplace Transforms and its Applications</u> : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivaties, transforms of integrals, multiplication by t^n , division by t. Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

Module -IV

<u>Partial Differential Equations and Its Applications</u>: Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

TEXT BOOKS:

- 1. Advanced Engg. Mathematics F Kreyszig
- 2. Higher Engg. Mathematics B.S. Grewal

REFERENCE BOOKS :

- 1. Differential Equations H.T.H. Piaggio.
- 2. Elements of Partial Differential Equations I.N. Sneddon.
- 3. Advanced Engineering Mathematics R.K. Jain, S.R.K.Iyengar.
- 4. Advanced Engg. Mathematics Michael D. Greenberg.

IN-ES-106 Programming for Problem Solving

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical errors.
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
- To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

	CO/PO Mapping												
	(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	COs Programme Outcomes (POs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO													
CO2													
CO.													
CO													
CO													

	Course Assessment methods:	nods:
	Indirect Cours	ect Cours

Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

Course No.	Course title	Credits	Teaching Schedule			nedule	Al	Duration			
			L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-ES-106	Programming for Problem Solving	4	3	1		4	40	60		100	3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C. Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions uniformly spread among the entire syllabus, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the entire syllabus, asking for the derivations, numericals and applications of the various topics covered therein. The student has to answer/ attempt 4-questions out of 4-questions in Section-A, 2-questions out of 4-questions in Section-B and Section-B and Section-C carry 24 marks each.

Course code	IN-ES-106
Category	Engineering Science Course

Course title	P L	rogr ab.)	amn	ning for P	roblem Solving (Theory &
Scheme and Credits	L 3	Т 0	P 4	Credits 5	Semester – II [The lab component should have one hour of tutorial followed or preceded by laboratory assignments.]
Pre-requisites (if any)	-				

i)Programming for Problem Solving

Detailed contents

Unit 1 Introduction to Programming (4 lectures)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) - (1 lecture).

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. (1 lecture)

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code- (2 lectures) *Unit 2*: Arithmetic expressions and precedence (2 lectures)

Unit 2: Conditional Branching and Loops (6 lectures)

Writing and evaluation of conditionals and consequent branching (**3 lectures**)

Iteration and loops (**3 lectures**)

Unit 3Arrays (6 lectures)

Arrays (1-D, 2-D), Character arrays and Strings

Unit 4 Basic Algorithms (6 lectures)

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

*Unit 5*Function (5 lectures)

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

*Unit 6*Recursion (4 -5 lectures)

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Unit 7Structure (4 lectures)

Structures, Defining structures and Array of Structures

Unit 8Pointers (2 lectures)

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Unit 9File handling (only if time is available, otherwise should be done as part of the lab)

Suggested Text Books

Text Books:

- 1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
- 2. C Programming A modern approach by K.N. King, 1996, WW Norton & Co.
- 3. Theory and problems of programming with C, Byron C Gotterfried, TMH
- 4. Teach yourself all about computers by Barry Press and Marcia Press, 2000, IDG Books India.

- 5. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- 6. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books

i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

B.Tech. 1ST YEAR (SEMESTER-II) (w.e.f.2018-19)

IN-ES-108 Basic Electronics Engineering

Course Outcomes:

It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of electronics and semiconductor applications that they would find useful in their disciplines. At the end of this course students will demonstrate the ability to

- 1. Understand the principles of semiconductor Physics
- 2. Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.

PROGRAM EDUCATIONAL OBJECTIVES

- 4. To prepare graduates for a successful technical and/or professional career.
- 5. To prepare graduates for higher education and research.
- 6. To prepare graduates to engage in resolving industrial and social issues.

	CO/PO Mapping											
	(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak											
COs	COs Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									
CO2												
CO3												
CO4												
CO5												

Course Assessment methods:

Direct	Indirect Course end survey
Internal test I	
Internal test II	
Internal test III	
Assignment	
Tutorial	
Seminar	
End Semester Exam	

Course No.	Course title	Credits	Teaching Schedule								Allotment
			L	Т	Minor test + Curricular activities	Major test	Practical	Total			of marks
IN-ES-108	Basic Electronics Engineering	3	2	1	40	60		100			3 Hrs

Note: The Examiner(s) will set the question paper in three sections, Section-A, Section-B, and Section-C. Section-A is compulsory. Section-A comprises 4-short answer type questions uniformly spread among the entire syllabus. Section-B comprises 4-questions among the 4-modules, asking for conceptual questions, definitions, derivations, principles, construction and working etc. Section-C comprises 4-questions uniformly spread among the 4-modules, asking for the derivations, numericals and applications of the various topics covered therein. The student has to answer/ attempt 4-questions out of 4-questions in Section-A, 2-questions out of 4-questions in Section-C carry 24 marks each.

Course code IN-ES-108	
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Category	Enginee	Engineering Science Course									
Course title											
Scheme and Credits	L	Т	Р	Credits	Semester-II						
	2	1	2	3							
Pro-requisites											

IN-ES-108

Basic Electronics Engineering - Detailed contents

MODULE-I

Semiconductors p-type, n-type, pn junction diodes, pn junction as a circuit element, its characteristics, half wave and full wave and bridge type rectifier circuits basic filter circuits, Doide as voltage multiplier, clipper & clamper circuit. Zener diode as a voltage regulator. LED its characteristics construction & applications

MODULE -II

Characteristics of transistors in different configuration. Concept of d.c. and a.c. load line and operating point selection. Various amplifiers configurations their h-parameter equivalent circuits determination of voltage gain current gain input resistance and output resistance & power gain. Concept of feedback in amplifiers, different oscillators circuits (without analysis)

MODULE -III

Differential amplifier and its transfer characteristics. IC Op-Amps, its ideal & practical specifications and measurement of parameters. Op-Amp in different modes as inverting amplifier non inverting amplifier scale changer, differentiator & integrator.

MODULE -IV

Characteristics of JFET, MOSFET, Various amplifier configurations using FET. Characteristics and Construction of SCR, TRIAC, UJT. Their basic areas applications.

Reference :

- 1. Electronic Devices & Circuits Boylstad & Nashelsky.
- 2. Integrated Electronics By Millman & Halkias.
- 3. Electronic Principles Malvino
- 4. Principles of Electronics V.K. Mehta, Shalu Melta.
- 5. Electronic Circuits Donald L. Shilling & Charles Belowl

IN-EVS-110 Environmental Studies

LTP

major test: 60 marks Minor test + curricular activities: 30 + 10 Marks

3

Total: 100 marks Duration of exam : 3 Hrs.

Sessional of 15 marks for Field report evaluation (internal assessment)

Unit 1 : The Multidisciplinary nature of environmental studies

Definition, scope and importance.

Need for public awareness.

Unit 2 : Natural Resources

Renewable and non-renewable resources :

Natural resources and associated problems.

- a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources : Use and exploitation, environmental effects of extracting and mineral resources, case studies.
- d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3 : Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :
- a) Forest ecosystem
- b) Grassland ecosystem
- c) Desert ecosystem
- d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit : 4 Biodiversity and its conservation

- Introduction Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : in-situ and ex-situ conservation of biodiversity.

Unit 5 : Environmental Pollution Definition

- Causes, effects and control measures of :
 - a) Air pollution

- b) Water pollution
- c) Soil pollution
- d) Marine pollution
- e) Noise pollution
- f) Thermal pollution
- g) Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides

Unit 6 : Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.

Unit 7 : Human Population and the Environment

- Population growth, variation among nations
- Population explosion Family Welfare Programme
- Environment and human health.
- Human Rights.
- Value Education.

Unit 8 : Field Work

- Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- Visit to a local polluted site Urban / Rural / Industrial / Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems pond, river, hill slopes, etc.

Examination Pattern : The question paper should carry 60 marks

The structure of the question paper being.

PART – A	:	Short Answer Pattern	20 Marks
PART – B	:	Essay type with inbuilt choice	40 Marks
PART – C	:	Field Work	15 Marks

INSTRUCTIONS FOR THE EXAMINERS

- Part A Question 1 is compulsory and will contain ten short-answer type question of 2 marks each covering the entire syllabus.
- Part B Eight essay type questions (with inbuilt choice) will be set from the entire syllabus and the candidates will be required to answer, any four of them. Each essay type question will be of the 10 marks.

The examination will be conducted by the college concerned at its own level earlier than the annual examination and each student will be required to score minimum of 35% marks each in theory and Practical. The marks obtained in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree. However, these will be shown in the detailed marks certificate of the student.

- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness.
 - HIV/AIDS
 - Women and Child Welfare.
 - Role of Information Technology in Environment and human health.
 - Case Studies.

Chemistry Lab IN-PRCH-02

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:
- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance
- Synthesize a small drug molecule and analyse a salt sample

Course No.	Course title	Credit	Teaching			nedule	Allotment of marks				Duration
		s	L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PRCH- 02	Chemistry Lab	1.5			3	3	30		45	75	3 Hrs

B.Tech. 1ST YEAR (SEMESTER-II) (w.e.f.2018-19)

Chemistry Laboratory[L:0;T:0;P:3(1.5credits)]

Choice of 10-12 experiments from the following:

- Determination of surface tension and viscosity
- Thin layer chromatography
- Ion exchange column for removal of hardness of water
- Determination of chloride content of water
- Colligative properties using freezing point depression
- Determination of the rate constant of are action
- Determination of cell constant and conductance of solutions
- Potentiometry determination of redox potentials and emfs
- Synthesis of apolymer/drug
- Saponification/acid value of an oil
- Chemical analysis of a salt
- Lattice structures and packing of spheres
- Models of potential energy surfaces
- Chemical oscillations- Iodine clock reaction
- Determination of the partition coefficient of a substance between two immiscible liquids
- Adsorption of acetic acid by charcoal
- Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg.

LIST OF EXPERIMENTS

- 1. Determination of Ca^{++} and Mg^{++} hardness of water using EDTA solution.
- 2. Determination of alkalinity of water sample.
- 3. Determination of dissolved oxygen (DO) in the given water sample.
- 4. To find the melting & eutectic point for a two component system by using method of cooling curve.

- 5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
- 6. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
- 7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.
- 8. To find out saponification No. of an oil.
- 9. Estimation of calcium in lime stone and dolomite.
- 10. Determination of concentration of $KMnO_4$ solution spectrophotometrically.
- 11. Determination of strength of HCl solution by titrating it against NaOH solution conductometerically.
- 12. To determine amount of sodium and potassium in a, given water sample by flame photometer.
- 13. Estimation of total iron in an iron alloy.

SUGGESTED BOOKS :

- 1. A Text Book on Experimental and Calculation Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
- 2. Essential of Experimental Engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company.
- 3. Theory & Practice Applied Chemistry O.P. Virmani, A.K. Narula (New Age)

Computer Programming Lab IN-PRCP-04

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at runtime
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to declare pointers of different types and use them in defining self- referential structures.

• To be able to create, read and write to and from simple text mes.											
Course No.	Course title	Credit	Teaching Schedule			edule	Allotment of marks				Duration
		s	L	Т	Р	Total	Minor test +	Major	Practical	Total	of Exams
							Curricular	test			
							acuvities				
IN-PRCP-04	Computer	1.5	-	-	3	3	30		45	75	3 Hrs
	programming										
	Lab										

• To be able to create, read and write to and from simple text files.

(ii) Laboratory - Programming for Problem Solving[L:0;T:0;P:4(2credits)] [The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Tutorial 12: File handling:

Lab 12: File operations

Course No.	Course title	Credit	Teaching Schedule				Allotment of marks				Duration of Exome
		5	L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PREL-06	Basic Electronic lab	1	-	-	2	2	20		30	50	3 Hrs

B.Tech. 1ST YEAR (SEMESTER-II) (w.e.f.2018-19)

Course Outcomes

After successful completion of this course, the students should be able to Design biasing circuits using BJT and FET.

- Apply this knowledge to the analysis and design of basic amplifiers.
- Design and analyze the response of differential and power amplifiers.
- Identify faults in Electronic circuits.
- Design and implement single stage power amplifier

LIST OF EXPERIMENTS : Experiments beyond the syllabus should be conducted.

- 1. To study the half wave & full wave rectifier.
- 2. To study the effect of various filters circuits.
- 3. To study the characteristics of pnp & npn transistor in common emitter & determine H- parameter from characteristics
- 4. To study the characteristics of pnp & npn transistor in CB & determine h-parameter from characteristics
- 5. To determine the Av, Ai of RC coupled CE transistor amplifier
- 6. Determine the frequency of oscillation in Hartley oscillator
- 7. Determine the frequency of oscillation in phase shift oscillator
- 8. Determine the effect of negative feedback on bandwidth & gain in CE, RC coupled amplifier
- 9. Study IC Op-Amp as a inverting amplifier & scale changer
- 10. Study IC Op-Amp as a non inverting amplifier
- 11. Study IC Op-Amp as an integrator
- 12. Study IC Op-Amp as a differentiator
- 13. Design of BJT Amplifier using Voltage divider bias.
- 14. Design of FET Amplifier using Voltage divider bias.
- 15. Design of transistorized series and shunt regulator
- 16. Design of HEARING AID with PUSH PULL OUTPUT

Workshop Practice LabIN-PRWS-08

Course Outcomes

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Laboratory Outcomes

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Course No.	Course title	Credit	Teaching Schedule			nedule	Allotment of marks				Duration
		s	L	Т	Р	Total	Minor test + Curricular activities	Major test	Practical	Total	of Exams
IN-PRWS-	Workshop	1	-	-	2	2	20		30	50	3 Hrs
08	Practice										
	Lab.										

Workshop/Manufacturing Practices_{[[L:1;T:0;P:0(1credit)]} Lectures & videos: (10 hours) Detailed contents

- 1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods (3 lectures)
- 2. CNC machining, Additive manufacturing (**1lecture**)
- 3. Fitting operations & power tools (1lecture)
- 4. Electrical & Electronics (1 lecture)
- 5. Carpentry (1lecture)
- 6. Plastic moulding, glass cutting (1lecture)
- 7. Metal casting (**1lecture**)
- 8. Welding (arc welding & gas welding), brazing (1 lecture)

List of experiments

- 1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
- 2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)
- 3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
- 4. To study different types of fitting tools and marking tools used in fitting practice.
- 5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
- 6. To prepare joints for welding suitable for butt welding and lap welding.
- 7. To perform pipe welding.
- 8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
- 9. To prepare simple engineering components/ shapes by forging.
- 10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
- 11.To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.

12. To prepare a job involving side and face milling on a milling machine.

Suggested Text/Reference Books:

- (i) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- (ii) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition,2002.
- (iii) Gowri P. Hariharan and A. Suresh Babu," Manufacturing Technology I' Pearson Education, 2008.
- (iv) Roy A. Lindberg, "Processes and Materials of Manufacture", 4thedition, Prentice Hall India,1998.
- (v) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

(ii) Workshop Practice:(60 hours)[L:0; T:0; P:4 (2 credits)]

- 1. Machine shop (10hours)
- 2. Fitting shop (8hours)
- 3. Carpentry (6hours)
- 4. Electrical & Electronics(8hours)
- 5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4hrs)
- 6. Casting (8hours)
- 7. Smithy (6hours)
- 8. Plastic moulding& Glass Cutting (6hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Department of Instrumentation Kurukshetra University Kurukshetra



M. Tech. Instrumentation Engineering SCHEME OF EXAMINATIONS

Session 2018-2019

10(777)

KURUKSHETRA UNIVERSITY KURUKSHETRA

Scheme for M.Tech. Instrumentation Engineering w.e.f. 2018-19 in Phased Manner Semester 1

Code	Subject Name	L	Р	Total	Minor test+		Major test	Practi cal	Total	Credits	
					activit	ular ies					
IE-1101	System Theory	3	0	3	30 + 1)	60	-	100	3	
IE-1102	Microcontroller & Embedded System	3	0	3	30 + 10	0	60	-	100	3	
IE-1103	Transducers, Signal Conditioning, Transmission & Display	3	0	3	30 + 10	0	60	-	100	3	
IE-1104	Advance Process Control	3	0	3	30 + 10	0	60	-	100	3	
IEP-1105	Embedded System & Control Lab	0	6	6	40		-	60	100	3	
IEP1106	Transducers Lab	0	4	4	40		-	60	100	2	
IERM- 1107	Research Methodology & IPR	2	-	2	15 + 5		30	-	50	2	
	Audit Course-1	2	-	2	50*		-	-	-	0	
	Total	16	10	26	310		270	120	650	19	
Semeste	er 2	1		r				n	-	1	_
Code	Subject Name	L	Р	Total	Minor test+ curricu activiti	ılar es	Major test	Practi cal	Total	Credits	
IE-1201	Biomedical Instrumentation	3	0	3	30 + 10)	60	-	100	3	
IE-1202	PLC & DCS	3	0	3	30 + 10)	60	-	100	3	
IE-1203	Digital Signal Processing	3	0	3	30 + 10)	60	-	100	3	
IE- 1204E	Elective-I	3	0	3	30 + 10)	60	-	100	3	
IEP- 1205	Digital Signal Processing Lab	0	4	4	40		-	60	100	2	
IEP- 1206	Process control& Instrumentation Lab	0	6	6	40		-	60	100	3	_
1200	Audit Course-2	2	-	2	50*		-	-	-	0	_
	Total	14	10	24	290		240	120	600	17	_
Semeste	er 3	•		•					•		
Code	Subject Name		L	Р	Total	Mino curric activi	r test+ cular ties	Major test	Practi cal	Total	Credits
IE-2301	Smart & Micro Sensor Des	sign	3	0	3 30 + 1		0	60	-	100	3
IE- 2302E	Elective 2		3	0	3	30 + 1	0	60	-	100	3
IEP- 2303	Instrumentation Lab.		0	4	4	40		-	60	100	2
SEM- 2301	Current Literature Report of Seminar	&	0	6	6	50		-	-	50	3
	Dissertation phase-1			14	14	100				100	7
	Total		6	24	30	270		120	60	450	18
Semeste	er 4										
<i>a</i> ,	~		-		-				ã	-	

Code	Subject Name	Hours per week			Minor	Major		Credits
		L	Т	р	Minor	Major	Total	
IE-2401	Dissertation Phase-II	0	0	32	100	300	400	16

	***LIST OF AUDIT COURSES – 1 for 1 st Semester							
1	IEAD-101	English for Research Paper Writing						
2	IEAD-103	Disaster Management						
3	IEAD-105	Sanskrit for Technical Knowledge						
4	IEAD-107	Value Education						

	***LIST OF AUDIT COURSES – 2 for 2 nd Semester							
1	IEAD-102	Constitution of India						
2	IEAD-104	Pedagogy Studies						
3	IEAD-106	Stress Management by Yoga						
4	IEAD-108	Personality Development through Life Enlightenment Skills						

*Audit courses are mandatory and qualifying in nature.

Students can choose Elective 1 and Elective 2 from the following list of electives. The option to be offered, however, will be decided by the department each year depending on the facilities available.

List of Electives 1

IE-1204E(i) -- Industrial Environment Engineering

IE-1204E(ii) -- Process Modeling and Control

IE-1204E(iii) -- Instrumentation System Design

IE-1204E(iv) -- Power Plant Instrumentation

IE-1204E(v) -- Industrial Electronics

IE-1204E(vi) -- Analytical instrumentation

IE-1204E(vii) -- Intelligent Instrumentation

IE-1204E(viii) -- Process Equipment design

IE-1204E(ix) -- Remote sensing and image processing

List of Electives 2

IE-2302E(i) -- Parameter Estimation & System Identification

IE-2302E(ii) -- Theory and Design of Neuro fuzzy controllers

IE-2302E(iii) -- Digital Control System

IE-2302E(iv) --Control system Design

IE-2302E(v) -- Research Methodology

IE-2302E(vi) -- Energy Management

IE-2302E(vii) -Optimization Techniques

IE-2302E(viii) -Nonlinear and Multivariable Control Systems

IE-2302E(ix) - Optimal Control System

IE-2302(**x**) -- Composite Materials

N.B

- 1. The syllabus for each theory paper will contain four units and examiner will set eight questions by selection two questions from each unit. The student will answer any five questions in all, selecting at least one from each unit
- 2. The Internal assessment in each theory paper will be 40 marks, out of which 30 marks will be assigned on the basis of two written test and 10 marks will be assigned on the basis of curricular activities.
- 3. Dissertation report will be examined by external as well as internal examiners.

Programme Outcomes

PO1 Apply the knowledge of science and basic control theories in designing, analyzing the various industrial and domestic applications.

PO2 Design the modern control circuits for specific applications and process automation.

PO3 Use modern tools, professional software platforms, embedded systems for the diversified applications.

PO4 Explore ideas for inculcating research skills.

PO5 Solve the problems which need critical and independent thinking to show reflective learning.

PO6 Imagine the larger picture and correlate the domain knowledge with the global industrial problems.

IE-1101 SYSTEM THEORY

L T P 3 0 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all, two from each unit. Answer five questions selecting one from each unit.

UNIT - I

Controllability & Observability: Introduction, general concept of controllability, general concept of observability, controllability tests for continuous time systems, observability tests for continuous time systems, controllability & observability for discrete time systems, controllability & observability for discrete time systems, controllability due to sampling, controllability & observability canonical forms of state model.

UNIT - II

State variables and input output descriptions: introduction, input output maps from state models, LTI continuous time systems, LTI discrete time systems, linear time varying systems, output controllability, reducibility, state model from input output maps realization of scalar transfer functions, phase variable canonical forms, realization of transfer function matrices, realization of pulse transfer functions.

UNIT - III

Stability: Introduction, equilibrium points, stability concepts and definitions, stability of linear time invariant systems, equilibrium stability of non-linear continuous time autonomous systems, direct method of Lyapunov and the linear continuous time autonomous systems, aids to find Lyapunov functions for non-linear continuous time autonomous systems, use of Lyapunov functions to estimate transients, the direct method of Lyapunov and discrete time autonomous systems.

UNIT - IV

Model control: Introduction, controllable and observable companion forms for single input/single output systems & multi-input/multi-output systems, the effect of state feedback on controllability & observability, pole placement by state feedback, full order observers, the separation principle, reduced order observers, deadbeat control by state feedback, deadbeat observers.

REFERENCE BOOKS:

- **1.** Modern control system theory by M. Gopal (New age international)
- **2.** Modern control systems a manual of design methods by John A Borrie (Prentice hall international)
- 3. Digital control and state variable methods by M. Gopal (Tata McGraw Hill)

IE-1102 Microcontroller & Embedded Systems

L T P 3 0 6

Minor test+ curricular activities = 30 + 10

Major test:	60 Marks
Total:	100 Mark
Time:	3 hrs.

Two Questions will be set from each unit and students have to attempt five questions in all selecting at least one from each unit.

UNIT - I

Microcontrollers: Assembly language -Instruction set, 8051 CPU structure- Register-file – Interfacing, application using PWM mode – simple program and applications.

Real time Control: 8096 CPU and its interrupt structure, interrupt control priorities, critical registers, programmable timers, interrupt density and interval considerations, real time clock.

UNIT-II

Introduction: Challenges of Embedded Systems, fundamental components, examples of embedded systems, hardware fundamentals, gates, timing diagrams, memory, direct memory access, buses, interrupts, schematics, build process of embedded systems.

UNIT-III

Memory Management And Interrupts: Memory access procedure, types of memory, memory management methods, Pointer related issues, polling versus interrupts, types of interrupts, interrupt latency, re-entrance, interrupt priority, programmable interrupt controllers, interrupt service routines.

UNIT - IV

Real-Time Operating Systems – RTOS: Desktop Operating Systems versus RTOS, need for Board Support Packages, task management, race conditions, priority inversion, scheduling, inter task communication, timers, semaphores, queues.

Text books:

- 1. John B Peatman, "Design with Microcontrollers" Mcgraw Hill International, Singapore
- 2. Michael Slater "Microprocessor Based design- A Comprehensive Guide to effective hardware design" prentice Hall, new Jersey
- 3. Sriram V. Iyer, Pankaj Gupta, "Embedded Real-time Systems Programming", Tata McGraw Hill publishers, 2004.
- 4. David E.Simon, "An Embedded Software Primer", Pearson Education publishers, 1999.

References:

- 1. Raj Kamal, "Embedded Systems" Tata McGraw Hill.
- 2. A unified Hardware/Software Introduction, "Embedded System Design "Frank Vahid and Tony Givargis, John Wiley & Sons publishers, 2002.
- 3. Ayala, Kenneth, "The 8051 Microcontroller- Upper Saddal River", New Jersey, prentice Hall.
- 4. James W. Stewart, Kai X Miao, "8051 Microcontroller, the Hardware, software and interfacing", Prentice Hall Career & Technology.

IE-1103 TRANSDUCERS, SIGNAL CONDITIONING, TRANSMISSION & DISPLAY L T P 3 0 4 Minor test+ curricular activities = **30** + **10**

 $\begin{array}{rcl} \text{Inor test+ curricular activities} = 30 + 10\\ \text{Major test:} & 60 \text{ Marks}\\ \text{Total:} & 100 \text{ Marks}\\ \text{Time:} & 3 \text{hrs.} \end{array}$

There will be 8 questions in all, two from each unit. Answer five questions selecting one from each unit.

UNIT I

Classification of transducers, Potentiometers, Differential transformers, Resistance strain gauges, Capacitance sensors, Eddy current sensors, Piezoelectric sensors, Photo-electric sensors, Resistance temperature detectors, Thermistors, Thermocouples, Elastic elements, Hall effect sensors, Electro dynamic sensors, Nuclear radiation sensors, Ultra sonic sensors, Smart sensors, Fibre optic sensors, Semiconductor IC sensors.

UNIT II

Wheat stone bridge circuits, isolation amplifier, Active filters – phase sensitive detector – F/V and V/F converters, Data acquisition systems: single channel, multi channel data acquisition systems.

UNIT III

Digital and analog data transmission, Wire and radio transmission, Fibre optic data transmission, Modulation technique for digital data transmission, Hydraulic and pneumatic data transmission, RS 232 and IEEE 488 standards, LAN.

UNIT IV

LED and LCD displays, Seven segment displays, Display multiplexing, Dot matrix bar graph displays, CRTs, Analog and digital oscilloscopes, Analog and digital recorders.

REFERENCE BOOKS

- 1. Jones, B.E., "Instrument Technology", Vol.3 Butter worth and Co., Publishers, 1987.
- 2. Neubert, "Instrument Transducers", Oxford University press, 1998.
- 3. Ernest O. Doebelin, "Measurement Systems", McGraw-Hill Publishing Co., 1990.
- 4. James Dally, W., "Instrumentation for Engineering Measurements", John Wiley & sons, Inc., 1993.
- 5. Patranabis, D., "Sensors and Transducers", Wheeler Publishing, 1997.
- 6. C.S.Rangan, G.R.Sarma, V.S.V.Mani, "Instrumentation Devices and systems", Tata McGraw-Hill Publishing Co. Ltd., Second Edition, 1999

L T P 3 0 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT – I

PID controller tuning procedures: Close loop oscillation based tuning, Ziegler-Nichol close-loop method. Tuning rules for first order + dead time processes: step testing quarter decay ratio response, Ziegler-Nichol open loop method, Cohen-Coon parameters. Synthesis of feedback controllers: Development of the controller synthesis formula, specifications of close loop response, direct synthesis for minimum and non-minimum phase processes, controller modes and tuning parameters derivative mode for dead time process. Dead Time Compensation (Algorithms for Smith Predictor), & effect of process modeling error.

UNIT – II

Control Valve Design: Control valve flow characteristics, Valve & process characteristics, range availability of control valve, control valve sizing for gas, liquid, vapors and steam, Control valve cavitation and flashing, flow control cavitation index, vibration curve cavitation index, calculation of flash fraction, Control valve gain, sequencing of control valve . Valve application, selection, valve capacity testing.

UNIT - III

Additional control techniques: Cascade control,. Selective control & Split range control, Cascade control for various processes , dynamic characteristics of Cascade control system and its tuning. Override and Auctioneering control system for various processes, Feedforward control system, Feedforward control of various processes. Design of Feedforward controllers, Feedforward – Feedback control & their relative advantages & disadvantages.

UNIT -IV

Ratio control system, Predictive control control Statistical control Adaptive and Inferential control system: Programmed Adaptive control, gain scheduling Adaptive control, Self tuning regulator (STR), MRAC, Multivariable Process Control.

Reference Books:

- Principles and Practice of Automatic Process Control by Carlos A Smith, John wiley & sons
- Computer Aided Process control by S.K. Singh PHI
- Process Control Modeling, Design, and Simulation by B.Wayane Bequette PHI
- Chemical Process control by Stephanopolous PHI

IE 1201 BIO-MEDICAL INSTRUMENTATION

L T P 3 0 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all, two from each unit. Answer five questions selecting one from each unit.

UNIT - I

Characteristics of Transducers and Electrodes for Biological Measurement: Introduction to human body; block diagram, classification, characteristics, various physiological events and suitable transducer for their recording, bioelectric potentials.

UNIT - II

Cardiac & System: Cardiac musculature, Electro cardiography, ECG recording, Phonocardiography, holter recoding ECG lead system, Heart rate meter, vector cardiography, Pacemakers, Defibrillators. Blood Pressure and Blood Flow Measurement: Invasive and noninvasive methods of Blood pressure, Characteristics of blood flow and heart sound, Cardiac output measurement, Plethysmography. Respiratatory System: Mechanics of breathing, Parameters of respiration, Respiratory system measurements, Respiratory therapy instruments.

UNIT - III

Instrumentation for Measuring Nervous Function: EEG signal, frequency band classification, Lead systems, EEG recording, Clinical applications of EEG signal, X-ray CT scan, MRI, PET. Muscoskeletal systems: EMG, Clinical applications, and Muscles stimulator. Clinical Laboratory Instrumentation: Test on blood cell, Blood cell counter, Blood glucose monitors, auto analyzer, Pulse-oximeter.

UNIT - IV

Recent Trends in Biomedical Engg.: Patient care and monitoring, Non-invasive diagnostic instrumentation, Biotelementry, Telemedicine, Prosthetic devices, Lie detector test, Application of lasers and ultrasonic in biomedical field. Troubleshooting & Electrical Safety of Biomedical Instruments: Physiological effect of current and safety measurement.

REFERENCE BOOKS:

- 1. Medical instrumentation application & design, John G Webster, John wiley, 1998.
- 2. Review of medical physiology, W.F. Ganong, Medical publisher, 1977
- 3. Biomedical instrument and measurement, Cromwell, PHI, 2000
- 4. Handbook of biomedical instrument, R S Khandpur, TMH

IE-1202 PROGRAMMABLE LOGIC CONTROLLERS AND DISTRIBUTED CONTROL SYSTEM L T P

300

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

Direct Digital Control – Structure and Software: The position algorithm (simplifying PID control equation, deriving position algorithm); the velocity algorithm (velocity algorithm, deriving the velocity algorithm); Multi variable control (Cascade control using velocity algorithm, radio control using velocity algorithm).

UNIT - II

Discrete State Process Control System: Development and analysis of ladder diagram, logic diagram from ladder diagram, Function description of PLC, Programming fundamentals, hardware and system sizing and selection, PLC peripherals, programming, PLC networking, PLC programmable languages, ladder diagrams language, Boolean mnemonics language, functional block language, PLCs.

UNIT - III

Distributed Process Control System: Functional requirement of DPCS, DCS configurations/ architecture, data highway cables, field buses, protocols used in DCS, Software configuration: controller function configuration, multiplexer and party line system.

UNIT - IV

Supervisory control and Data Acquisition system (Functions of SCADA, channel scanning, conversion to engineering units, data processing, distributed SCADA system, Remote terminal unit). DCS supervisory computer and configurations: supervisory computer function, supervisory control techniques and consideration, Supervisory control algorithm, DCS system integration with PLC and computer. Fiber optic local area networks – map and top.

Popular Distributed Control Systems: CP 80 system.

Reference Books:

- 1. Computer Aided Process control by S.K. Singh PHI
- 2. Computer Based Industrial Control by Krishna Kant PHI
- 3. Instrument Engineers Handbook- Process Control by Bela G. Liiptak
- 4. Microprocessor in Process control by C.D. Johnson
- 5. Principles and Practice of Automatic Process Control by Carlos& A Smith

LTP 306

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT – I

Discrete time signals – Sequences – Stability and Causality – Frequency domain Representation of Discrete time Systems and Signals – Two-dimensional sequences and systems – Z-transform – Z-Transform theorems and properties – Two-dimensional Z-transform. Structures for discrete time system - Direct, cascade and parallel forms – Lattice structure.

UNIT – II

Realization of digital linear systems: IIR direct form filter realizations, IIR cascade and parallel filter realizations, FIR filter realization and Ladder realization. Digital filter design: Advantages and disadvantages of digital filters, IIR filter design: Design of IIR filter from analog filter approximations (Butterworth, Chebyshev and Elliptical filters), Lowpass filter design using MATLAB. Invariant- Impulse –response method, IIR digital filter design by pole-zero placement. FIR digital filter design: Characteristics and properties of FIR digital filter

UNIT - III

FIR digital filter design using Fourier series method, window design techniques. Optimal equiripple desgn techniques, frequency sampling design techniques, Comparison between FIR and IIR filter designs.

UNIT-IV

Wavelets and Wavelets Trasformations: The Wavelets Transformations and Time-frequency analysis, the wavelet approach to time –frequency analysis (Density of time-frequency, Marginals, Moments, Mean time and Mean frequency, conditional moments, Morlet wavelet, Modified Morlet wavelet, time and frequency moments). Multiwavelets in \mathbb{R}^n with an Arbitrary Dilation Matrix : Self-similarity, Refinement equations, Existence of MRAs

Reference Books:

- 1. Digital filter analysis and Design by Andreas Antoniou McGraw Hill
- 2. Digital Signal Processing by David J. Defalta
- 3. Digital Signal Processing by A.V. Oppenhein and Schafer PHI
- 4. Digital Signal Processing by J.G.Proakin, D.G. Manolakis, PHI
- 5. Modern filter theory by Johnson and Johnson
- 6. Wavelets and Signal Processing by Lokenath Debnath, Birkhauser Boston Basel Berlin

IE-1204E(i) -- INDUSTRIAL ENVIRONMENTAL ENGINEERING L T P 3 0 0 Minor test+ curricular activities = 30 + 10

 $\begin{array}{rcl} \text{for test+ curricular activities} = 30 + 10\\ \text{Major test:} & 60 \text{ Marks}\\ \text{Total:} & 100 \text{ Marks}\\ \text{Time:} & 3 \text{hrs.} \end{array}$

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT- I

INTRODUCTION: Source and classification of Air Pollution, Effect of Air Pollution in Human Health, Effect of Air Pollution on Animals, Effect of Air Pollution on Plants, Economics Effects of Air Pollution, Control of Air Pollution by Equipment, Control of Air Pollution by Process Changes, Air Pollution from Major Industrial Operations, Air Pollution legislation and regulation, Environment Protection Act, Air Pollution in Indian cities, Water & Noise Pollution. & its control, Green House effects & its control.

UNIT-II

POLLUTION CONTROL FOR SPECIFIC POLLUTANTS: Industrial Pollution Emission and Indian Standards, Analysis of Pollutants, Control of BOD, Removal of Chromium, Removal of Mercury, Removal of Ammonia / urea, Treatment of Phenolic Effects, Removal of particular matter, Removal of Sulphur Dioxide, Removal of Oxides of Nitrogen, Removal of Vapour from Efficient case, Control of CO2 and CO.

UNIT- III

POLLUTION CONTROL IN SELECTED PROCESS INDUSTRIES: General considerations of Pollution Control in Chemical Industries, Pollution Control aspects of fertilizer industries, Pollution Control in Petroleum & Petrochemical Units, Pollution Control in Pulp & Paper Industries, Tanning Industries, Sugar Industries, Alcohol Industries, Electroplating & Metal Finishing Industries, Radioactive Wastes, Pollution Control methods used in Power Plants.

Reference Books:

1. Air Pollution by H V Rao, McGraw Hill

2.Pollution Control in Process Industries by S P Mahayar, McGraw Hill

3.Encyclopedia of Environmental Pollution & Control, Vol. 1 & 2, Enviro Media, Karad, India.

4.Envoronmental Water Pollution & its control by G R Chhatwal, M.C. Mehra & Others, Anmol Publication, Delhi.

5. Environmental Air Pollution & its control by G.R. Chhatwal & Others, Anmol Publication, Delhi.

IE-1204E(ii) - PROCESS MODELLING AND CONTROL

L T P 3 0 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be Eight questions in all. Two questions from each Unit. Answer five questions in all, selecting at least One from each Unit.

UNIT- I

Simulation and Modelling: Importance of Simulation, Mathematical Modelling, Process dynamic of fluid flow and heat transfer system, Mass transfer dynamics and distillation column, Reaction kinetics of chemical processes. Process control aim and objectives classification of process control system, techniques for process control. Modelling and simulation for plant Automation-case studies.

UNIT- II

PREDICTIVE CONTROL SYSTEM: Model based control system (Internal mode control, Model Predictive control and Process Model based control), Plant wide Control, Inferential control, Multiple-loop (Multivariable) control system. Interaction and Decoupling of control loops. Design of cross controllers and selection of loop using RGA. Prosperities and application of RGA.

UNIT- III

ADAPTIVE AND LEARNING CONTROL SYSTEM: Basic principles of Adaptive and learning systems, MRAC & STAC, Adaptive control techniques, Types of Learning- Supervised and Unsupervised Learning control system, On-line and Off-line Learning control system.

UNIT- IV

Real time control system: Characteristics and classes of real time systems, program classification: Sequential, multitasking real time, concurrency and synchronization. Design strategies, Reability, fault detection, fault tolerance real time operating system, Distributed computing systems, Software Process models (Build and mix model, waterfall, rapid prototyping, Incremental and Spiral model) Design techniques and tools

Reference Books:

- Techniques of Process Modelling, Simulation and Control for Engineer by Astrom, Luyben, McGraw Hill.
- Computer Controlled System by Astrom, K.J and B. Wittenmark PHI
- Chemical Process Control by Stephanopolous PHI
- Process Control Modeling ,Design and Simulation by B.Wayane Bequette, PHI

IE-1204E(iii) -- INSTRUMENTATION SYSTEM DESIGN

L T P 300

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT- I

Concept of generalized measurement system, functional elements.

TRANSDUCERS: Operating principle, construction and design of piezoelectric transducers, magnetostrictive transducers, Hall effect, eddy current, ionization, optical transducers, fiber optic sensors, concept of smart and intelligent sensor, bio-sensors. Density and viscosity measurement, level measurement, humidity & moisture measurement, flow measurement, pressure gauges, temperature measurement, torque, Speed Vibrations measurement.

UNIT- II

Definition of intelligence and of an intelligent instrumentation system; features characterizing intelligence and features of intelligent instrumentation; components of intelligent instrumentation; Block diagram of an intelligent instrumentation system.

Smart Sensors: Primary sensors; Excitation; Amplification; Filters; Converters; Compensation (Nonlinearty: look up table method, polygon interpolation, polynomial interpolation, cubic spline interpolation, Approximation & regression; Noise & interference; Response time; Drift; Cross-sensitivity); Information Coding/ Processing; Data Communication; Standards for smart sensor interface.

UNIT- III

Recent Trends in Sensor Technologies: Introduction; Film sensors (Thick film sensors, Thin film sensors); Semiconductor IC technology – standard methods; Microelectromechanical systems (Micro-machining, some application examples); Nano-sensors. Bulk Micromachining .Micromachining Surface Micromachining. Other Micromachining Techniques.(LIGA Process) Micromilling. Micromachined Materials. Getting Sensor Information into the MCU. Using MCUs/DSP to Increase Sensor IQ.

UNIT- IV

Smart and Intelligent transmitters, Smart features, Standards for Smart Sensing, Setting Standards for Smart Sensors and System ,IEEE 1451.1,, IEEE 1451.2, IEEE 1451.2, STIM, IEEE P1451.3, IEEE P1451..4, Fieldbus Systems, Industrial Field buses., Design of intelligent instrumentation system.

Reference Books:

- 1. E.O. Dobelin Measurement Systems Application and Design- McGraw Hill
- 2. Beeweth and Buck-Mechanical Measurement-Nares Puti
- 3. Nortan- Hand Book of transducer- PHI

4. C. D. Johnson-Instrumentation and Control-Wiley Intrivator3

5. Conside-Process and industrial instrumentation, Mc Graw Hill.

IE-1204E(iv) -- POWER PLANT INSTRUMENTATION

L T P 300

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks

Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT- I

Power System Introduction: Structures of power system. Conventional and Nonconventional sources of electrical energy. Representation of power system components, Per unit system (PU). Transmission Lines: Inductance & resistance & capacitance of transmission lines. Characteristic performance of power transmission lines. Instrumentation scheme used for HVDC and EHVDC transmission system.

UNIT- II

INTRODUCTION TO POWER PLANTS: Elements and general layout of steam, gas, diesel engine, nuclear and hydro-electric power plants and their working principle and classification, Instrumentation and Control.

UNIT- III

Automatic generation and voltage control: Load frequence control, Automatic voltage control, Digital LF controllers, Decentralized control, Load flow studies. Automatic load dispatch using computers, Instrumentatation for the operation and maintenance of generation unit.

UNIT- IV

POWER PLANT CONTROLS: Basic types of boilers and steam turbines, controls of feed water, air flow, fuel feeding, deaerator, DM plant, boiler drum pressure & level, ash handling system, controls of steam inlet to turbine, turbine back pressure control, electrostatic precipitation, gas analysis, O2, CO2, oxides of nitrogen, measurement of smoke & dust, flame momentum, nuclear measurements and nuclear reactor and coolant controls, instrumentation & control in boiler accessories like economizers, air preheaters, de-super heaters, soot blowers and instrumentation & control in chemical recovery boilers.

Reference Books:

- 1. An introduction to power plant technology by G. D. Rai, Khanna Publishers, Delhi.
- 2. Instrument Engineer's (Process Control) handbook by B.G. Liptak
- 3. A course in power plant engineering by S.C. Arora & S. Domkundwar, Dhanpat Rai & Co (P) Ltd., Delhi
- 4. Power plant engineering, steam & nuclear by P.K. Nag, Tata McGraw Hill
- 5. Power systems stability and control by Anderson & Fouad, Galgoti Publication
- 6. EHVAC and Transmission, K. R. Padiyar.

IE-1204E(v) -- INDUSTRIAL ELECTRONICS

L T P 300

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT-I

INTRODUCTION: Review of semiconductor power devices (Power diodes, Power Transistors, MOSFETS, IGBT, SCR, GTO, MCT, DIAC, TRAIC, PUT, SUS, SCS), Review of choppers, converters, inverters, cyclo-converters.

CLOSED LOOP CONTROL OF DC DRIVES: Single Quadrant variable speed drives; Four Quadrant variable speed drives, Armature voltage control at constant field, field weakening, details of various blocks of closed loop drives; drive employing armature reversal by a contactor, drive employing a dual converter with non- simultaneous and simultaneous control.

UNIT-II

Industrial application of Industrial Electronic Devices: Control of electric drives used in manufacturing and process industries, protection of electric drives using solid state devices and controllers, analysis of drive systems. Testing for drive controllers: Design and testing if microprocessor based drive controllers, analysis of solid state control of industrial drives, design and testing of thyristor based controllers for electric drives.

UNIT- III

FREQUENCY CONTROLLED INDUCTION MOTOR DRIVES: Control of IM by VSI-3 phase VSI, six step inverter voltage control, PWM inverter, breaking and multiquadrant control, VSI variable frequency drives; control of IM by CSI- 3 phase CSI, current sources, Braking, PWM in a thyristor CSI, PWM GTO CSI, CSI variable frequency drives.

UNIT- IV

SELF -CONTROLLED SYNCHRONOUS MOTOR DRIVES: Self control, brushless & commutatorless, DC & AC motors synchronous motor control-operation of a wound field and permanent magnet synchronous motor from a variable frequency current source; source, permanent magnet, operation of a permanent magnet motor at the maximum torque to armature current ratio and at the maximum torque to flux ratio; operation of self controlled synchronous motor drives- CSI drives, VSI drives, cyclo-converters drives, brush-less and commutator-less AC & DC motor drives and their applications.

Reference Books:

- 1. Industrial Electronics by Frank D. Petruzella (Mc Graw-Hill)
- 2. Industrial Electronics by Morris (McGraw-Hill)
- 3. Power semiconductor drives by G.K.Dubey, Prentice Hall Inc, New Jersey
IE-1204E(vi) ANALYTICAL INSTRUMENTATION

L T P 3 0 ---

There will be eight questions in all, two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

Basic Components of a Spectrophotometer, different types of excitation sources, monochromators, detectors, filters etc for various wavelengths, Spectrophotometers Fluorescence & Phosphorescence Spectrophotometry, Laser Raman Spectrophotometer Instrumentation & application

UNIT - II

Atomic Absorption & Emission Spectroscopy (Sample preparation, photometer instrumentation). . Infra-red spectrometry. X-ray spectrometry applications of i) X-Ray Fluorescence, ii) Auger Electron and iii) ESCA techniques.

UNIT - III

pH and ion selective Potetiometry: conductometry: conductance methods, Thermometric methods (TGA, DTG, DTA,), themomechanical analysis, dynamic analysis, thermometric titrimetry

UNIT - IV

Basic principle of NMR phenomenon, NMR spectrometer Instrumentation and application Electron spin resonance (ESR) Spectroscopy basic principle, spectrometer instrumentation and applications. Basic principle of chromatography - Gas & Liquid column chromatograph instrumentation and applications; water pollution monitoring instrumentation.

- 1. Instrumental Methods Of Analysis By Williard, Merrit, Dean
- 2. Handbook Of Analytical Instrumentation By R.S. Khandpur
- 3. Instrumental Methods For Chemical Analysis By E.W.Ewing
- 4. Introduction To Instrumental Analysis By Robert D. Braun
- 5. Essentials of Instrumental analysis by Skoog, Holler & Nieman, Thomson Publ.

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

UNIT-I

Introduction: Definition of intelligence and of an intelligent instrumentation system; features characterizing intelligence and features of intelligent instrumentation; components of intelligent instrumentation; Block diagram of an intelligent instrumentation system.

UNIT-II

Smart Sensors: Primary sensors; Excitation; Amplification; Filters; Converters; Compensation (Nonlinearty: look up table method, polygon interpolation, polynomial interpolation, cubic spline interpolation, Approximation & regression; Noise & interference; Response time; Drift; Cross-sensitivity); Information Coding/ Processing; Data Communication; Standards for smart sensor interface; The automation.

UNIT-III

Interfacing Instruments & Computers: Basic issues of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Other interface considerations.

UNIT-IV

Software Filters (Digital Filters) : Description of Spike Filter, Low pass filter, High pass filter etc.

Recent Trends in Sensor Technologies: Introduction; Film sensors (Thick film sensors, Thin film sensors); Semiconductor IC technology – standard methods; Microelectro-mechanical systems (Micro-machining, some application examples); Nano-sensors.

Reference Books:

L T P 300

- Alan S. Morris, 'Principles of measurement & Instrumentation', PHI.
- Wai-Kai Chen, 'Passive and Active Filters: Theory and Implementations', John Willey & Sons (Asia) Ptr. Ltd., New Delhi.
- D. Patranabis, 'Sensors & Transducers', PHI, 2003.
- Roman Kuc, 'Introduction to Digital Signal Processing', Mc Graw Hill Introduction Edition N.York.

L T P 3 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT- I

Valve Noise calculation and reduction: Sources of valve noise, noise control, path treatment, valve treatment, valve noise calculation. Design & construction of Globe valve: valve trends, trim design, trim flow characteristics, flow range ability, standard trim configuration, valve plug stems, Body form of single and double seated globe valve, Bonnet design of global valve. Construction and flow characteristics of butterfly valve.

UNIT - II

Boiler control and optimization, compressor control and optimization, cooling tower control and optimization, distillation controls, evaporator controls, , reactor control and optimization

Basics of Process Equipment Design: General design procedure, Computer design, Fabrication techniques, Equipment classification, Power of rotational motion, Drives for process equipment.

UNIT - III

Pressure Vessels: Pressure vessel code, Operating conditions – at low temperatures, at elevated temperatures, Design considerations and stresses, fabrication, inspection and tests, unfired vessel codes, High pressure vessels: Constructional features, materials, solid walled, multi shell, vessel closures, Jacket for vessels, Examples. Storage Vessels: Storage of fluids, Non-volatile liquids, volatile liquids and gases, Design of tanks, rectangular tanks, nozzles and mounting, Large capacity storage tanks, Examples. Reaction Vessels: Materials for construction, agitation, classification of reaction vessels, heating systems.

UNIT - IV

Heat Exchangers: Types of heat exchangers, design of shell and tube heat exchangers. Evaporators and Crystallisers: Types of evaporators, entrainment separators, materials and design considerations, crystallisers, Examples.Process Hazards and Safety Measures in Equipment design. Process flow diagrams.

- Instrument Computer Aided Process control by S.K. Singh PHI
- Computer Based Industrial Control by Krishna Kant PHI
- Instrument Engineers Handbook- Process Control by Bela G. Liiptak

IE-1204E(ix) REMOTE SENSING AND IMAGE PROCESSING

L T P 3 1 --

Minor test+ curricular activities = 30 + 10

Major test: 60 Total: 100 Marks Time: 3 hrs.

There will be eight questions in all, two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT-I

Concepts and Foundations of Remote sensing - Introduction: Energy interactions with earth surface features; data acquisition and interpretation; global positioning system; Successful applications of remote sensing systems; geographic information systems - introduction. Sensors and Instruments: Introduction, active and passive sensors, Visible and near infrared, thermal infrared, microwave, sonic sensors; IR spectrometer Radiometers, Scanners, Sensors and Platforms, Resolution: spatial and temporal, geometric, angular.

UNIT-II

Satellite systems: Introduction, Land observation satellites, current satellite systems (Landsat class, spot, IRS, broad scale coverage, AVHRR, SeaWiFS, IKONOS, Cartosat etc); Multispectral thermal and hyper spectral sensing: Introduction, along track, across track scanning; FLIR systems, hyperspectral sensing, Microwave and lidar sensing : radar development, SAR, geometric characteristics of side looking radar, transmission of radar signals, radar image interpretation, radar remote sensing from space, Seasat, radarsat, ERS, JERS, ALOS, etc. Lidar – introduction, sensors, resolution, sensors, development and applications.

UNIT-III

Continuous image mathematical characterization, psychophysical vision properties, photometry and calorimetry, Digital image characterization – image sampling and reconstruction, discrete image mathematical representation, image quantization

UNIT-IV

Discrete 2-dim. Linear processing: Superposition and convolution, unitary transforms, linear processing techniques; Image Improvement: Image enhancement, image restoration (point and spatial techniques), geometrical image modification, Image analysis

References

- 1. Digital image processing, (PIKS) William K.Pratt, John Wiley 2001
- 2. Remote sensing and image interpretation by Thomas M Lillisand, RW Kiffer, JW Chipaman, John Wiley 2004
- 3. Digital Signal Image Processing by Tamal Bose, JohnWeily, 2004
- 4. Introduction to Remote sensing by JB Campbell, Taylor & Francis Publ.2002 Remote sensing by FA Sabins, 1992

IE-2301

L T P 300

01 SMART & MICRO-SENSORS DESIGN

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be Eight questions in all. Two questions from each Unit. Answer five questions in all, selecting at least one from each Unit.

UNIT- I

MEMS: Introduction, principle of MEMS, Example of Mems, small and large scaling, fabrication technology, micromachining: photolithography, thin film deposition and doping, wet chemical etching, waferonding, plasma etching, surface micromachining.

UNIT- II

Mechanics of Membrane and beams: dynamics, string, beams, diaphragms and membrane Transduction of Deformation: Metal strain gauges, Semiconductor Strain Gauges, Capacitive Transducers, Force and Pressure sensors: Force Sensors, Pressure sensors, Thermocouples Semi conducting Thermo resistors, Fiber Optical sensors, concept of smart and intelligent sensor, bio sensors.

UNIT-III

Acceleration Sensors: introduction, Bulk Michromachined Accelerometers, surface Michromachined accelerometers, force feedback, angular rate sensors, Flow Sensors: The laminar boundary layer, Heat Transport in the limit of very small Reynolds Numbers, Thermal Flow Sensors, Skin Friction Sensors, Dry fluid Flow Sensors, wet fluid flow sensors, Resonant Sensors: Basic principle and physics.

UNIT-IV

Definition of intelligence and of intelligent instrumentation system: Features characterizing intelligence and Features intelligent instrumentation, component of intelligent instrumentation. Design of intelligent instrumentation systems.

Smart and Intelligent transmitters, smart features standard for smart sensing, setting standards for smart sensors and system, IEEE 1451.1, IEEE 1451.2, STIM, IEEE P1451.3, IEEEP 1451.4, Field buses systems.

- 1. E.O. Doeblin Measurement System Application and Design, McGraw Hill
- 2. Beeweth and Buck- Mechanical Measurement, Nares Puti
- 3. Nortan- Hand Book of transducers, PHI
- 4. Conside-Process and industrial instrumentation, McGraw Hill
- 5. Mechanical Microsensors, M.Elwenspoek, R. Wiegerink, Springer

IE-2302E(i) --PARAMETER ESTIMATION & SYSTEM IDETIFICATION L T P 3 0 0 Minor test+ curricular activities = 30 + 10

Inor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

Stochastic Linear estimation and control: Stochastic processes and linear systems, characterization, Response of linear continuous-time, linear discrete-time systems, Estimation for linear continuous-time, linear discrete-time systems.

UNIT - II

Estimator Design, Regular Design: Combined control law and estimator, Reference input: Reference input for full-state feedback, Reference inputs with Estimators: State command structure, Output error command, Estimator structure and classical methods, integral control and disturbance estimation, Effect of delays.

UNIT - III

Optimal Estimator: Least squares Estimation, weight least squares, recursive least squares, Kalman Filter, Steady- State Optimal Estimation, Noise Matrices and Discrete Equivalents. State Regulator design Through the Lyapunov Equation, Optimal State Regulator Through Riccati Equation, Multivariable control design: Slection of weighting Matrices, Pincer Procedure.

UNIT-IV

System Identification: Defining the model set for liner systems, Identification of Nonparametric models, Models and Criteria for Parametric Identification, deterministic Estimation, Stochastic least squares, Maximum likelihood, Numerical search for the maximum likelihood estimate, Subspace identification methods. Reference Books:

• B.N. Chatterji and K.K. Parmar, System Identification Techniques, Oxford &IBH Pub. New Delhi.

• M.S. Garwaal & A.P. Andrews, Kalman Filtering : Theory and Practice, Prentice Hall Inc.

• Gene F. Franklin, J. David Powell & Michael Workman, Digital Control of dynamic System, Pearson Education Asia

IE-2302E(ii) -- THEORY AND DESIGN OF NEURO – FUZZY CONTROLLERS L T P 3 0 0 Minor test+ curricular activities = 30 + 10

Amor test+ curricular activities = 30 + 10Major test: 60 Marks Total : 100 Marks Time : 3hrs.

UNIT -I

NEURAL NETWORK

Introduction - Biological neurons and their artificial models – Learning, adaptation and neural networks learning rules types of neural networks – Single layer, multiplayer – Feed forward, feedback networks; back propagation – Learning and training – Hop field network.

UNIT -II

NEURAL NETWORKS IN CONTROL

Neural network for non-linear systems – Schemes of neuro control – System identification forward model and inverse model – Indirect learning neural network control applications – Case studies.

UNIT -III

FUZZY LOGIC

Fuzzy sets – Fuzzy operation – Fuzzy arithmetic – Fuzzy relations – Fuzzy relational equations – Fuzzy measure – Fuzzy functions – Approximate reasoning – Fuzzy propositions – Fuzzy quantifiers – If-then rules.

UNIT -IV

NEURAL NETWORKS IN CONTROL

Structure of fuzzy logic controller – Fuzzification models – Database – Rule base – Inference engine defuzzification – Module - Non-linear fuzzy control – PID like FLC – Sliding mode FLC – Sugeno FLC – Adaptive fuzzy control – Fuzzy control applications case studies.

REFERENCE BOOKS

- 1. Jacek. M. Zurada, "Introduction to Artificial Neural Systems", Jaico Publishing House, 1999.
- 2. Kosko, B. "Neural Networks and Fuzzy Systems", Prentice Hall of India Pvt. Ltd., 1994.
- 3. Klir G.J. & Folger T.A. "Fuzzy sets, uncertainty and information", Prentice Hall of India Pvt. Ltd., 1993.
- 4. Zimmerman H.J., "Fuzzy set theory and its application" Kluwer Academic Publishers, 1994.
- 5. Driankov, Hellendroon, "Introduction to Fuzzy Control", Narosa Publishers.
- 6. Farin Wah S.S., Filev, D. Langari, R. "Fuzzy control synthesis and analysis", John Wiley and Sons, 2000.

L T P 3 0 0

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

DIGITAL CONTROL: Introduction to digital control, sampling, Data reconstruction principles, Pulse transfer functions, Block diagram & signal flow graph, Digital Control Techniques-PID, Deadbeat. Time domain analysis, correlation between time response & root location in S & Z transform, effect of pole-zero configuration in Z-plane on maximum overshoot & peak time transient response, Stability in Z-plane using modified Rouths criteria, Jury's criteria.

UNIT - II

Digital control system design : Design by Emulation, Direct design by root locus in zplane, Frequency response method, Direct design method by Ragazzini.

NON LINEAR CONTROL SYSTEM: Introduction to non linear feedback control system, special features of linear system; limit cycle, jump response, sub harmonics etc., describing function and phase plane techniques for analysis of non linear system, concept of local, global, asymptotic and total stability of non linear system, Liapunov's stability criterion.

UNIT - III

PID CONTROL AND ROBUST CONTROL:

Tuning procedure for PID controllers, modification of PID control schemes, two degrees of freedom control. Design considerations for Robust control

UNIT - IV

ADAPTIVE AND LEARNING CONTROL SYSTEMS: Basic Principles of Adaptive and Learning Control Systems, Model Reference Adaptive Control, Types of Learning-Supervised and Unsupervised Learning Control Systems, On-line and Off-line Learning Control Systems.

- 1. Digital control system By B. C. Kuo (PHI)
- 2. Modern control engineering By Ogata (PHI)
- 3. Control System Engineering By Nagrath & Gopal (Wiley Eastern)
- 4. Control System Engineering By Phillips and Nagle (PHI Publications)
- 5. Control System Engineering by Norman S Nise, Wile
- 6. Modern Control System by R C Dorf, R H Bishop, Addision Wesley
- 7. Systems, Modeling & Analysis by I J Nagrath, M Gopal, TMH
- 8. Digital Control & State Variable Methods by M Gopal, TMH

IE-2302E(iv) -- CONTROL SYSTEM DESIGN

L T P 300

Minor test+ curricular activities = 30 + 10

Major test: 60

Total: 100 Marks

Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

INTRODUCTION: Control System Architecture, Design Specifications Functional inequally specifications, multi-criteria optimization, norms of scalar & vector signals, norms of SISO LTI & MIMO LTI systems, state space methods for computing norms, design specifications as sets, affine & convex sets and functions, closed loop convex design specifications, convexity & duality.

UNIT - II

DESIGN SPECIFICATIONS: Reliability & closed loop stability, I/O specifications, regulation specifications, actuator effort, combined effect of disturbances & commands, differential sensitivity specifications, robustness specifications via gain bounds.

UNIT - III

COMPENSATORS & CONTROLLERS DESIGN: Selection criteria and design of lead, lag, lead-lag and cascade type of compensators using Root locus & Bode plots, Rate feedback. Controllers – configuration and fundamentals of design, cascade and feed back compensation using various controllers.

UNIT – IV

STATE VARIABLE FEED BACK DESIGN: Introduction to state variable analysis, controllability and observability, state feed back for SISO system, state feed back design of SISO system using control canonical form. State variable feedback _ steady state error analysis, Use of steady state error coefficients, design of state observers, Introduction to design of MIMO systems. Introduction to design of non-linear system and software.

- 1. Modern Control Systems A manual of design methods by John A. Borrie (Prentice Hall International)
- 2. Control Systems Principle & Design by M. Gopal (TMH publication)
- 3. Introduction to feed back control system by Pericles E. Manuel & Edward leff (International Student Edition)
- 4. Linear controller designs limits of performance by Stephen P. Boyd & Craig H. Barratt (Prentice Hall International).
- 5. Linear control analysis & design By John J. D'azzo & C. H. Houpis (Mc-graw Hill)

IE-2302E(v) -- RESEARCH METHODOLOGY

L T P 300

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT- I

Nature and objective of the research

Methods of Research: Historical, descriptive and experimental. Alternative approaches to the study of the research problem and problem formulation. Formulation of hypotheses, Feasibility, preparation and presentation of proposal.

UNIT- II

Introduction to statistical analysis: Probability and probability distributions, binomial, Poisson, exponential and normal distributions, and their applications. Sampling: Primary and secondary data, their collection and validation, methods of sampling, stratified random sampling, and systematic sampling.

UNIT- III

Regression and correlation analysis: Tests of significance based on normal, t and chi square distributions, analysis of variance.

Basic Principles of design of experiments, completely randomized and randomized block designs.

UNIT- IV

Edition, tabulation, & testing of hypotheses, Interpolation of results, presentation, styles for figures, tables, text, quoting of reference and bibliography. Use of software for statistical analysis like SPSS, Mini tab or MAT lab, Report writing, preparation of thesis.

- Research Methodology by C.R Kothari, Wishwa Prakashan
- Research Methodology by P.G . Tripathi
- Research Methodology in Social Science by Sadhu Singh, Himalya Publishers
- Business Research Methods, Donald cooper, Tata McGraw Hill Statistical analysis for Engineers & Scientists, J. W. Barnes, McGraw Hill

L T P 3 0 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Marks Total : 100 Marks Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT- I

INTRODUCTION: Various Sources of Energy, Conventional and non- Conventional energy, Concept and Classification of Renewable energy, Concept of Energy Conservation and Energy Management, Present Energy Scenario in India (Conventional and non- Conventional energy)

UNIT-II

RENEWABLE ENERGY SOURCES: Potential and Utilization status of Renewable Energy in India, Solar Energy: Solar Water Heater Systems, Solar Air dryer Systems, Solar Photo-voltaic Systems, Solar Cookers and Solar ponds, Wind Energy: Selection Criteria for Wind farms, Wind Mills, Bio Gas Plants-Construction and Operation, Bio Mass Gasification, Bio Mass Briquetting; Mini and Micro Hydel Power Plants, Geo-Thermal Energy, Ocean Energy.

UNIT- III

ENERGY CONSERVATION AND MANAGEMENT: Actual energy requirement assessment techniques of any industry and energy consumption status, possibility of reduction of energy consumption by using various energy conservation techniques or equipments e.g. variable speed drives, constant voltage transformers, electronic chokes, CFLs etc.

UNIT- IV

Importance of instrumentation and control techniques in the energy conservation and management, SCADA systems, Instruments required to carry out energy audit exercise, optimal mixing of renewable energy sources and load rationalization for reducing load on conventional energy sources.

Reference Books:

1. Hand Book of Industrial Energy Conservation by S David; Van Nostrand Reinhold Publishing Company.

- 2. Energy Technology by S Rao & B. B. Parulkar; Khanna Publishers
- 3. Solar Energy by S. P. Sukhatme; TMH publications
- 4. Solar Energy & Energy Conservation by Sawhney & Maheshwari; PHI publication.

IE-2302E(vii) -- OPTIMIZATION TECHNIQUES

L T P 3 0 0

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

OPTIMIZATION PROBLEM: Definition, types, optimality criteria, single-variable optimization, exhaustive search, region elimination, fibonacci search and golden section search, cubic interpolation method, Newton-Raphson bisector and secant method.

UNIT - II

MULTIVARIABLE OPTIMIZATION ALGORITHMS: Direct search methodsevolutionary simplex, Hooke-Jeeves pattern search, Gradient Based Method- Steepest method, Newton conjugate gradient method.

UNIT - III

CONSTRAINED OPTIMIZATION: Kuhn Tucker condition, transformation methods, penalty function, method of multipliers, sensitivity analysis, interior point optimization.

UNIT - IV

NON-TRADITIONAL OPTIMIZATION: Genetic Algorithms for constrained optimization, simulated annealing, Multi Objectives Optimization Problems, weighting method, \in -constrained method, decision-making, min-max problem.

- 1. Optimization Techniques, S S Rao.
- 2. Optimization for Engineering Design Algorithms and Examples, Kalyanmoy Deb, PHI.
- 3. Emerging Optimization Techniques in Producion Planning & Control by Godfrey G Onubolu, Imperial College Press.
- 4. Multi Objective Optimization using Evolutionary Algorithms by Kalyanmoy Deb, Chichester, UK, Wiley.
- 5. Non-Linear programming; Sequesntial Unconstrained Minimization Techniques by A V Fiacco and G P McComic, John Wiley & Sons, New York.
- 6. Modern Optimization Techniques in Power Systems by Yong Hua Song, Kluwer Academic Publishers.

IE2302E(viii) -- NON-LINEAR and MULTIVARIABLE CONTROL SYSTEMS

LTP

300

 $\begin{array}{l} \text{Minor test+ curricular activities} = \mathbf{30} + \mathbf{10} \\ \text{Major test:} \quad \mathbf{60} \\ \text{Total:} \quad \mathbf{100 Marks} \end{array}$

Time : 3hrs.

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

Analysis Techniques: Simulation, Linearization, Describing functions, Equivalent gains, circle criteria, Lyapunov second method; Non-liner control structures: Design, large signal linearization, time-optimal servomechanisms, Extended PTOS for flexible structures, Design with non-linear cost functions: Random neighborhood search.

UNIT - II

Linear and piecewise linear approximation, Harmonic linearization, Common physical non-linearities, Phase-plane method, singular points, stability of nonlinear systems, Describing function analysis, Stability analysis by describing function method, Jump resonance, Lyapunov stability criteria, Popov stability criteria,

UNIT - III

Multivariable system models, State equations canonical forms, Polynomial matrices, Minimal realizations. Multivariable system design: decoupling, Ideal, simplified and static decoupling, model matching, inverse Nyquist array, characteristic locus metods.

UNIT - IV

Selection of Weighting matrices Q1, and Q2, Pincer procedures, Design examples

- 1. Optimum system control by Kirk
- 2. Linear Optimal Control by B.D.O. Anderson and B.Moore (PHI Publications)
- 3. Systems, Modeling & Analysis by I J Nagrath, M Gopal, TMH
- 4. Digital Control & State Variable Methods by M Gopal, TMH
- 5. Modern control engineering By Ogata (PHI)

IE-2302E(ix) -- OPTIMAL CONTROL SYSTEMS

L T P 300

There will be 8 questions in all. Two questions from each unit. Answer five questions in all selecting one from each unit.

UNIT - I

Introduction to optimal control problems, Classification of optimal control problems, performance indices for optimal control and their selection, Dynamic optimization using calculus of variations.

UNIT - II

Lagrange multiplier, Euler Lagrange's equation for different conditions, Transversality conditions, Dynamic optimization with equality and inequality constraints.

Optimization using pontryegans maximum (minimum) principles with special emphasis on bang-bang type system.

UNIT - IIII

Developments of Hamilton Jacobi equation, Matrix Riccati equation Optimal control based on quadratic performance indices, Linear regulator and servomechanism problem. Optimal control systems.

UNIT - IV

Dynamic programming multi stage decision processes in continuous time. Principle of causality, Invariant inbodding & optimality, Optimization using gradient methods and interactive techniques (steepest descent), Newton Raphson and Fletcher Powell. Introduction to multivariable system and decoupling, Sensitivity in optimal systems. Introduction to Optimal Filters (Kalman Filter).

- 1. Optimum system control by Andrew P Sage.
- 2. Modern control system theory by M. Gopal.
- 3. Optimum system control by Kirk
- 4. Linear Optimal Control by B.D.O. Anderson and B.Moore (PHI Publications)
- 5. Discret time control system by Katsukiko Ogata, Pearson Education Asia

IE-2302(**x**) -- Composite Materials

L T P 3 0 0

Minor test+ curricular activities = **30** + **10** Major test: 60 Total : 100 Marks Time : 3hrs.

UNIT-I

INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT-II

REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT - III

Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT-IV

Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT - V

Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

- 1. Material Science and Technology Vol 13 Composites by R.W.Cahn VCH, West Germany.
- 2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:

- 1. Hand Book of Composite Materials-ed-Lubin.
- 2. Composite Materials K.K.Chawla.
- 3. Composite Materials Science and Applications Deborah D.L. Chung.
- 4. Composite Materials Design and Applications Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

IERM-1107 - Research Methodology and IPR

Minor test: 50

L T P 2 0 0

UNIT-1

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT-2

Effective literature studies approaches, analysis Plagiarism, Research ethics,

UNIT-3

Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

UNIT-4

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT- 5

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

UNIT-6

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR

References:

- 1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students""
- 2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- 3. Ranjit Kumar, 2 ndEdition, "Research Methodology: A Step by Step Guide for beginners"
- 4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007.
- 5. Mayall, "Industrial Design", McGraw Hill, 1992.
- 6. Niebel, "Product Design", McGraw Hill, 1974.
- 7. Asimov, "Introduction to Design", Prentice Hall, 1962.
- 8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
- 9. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

ENGLISH FOR RESEARCH PAPER WRITING

L T P 2 0 0

Course objectives:

Students will be able to:

- **1.** Understand that how to improve your writing skills and level of readability
- 2. Learn about what to write in each section
- **3.** Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

UNIT - 1

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT - 2

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

UNIT - 3

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT - 4

key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

UNIT - 5

skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

UNITS 6

useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Suggested Studies:

- 1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
- 2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
- 3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook.
- 4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Minor test: 50

AUDIT 1 and 2: DISASTER MANAGEMENT

Minor test: 50

L T P 2 0 0

Course Objectives: -Students will be able to:

- 1. learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- 2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- 3. develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- 4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

UNIT - 1

Introduction: Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.

UNIT - 2

Repercussions Of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills,Outbreaks Of Disease And Epidemics, War And Conflicts. 4

UNIT - 3

Disaster Prone Areas in India: Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics. 4

UNIT - 4

Disaster Preparedness And Management: Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

UNIT - 5

Risk Assessment: Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival. 4 UNIT - 6

Disaster Mitigation: Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India. 4

SUGGESTED READINGS:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "New Royal book Company.

- 2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
- 3. Goel S. L., Disaster Administration And Management Text And Case Studies", Deep &Deep Publication Pvt. Ltd., New Delhi.

SANSKRIT FOR TECHNICAL KNOWLEDGE

LTP	Minor test:	50
200		
Course Objectives		
1. To get a working knowledge in illustrious Sanskrit, the scientific language in t	the world	
2. Learning of Sanskrit to improve brain functioning		
3. Learning of Sanskrit to develop the logic in mathematics, science & other sub	jects	
4. enhancing the memory power		
5. The engineering scholars equipped with Sanskrit will be able to explore the		
6. huge knowledge from ancient literature		
UNIT - 1		
Alphabets in Sanskrit, Past/Present/Future Tense, Simple Sentences		8
UNIT - 2		
Order, Introduction of roots, Technical information about Sanskrit Literature		8
UNIT - 3		
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematical	natics 8	
Suggested reading		

1. "Abhyaspustakam" - Dr. Vishwas, Samskrita-Bharti Publication, New Delhi

2. "Teach Yourself Sanskrit" Prathama Deeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication

3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

Course Output

Students will be able to

1. Understanding basic Sanskrit language

2. Ancient Sanskrit literature about science & technology can be understood

3. Being a logical language will help to develop logic in students

VALUE EDUCATION

L T P

 $2\ 0\ 0$

Course Objectives

Students will be able to

1. Understand value of education and self- development

2. Imbibe good values in students

3. Let the should know about the importance of character

UNIT - 1

Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism, Moral and non- moral valuation. Standards and principles, Value judgements.

UNIT - 2

Importance of cultivation of values, Sense of duty. Devotion, Self-reliance. Confidence, 6 Concentration. Truthfulness, Cleanliness., Honesty, Humanity. Power of faith, National Unity, Patriotism.Love for nature,Discipline

UNIT - 3

Personality and Behavior Development - Soul and Scientific, attitude. Positive Thinking. 6 Integrity and discipline., Punctuality, Love and Kindness., Avoid fault Thinking., Free from anger, Dignity of labour., Universal brotherhood and religious tolerance., True friendship., Happiness Vs suffering, love for truth., Aware of self-destructive habits., Association and Cooperation., Doing best for saving nature

UNIT - 4

Character and Competence –Holy books vs Blind faith., Self-management and Good health. 6 Science of reincarnation., Equality, Nonviolence, Humility, Role of Women., All religions and same message., Mind your Mind, Self-control., Honesty, Studying effectively

Suggested reading

1. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University, Press, New Delhi

Course outcomes

Students will be able to

- 1. Knowledge of self-development
- 2. Learn the importance of Human values
- 3. Developing the overall personality

Minor test: 50

4

CONSTITUTION OF INDIA

Minor test: 50

L T P 2 0 0

Course Objectives:

Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.

2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.

3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT - 1

History of Making of the Indian Constitution: History, Drafting Committee,	4
(Composition & Working)	
UNIT - 2	
Philosophy of the Indian Constitution: Preamble, Salient Features	4
UNITS - 3	
Contours of Constitutional Rights & Duties: Fundamental Rights, Right to Equality	4
Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and	
Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy,	
Fundamental Duties.	
UNIT - 4	
Organs of Governance: Parliament, Composition, Qualifications and Disqualifications	4

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications 4 Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

UNIT - 5

Local Administration: District's Administration head: Role and Importance, Municipalities: 4 Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation., Pachayati raj: Introduction, PRI: Zila Pachayat., Elected officials and their roles, CEO Zila Pachayat: Position and role., Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy UNITS 6

Election Commission: Election Commission: Role and Functioning., Chief Election 4 Commissioner and Election Commissioners., State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested reading

1. The Constitution of India, 1950 (Bare Act), Government Publication.

2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Course Outcomes:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.

2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.

3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.

4. Discuss the passage of the Hindu Code Bill of 1956.

PEDAGOGY STUDIES

LTP 200

Course Objectives:

Students will be able to:

4. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.

5. Identify critical evidence gaps to guide the development.

UNIT - 1

Introduction and Methodology: Aims and rationale, Policy background, Conceptual 4 framework and terminology, Theories of learning, Curriculum, Teacher education., Conceptual framework, Research questions., Overview of methodology and Searching. **UNIT - 2**

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries., Curriculum, Teacher education.

UNIT - 3

Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: 4 quality assessment of included studies., How can teacher education (curriculum and practicum) and the school, curriculum and guidance materials best support effective pedagogy?, Theory of change., Strength and nature of the body of evidence for effective pedagogical practices., Pedagogic theory and pedagogical approaches., Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT - 4

Professional development: alignment with classroom practices and follow-up support, 4 Peer support, Support from the head teacher and the community., Curriculum and assessment Barriers to learning: limited resources and large class sizes

UNIT - 5

Research gaps and future directions, Research design, Contexts, Pedagogy, 2 Teacher education, Curriculum and assessment, Dissemination and research impact.

Suggested reading

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.

2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.

3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.

4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic

maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.

5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.

Minor test: 50

2

6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.

7. www.pratham.org/images/resource%20working%20paper%202.pdf.

Course Outcomes

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?

2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?

3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

STRESS MANAGEMENT BY YOGA

L T P 2 0 0

Course Objectives

1. To achieve overall health of body and mind

2. To overcome stress

UNIT-1

Definitions	of Eight	parts of yog.	(Ashtanga)
	0	1 20	$\langle 0 \rangle$

UNIT - 2

Yam and Niyam. Do`s and Don't's in life. i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan UNIT - 3

Asan and Pranayam

i) Various yog poses and their benefits for mind & body

ii) Regularization of breathing techniques and its effects-Types of pranayam

Suggested reading

1. 'Yogic Asanas for Group Tarining-Part-I" :Janardan Swami Yogabhyasi Mandal, Nagpur 2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, AdvaitaAshrama (Publication Department), Kolkata

Course Outcomes:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also

2. Improve efficiency

Minor test: 50

8

8

8

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS L T P Minor test: 50

200

Course Objectives

- 1. To learn to achieve the highest goal happily
- 2. To become a person with stable mind, pleasing personality and determination
- 3. To awaken wisdom in students

UNIT-1

Neetisatakam-Holistic development of personality, Verses- 19,20,21,22 (wisdom)8Verses- 29,31,32 (pride & heroism), Verses- 26,28,63,65 (virtue), Verses- 52,53,59 (dont's)8Verses- 71,73,75,78 (do's)8

UNIT-2

Approach to day to day work and duties., Shrimad Bhagwad Geeta: 8 Chapter 2 - Verses 41, 47, 48, Chapter 3-Verses 13, 21, 27, 35, Chapter 6 - Verses 5, 13, 17, 23, 35, Chapter 18-Verses 45, 46, 48.

UNIT - 3

Statements of basic knowledge., Shrimad BhagwadGeeta: Chapter2-Verses 56, 62, 68 8 Chapter 12 -Verses 13, 14, 15, 16, 17, 18, Personality of Role model. Shrimad BhagwadGeeta: Chapter2-Verses 17, Chapter 3-Verses 36, 37, 42, Chapter 4-Verses 18, 38, 39, Chapter18 – Verses 37,38,63

Suggested reading

- 1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication
- 2. Department), Kolkata
- 3. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath,
- 4. Rashtriya Sanskrit Sansthanam, New Delhi.

Course Outcomes

Students will be able to

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life

- 2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- 3. Study of Neetishatakam will help in developing versatile personality of students.

KURUKSHETRA UNIVERSITY KURUKSHETRA (DISTANCE EDUCATION)

POST-GRADUATE DIPLOMA IN CYBER LAW AND INTELLECTUAL PROPERTY RIGHTS

(ACADEMIC SESSION 2018-19)

SCHEME OF EXAMINATION

PAPER	NOMENCLATURE	MAXIMUM	THEORY	INTERNAL	TIME
CODE	OF PAPER	MARKS	MARKS	ASSESSMENT	
				MARKS	
Paper-I	Cyber Law:	100	80	20	3 hours
	Development and				
	Challenges				
Paper-II	Information	100	80	20	3 hours
	Technology Act,2000				
Paper-III	Role of Law in Cyber	100	80	20	3 hours
_	World				
Paper-IV	Law of Patent	100	80	20	3 hours
	including Plant				
	Verities of Farmer's				
	Rights				
Paper-V	Copyright and	100	80	20	3 hours
_	Design Law				
Paper-VI	Trademarks Law and	100	80	20	3 hours
_	Geographical				
	Indication of Goods				

Note: - The minimum marks required to pass the examination shall be 40% in each paper and 45% in aggregate.

Paper –I Cyber Law: Development and Challenges

Theory Marks=80 Internal Assessment Marks=20 Max. Marks: 100 Time: 3 Hours

- Note: (i) Total eight questions shall be set and the candidates will be required to attempt one question from each unit.
 - (ii) All questions shall carry equal marks.

Unit-I

General Introduction of Computers: Software and Hardware, Network, Computer Programing, Computer Security System; Information System, Operating System, Key Pair, Private Key, Public Key.

Unit-II

Concept of Domain Names: Server; Web Hosting; Protocols; E-Mail and Chat; Basics of Internet. Use of Internet in Legal Profession. Concept of Cyber Space: Definition and Meaning of Cyber Space.

Unit-III

Cyber Crimes: Types of Cyber Crimes, Tempering with Computer Source Documents; Hacking with Computer System; Publishing of Obscene Information in Electronic Form; Breach of Confidentiality and Privacy; Publishing of False Digital Signature Certificate.

Unit-IV

Act and omissions against the Controller; Cyber Terrorism and Cyber Security; Offences or Contraventions Committed outside India; Computer Forensic and the Process of Confiscation; Powers of Police Officers.

Books Recommended:-

1. Nandan Kamath	:	A Guide to Cyber Laws and the Information Technology
		Act, 2000 with Rules and Notifications.
2. Rodney, D. Ryder	:	Guide to Cyber Laws.
3. Yogesh Barua& Denzyl	:	Cyber Crimes
4. Sharma, Vakul	:	Information Technology: Law and Practice
5. Justice Yathindra Singh	:	Cyber Laws
6. Bakshi, R.M.	:	Cyber & E- Commerce Laws
7. Farooq Ahmad	:	Cyber Law in India (Law of Internet)

Paper-II Information Technology Act, 2000

Theory Marks=80 Internal Assessment Marks=20 Max. Marks: 100 Time: 3 Hours

- Note: (i) Total eight questions shall be set and the candidates will be required to attempt one question from each unit.
 - (ii) All questions shall carry equal marks.

Unit-I

Background; Object and Scope of the Information Technology Act, 2000. Concepts of 'Access'; 'Addressee'; 'Affixing Digital Signature'; 'Asymmetric Crypto System'; 'Electronic Record'; 'Electronic System'; Legal Recognition of Digital and Electronic Signature, Central Government's power to make rules in respect of Electronic Signature; Secure Electronic Signature, Security Procedure; Issuance of Electronic Signature Certificates; Acceptance, Suspension and Revocation of Electronic Signature Certificate.

Unit-II

Electronic Governance; Legal Recognition of Electronic Records; Legal Recognition of Digital Signature and Electronic Signature; use of Electronic Records and Digital Signatures in Government and its Agencies. Retention of Records; Audit of Documents Etc.; Publication of Rule and Regulation in Electronic gazette. Attribution of Electronic Record; Acknowledgement of Receipt; Time and Place of Dispatch and Receipt of Electronic Record; Secure Electronic Record.

Unit –III

Regulation of Certifying Authorities; Appointment of controller and other officers; Functions and Powers of the Controller, Certifying Authority, Cyber Regulations Appellate Tribunal, Composition; Qualification, Term of office, etc., Procedure and Powers of the Tribune. Appeals to High Court; Compounding of Contraventions; Recovery of Penalty and Compensation.

Unit-IV

Penalties; Compensation and Adjudication; Liabilities of the Intermediaries; Interception and monitoring of Electronic Communications; Preservation and Retention of Information by Intermediaries.

Books Recommended:-

1. Nandan Kamath	:	A Guide to Cyber Laws and the Information Technology Act, 2000 with Rules and Notifications.
2. Rodney, D. Ryder	:	Guide to Cyber Laws.
3. Yogesh Barua& Denzyl	:	Cyber Crimes
4. Sharma, Vakul	:	Information Technology: Law and Practice
5. Justice Yathindra Singh	:	Cyber Laws
6. Bakshi, R.M.	:	Cyber & E- Commerce Laws
7. Farooq Ahmad	:	Cyber Law in India (Law of Internet)

Paper- III Role of Law in Cyber World

Theory Marks=80 Internal Assessment Marks=20 Max. Marks: 100 Time: 3 Hours

- Note: (i) Total eight questions shall be set and the candidates will be required to attempt one question from each unit.
 - (ii) All questions shall carry equal marks.

Unit-I

E-Commerce: A New Business Paradigm; Online Contract; Payment Mechanism in Cyber Space; Taxing, E- Commerce.

Unit-II

Jurisdiction Issues in Cyber Space: Concept of Jurisdiction; International Law and Jurisdiction in Cyber Space; Personal Jurisdiction in Cyber Space; Indian Perspective of Jurisdiction in Cyber Space.

Unit-III

Cyber Law and Related Issues: Freedom of Speech and Expression in Cyber Space; Privacy Issues; Defamation in Cyber Space; Liabilities of Intermediaries.

Unit-IV

Conventions on Cyber Law: UNCITRAL Model Law on Electronic Commerce; Convention on Cyber crime; India and Cyber Crimes Conventions; United State of America and Cyber Crimes Conventions; United Kingdom and Cyber Crimes Conventions.

Books Recommended:

1. Nandan Kamath	:	A Guide to Cyber Laws and the Information Technology
		Act, 2000 with Rules and Notifications.
2. Rodney, D. Ryder	:	Guide to Cyber Laws.
3. Yogesh Barua& Denzyl	:	Cyber Crimes
4. Sharma, Vakul	:	Information Technology: Law and Practice
5. Justice Yathindra Singh	:	Cyber Laws
6. Bakshi, R.M.	:	Cyber & E- Commerce Laws
7. Farooq Ahmad	:	Cyber Law in India (Law of Internet)

Paper-IV Law of Patent Including Plant Varieties and Farmer's Rights

Theory Marks=80 Internal Assessment Marks=20 Max. Marks: 100 Time: 3 Hours

- Note: (i) Total eight questions shall be set and the candidates will be required to attempt one question from each unit.
 - (ii) All questions shall carry equal marks.

Unit-I

Object and Purpose of Patent Law; Value of Patent System, International Character of Patents; Advantages of Patent to Inventor; Rights and Obligations of Patentee. Paris Convention and TRIPS Agreement. Patents for Computer Technology, Computer Software and Electronic Commerce.

Unit-II

Concept of 'Patent' Invention, 'Patented Article', 'Patented Process', 'True and First Inventor' Patentable Inventions; Invention Not Patentable, Product Patents in respect of Medicine and Drug. Application for patents; opposition to grant of patent; Register of patents and Patent office.

Unit-III

Grant and Sealing of Patents and Rights; Transfer of patent right: Assignment and Licenses. Government use of Invention; Revocation and Surrender of patents; Infringement of Patents and Remedies.

Unit-IV

Protection of Plant Varieties and Farmer's Rights Act, 2001: Protection of Plant Varieties and Farmer's Rights Authority, Registration of Plant Varieties, Duration and Effect of Registration, Revocation and Surrender of Registration, Plant Varieties Protection Appellate Tribunal: Composition, Procedure and Penalties Under the Act.

Books Recommended:

1. Baxi, U.	:	The Law of Intellectual Property
2. Cornish, W.R.	:	Intellectual Property: Patent, Copyright, Trade Marks and Allies Rights
3. Narayanan, P.	:	Law of Patents
4. Narayanan, P.	:	Copyright Law
5. Khosla, K.D.	:	Know yours Copyright
5. Thairrany Kala	:	Copyright Act.
7. Vashisth Vikas	:	Law and Practice of Intellectual Property in India
8. Nagarajan, R.K	. :	Intellectual Property Law
9. Raju, K.D.	:	Intellectual Property Law
10. B.L. Wadhera	:	Law Relating to Intellectual Property

Paper –V Copyright and Design Law

Theory Marks=80 Internal Assessment Marks=20 Max. Marks: 100 Time: 3 Hours

Note: (i) Total eight questions shall be set and the candidates will be required to attempt one question from each unit.

(ii) All questions shall carry equal marks.

Unit-I

Object and Purpose of Copyright Law; International Conventions of Copyright; Barne Convention, WIPO Copyright Convention and Phonogram Treaty, TRIPs Agreement. Copyright Law and Protection of Computer Programmes and data.

UNIT-II

Historical Background and Objectives of Copyright Act, 1957; Concepts of Author, Work, Literary Work, Artistic Work, Musical Work, Cinematograph Film, Work of Sculpture, Reprography, Computer Programme, Copyright and Adaption, Nature of Copyright and Subject matter of Copyright; Term of Copyright.

Unit-III

Ownership of Copyright and the Rights of the owner. Rights of Broadcasting Organizations and Performers, Copyright office and Copyright Board; their Powers and Procedure; Registration of Copyright, Infringement of Copyright, Remedies; Appeals.

Unit-IV

The Designs Act, 2000: Objective and salient features of the Act, Definitions; Registration of Designs; Copyright in Registered Designs; Power and Duties of Controller; Infringement, Remedies, Penalties.

Books Recommended:

1. Baxi, U.	:	The Law of Intellectual Property
2. Cornish, W.R.	:	Intellectual Property: Patent, Copyright, Trade Marks and Allies Rights
3. Narayanan, P.	:	Law of Patents
4. Narayanan, P.	:	Copyright Law
5. Khosla, K.D.	:	Know yours Copyright
5. Thairrany Kala	:	Copyright Act.
7. Vashisth Vikas	:	Law and Practice of Intellectual Property in India
8. Nagarajan, R.K.	:	Intellectual Property Law
9. Raju, K.D.	:	Intellectual Property Law
10. B.L. Wadhera	:	Law Relating to Intellectual Property

Paper-VI Trademarks Law and Geographical Indication of Goods

Theory Marks=80 Internal Assessment Marks=20 Max. Marks: 100 Time: 3 Hours

- Note: (i) Total eight questions shall be set and the candidates will be required to attempt one question from each unit.
 - (ii) All questions shall carry equal marks.

Unit-I

Trade Marks Law Treaty: Madrid Agreement and Madrid Protocol; Object and Concept of Trade Marks; Types of Trade Marks; Principles of Registration to Trade Marks; Effect of Registration.

Unit-II

Rights Conferred by Registration of Trade Marks; Registered Users; Passing off and Infringement of Trade Marks; Certification of Trade Marks.

Unit-III

International Concerns Regarding Geographical Indication of Goods; Historical Perspective and Objective of the Geographical Indication of Goods Act, 1999; Definitions, Procedure for Registration.

Unit-IV

Infringement of Geographical Indication and Remedies; Geographical Indication and Genetic Resources; Comparison between Trade Marks and Geographical; the Semi Conductor Integrated Circuits Layout Design, Act. 2000.

Books Recommended:-

1. Baxi, U.	:	The Law of Intellectual Property
2. Cornish, W.R.	:	Intellectual Property: Patent, Copyright, Trade Marks and Allies Rights
3. Narayanan, P.	:	Law of Patents
4. Narayanan, P.	:	Copyright Law
5. Khosla, K.D.	:	Know yours Copyright
5. Thairrany Kala	:	Copyright Act.
7. Vashisth Vikas	:	Law and Practice of Intellectual Property in India
8. Nagarajan, R.K.	:	Intellectual Property Law
9. Raju, K.D.	:	Intellectual Property Law
10. B.L. Wadhera	:	Law Relating to Intellectual Property

ANNEXURE-XII

DEPARTMENT OF PHILOSOPHY KURUKSHETRA UNIVERSITY KURUKSHETRA

Scheme of Examination for M.Phil. (Philosophy) (Effective from the Academic Session: 2018-2019)

Scheme of Examination for M.Phil. Philosophy with CBS System. There are four credits for each paper and One

credit is equal to 20 Marks.

Scheme of Examination for M.Phil. (Philosophy)

Course Code. Nomenclature of the Pa	per Theor Marks	ry Internal Assessmen Marks	t Credits M	/Iax. Marks	Time Month a	&Year of L	+ T + P
Compulsory rapers	IVIAL KS			Anowe	u Examinati	UII	
PHIL.HC-101: Research Methodology	y 80	20	04	100	03 Hours	May,2019.	4
PHIL-HC-102: Fundamental Concept	: of Philoso 80	ophy 20	04	100	03Hours.	May,2019	4
PHIL-HC-103: Seminars(50+50=100	Marks)		04	100	1	May,2019	4

Total Credits: 4x3=12

Dissertation:

Grade (As per University rules)

10(826)

<u>M.Phil (PHILOSOPHY)</u> (w.e.f. 2018-2019)

Paper – I RESEARCH METHODOLOGY

Time: 3 Hours Theory Examination Marks: 80 Internal Assessment Marks: 20 Total Marks: 100

PHIL.HC-101: Research Methodology

Note: The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.

Unit –I: Introduction to Research Methodology.

- 1. Meaning, Definition and Importance of Research in Philosophy.
- 2. Preparation of a Seminar Paper& Research Proposal/Synopsis
- 3. Selection of Topic and Writing of a Dissertation/Thesis
- 4. Methods of references and Preparation of Bibliography.

Unit –II: <u>Methods for doing Philosophy:</u>

- 1. Tark-Nirupan in Nyaya
- 2. The Socratic Method
- 3. Adyarop-Apvada of Advaita.
- 4. Prsangapadana of Madhymika Boudha
- 5. Vakyarth Nirnya of Mimansa.

Unit-III: <u>Things Philosophers do:</u>

- 1. Exposit, Speculate, Prescribe, Describe, Criticise and Synthesis.
- 2. Panchavyava Nyaya and Dashavyava Nyaya
- 3. Objectives of Philosophy and importance of Philosophy in Recent Times
- 4. Philosophy and its Fundamental Basic Problems.

.Unit –IV: <u>Nature of Philosopical Inquiry:</u>

- 1. How Philosophical Inquiry is different from other disciplines.
- 2. Synopsis as peculiar characteristic of Philosophy.
- 3. Some Methods of Speculative Philosophy.
- 4. Critical appraisal of presuppositions

RECOMMENDED BOOKS FOR PAPER-I

- 1. Nyayasutra-Gautama
- Broad, C.D., "Two Lectures on the Nature of Philosophy" in "Clarity is not Enough" (ed) by.H.D.Lewis, George Allen and Unwin Ltd., 1963 (See First Lecture for topic no.2 of Unit-IV.and see II lecture for topic no.III of Unit-IV)

3. Richard E. Creel, *Thinking Philosophically*, Blackwell Publishers: USA, 2001.

- 4. J.N.Sinha: Introduction to Philosophy, New Central Book Agency Pvt. Ltd. Kolkata
- 5. Patric, G.T.W., Introduction to Philosophy, Surjeet Publication, Delhi.
- 6. S.N.Dasgupta, History of Indian Philosophy, Vol-1.
- 7. Jaidev Vedalankara, Bhartiya Darshan
<u>M.Phil (PHILOSOPHY)</u> (w.e.f. 2018-2019)

Paper – II FUNDAMENTAL CONCEPTS OF PHILOSOPHY

Time: 3 Hours Theory Examination Marks: 80 Internal Assessment Marks: 20 Total Marks: 100

PHIL-HC-102: Fundamental Concept of Philosophy

Note: The paper setter is requested to set Nine questions in all i.e., One Compulsory Objective Type Question without any choice, equitably distributed over the whole syllabus and Two Question from Each Unit, spread over all the concerned unit, will also be set. Examinees will have to attempt Five questions in all, selecting one question from each unit. Objective Type Question is compulsory. All questions carry equal marks.

Unit-I: <u>Metaphysics;</u>

- 1. Concept of Isvara : Nyaya
- 2. Madhyamik Sunnyavada: Buddhism
- 3. Syadvada : Jainism
- 4. Concept of Brahma :Sankara
- 5. Pragmatism: William James
- 6. Realism: G.E. Moore
- 7. Feminism and Post-Modernism
- 8. Existentialism: Martin Buber

Unit-II: <u>Epistemology</u>;

- 1. Nature & Definition of Prama and Aprama: Nyaya.
- 2. Charvaka Theory of Perception.
- 3. Theories of Error (Khyativada): Sankhya and Advaita Vedanta.
- 4. Causation: Sańkhya & Nyaya
- 5. Nature and Definition of Knowledge
- 6. Knowledge and Belief
- 7. Theories of Truth
- 8. Deconstruction: Jacques Derrida (Difference, Supplement).

Unit-III: Moral Philosophy and Applied Ethics:

- 1. Role of Nişkňma Karma in Social Reform
- 2. Secularism :Vivekananda
- 3. Humanism : Tagore
- 4. Non Violence and War: Gandhi & J.Krishnamurti
- 5. Environmental Ethics:Deep Ecology
- 6. Bio-Medical Ethics: Status of Foetus.
- 7. Medical Ethics:Suicide and Euthanasia
- 8. Business Ethics: Ethical Concerns

Unit-IV: Social and Political Philosophy:

- 1. Social Welfare: Bhagvadgitâ
- 2. Varna System: Swami Dayanand
- 3. Socialism: Osho
- 4. Sarvodya of Gandhi & Antyodya of Deen Dayal Upadhyay.
- 5. Society and Politics: Aristotle
- 6. Theory of Justice: John Rawls
- 7. Historical Materialism : Marx
- 8. Humanism: Sartre

RECOMMENDED BOOKS FOR PAPER-II

- 1. Datta & Chatterjee : An Introduction to Indian Philosophy.
- 2. Harendra Prasad Sinha : Bhartiya Darshan ki Ruprekha.
- 3. S. Radhakrishanan : Indian Philosophy, Vol. I & II.
- 4. V.P. Verma : Nitisastra ki Ruprekha.
- 5. Lal B.K. : Contemporary Indian Philosophy.
- 6. B.N. Singh : Indian Logic
- 7. P.Shah Singh : Anumana Parmana
- 8. Masiha Yacub : A Critical History of Western Philosophy.
- 9. D.R. Jatav : *Pashchatva Darshan*.
- 10. Aristotle : *The Politics*.
- 11. B.K. Lal. : Samkalin Pashchatya Darshan.
- 12. V.P. Verma : Adhinitisastra ke Mool Siddanta.
- 13. D.D.Upadhyay : *Ekatm Manavavada*.
- 14. Swami Dayanand : Updesh Manjri & Satyarth Parkash
- 15. Ramnath Sharma : Samkalin Bhartiya Darshan
- 16. Baidyanath Shastri : Darshan Tattva Vivek
- 17. (Editor)Dayakrishan : History of Western Philosophy

MASTER OF BUSINESS ADMINISTRATION

(For University School of Management (Choice Based Credit System) and affiliated Institutions

(W.E.F. SESSION 2018-19)

The Master of Business Administration (MBA) is a Two Year Full Time Programme. The course structure of the programme is given hereunder:

	SEMES	FER-I				
Paper Code	Title of Course	Total Marks	Ext. Marks	Int. Marks	Hrs	Credits
MBA-101	Management Process and Organizational Behaviour	100	70	30	5	4
MBA -102	102 Managerial Economics		70	30	5	4
MBA -103	Business Communication	100	70	30	5	4
MBA -104	Business Environment	100	70	30	5	4
MBA -105	Financial Reporting, Statements and Analysis	100	70	30	5	4
MBA -106	Statistics and Analytics for Decision Making	100	70	30	5	4
MBA -107	Computer Applications for Business	100	70	30	5	4
MBA -108	Soft Skills/Seminar/Presentation	50	-	50	2.5	2
	Total Marks/Credit	750				30
	SEMEST	TER-II				
MBA -201	Optimization Models for Business Decisions	100	70	30	5	4
MBA -202	Business Research Methodology	100	70	30	5	4
MBA -203	Production and Operations Management	100	70	30	5	4
MBA -204	Marketing Management	100	70	30	5	4
MBA -205	Corporate Finance	100	70	30	5	4
MBA -206	Human Resource Management	100	70	30	5	4
MBA -207	Legal Environment	100	70	30	5	4
MBA -208	Comprehensive Viva-Voce	50	50	-	-	2
	Total Marks	750	-	-	-	30
OE-I	Open Elective-I (Only at USM, KUK Campus under CBCS)	50	50	-	-	2
	Total Marks/Credit (CBCS)	800				32

Note: Students after completion of second semester are required to undergo summer internship of 6-8 weeks in a reputed business organization, which shall be credited as MBA-303 in the third semester.

During Second year, in addition to compulsory papers and research project, students shall have to choose six optional papers each in third and fourth semesters from the list of optional papers announced at the beginning of each semester. A student is required to specialize in two areas (One Major and other Minor) by opting at least four papers (in major area) two papers from (in minor area) in third and fourth semester.

	SEMEST	ER-III				
MBA -301	Corporate Strategy	100	70	30	5	4
MBA -302	Indian Ethos and Business Ethics	100	70	30	5	4
MBA -303	MBA -303 Summer Internship/Field Work		50	50	-	4
	Elective papers four From Major and two from Minor specialization area					
	Major Elective-I	100	70	30	5	4
	Major Elective-II	100	70	30	5	4
	Major Elective-III	100	70	30	5	4
	Major Elective –IV	100	70	30	5	4
	Minor Elective –I	100	70	30	5	4
	Minor Elective –II	100	70	30	5	4
	Total Marks (Affiliated Institutions)	900	-	-	-	36
OE-II	Open Elective-II (Only at USM, KUK Campus under CBCS)	50	50	-	-	2
	Total Marks/Credit (CBCS)	950	-	-		38
	SEMEST	ER-IV				
MBA -401	Entrepreneurship	100	70	30	5	4
MBA -402	Corporate Social Responsibility and Sustainability	100	70	30	5	4
MBA -403	Research Report and Comprehensive Viva-Voce	100	50 Marks for Research Report and 50 Marks for Viva- Voce		5	4 (2+2)
	Elective papers four From Major and two from Minor specialization area					
<u> </u>	Major Elective-I	100	70	30	5	4
	Major Elective-II	100	70	30	5	4
	Major Elective-III	100	70	30	5	4
	Major Elective –IV	100	70	30	5	4
	Minor Elective –I	100	70	30	5	4
	Minor Elective –II	100	70	30	5	4
	Total Marks (Affiliated Institutions)	900	-	-	-	36
	Grand Total (Affiliated Institutions)	3300	-	-	-	132
	Grand Total (USM KUK)	3400	-	-	-	136

	FINA	NCE				
	Semest	er-III	_	-	-	
FM-301	Quantitative Analysis for Financial Decision Making	100	70	30	5	4
FM-302	Foreign Exchange Management	100	70	30	5	4
FM-303	Derivatives Trading in India	100	70	30	5	4
FM-304	Banking and Financial Services	100	70	30	5	4
FM-305	Corporate Restructuring & Control	100	70	30	5	4
FM-306	Security Analysis		70	30	5	4
	Semest	er-IV				
FM-401	Financial Engineering	100	70	30	5	4
FM-402	Project Planning and Management	100	70	30	5	4
FM-403	Behavioral Finance	100	70	30	5	4
FM-404	Portfolio Management	100	70	30	5	4
FM-405	Insurance and Risk Management	100	70	30	5	4
FM-406	Private Equity and Wealth Management	100	70	30	5	4
	MARKE	TING		I		
	Semest	er-III				
MM-301	Advertising Management	100	70	30	5	4
MM-302	Marketing Research and Analytics	100	70	30	5	4
MM-303	Sales and Logistics Management	100	70	30	5	4
MM-304	Consumer Behaviour	100	70	30	5	4
MM-305	Strategic Brand Management	100	70	30	5	4
MM-306	Digital and Social Media Marketing	100	70	30	5	4
	Semest	er-IV				
MM-401	International Marketing	100	70	30	5	4
MM-402	Business Marketing	100	70	30	5	4
MM-403	Service Marketing	100	70	30	5	4
MM-404	Strategic Marketing	100	70	30	5	4
MM-405	Rural and Agribusiness Marketing	100	70	30	5	4
MM-406	Retail and Mall Management1007030		5	4		

	HRM	M				
	Semeste	er-III				
HRM-301	HRD: Systems & Strategies	100	70	30	5	4
HRM-302	Indian Labour Legislation	100	70	30	5	4
HRM-303	Management of Industrial Relations	100	70	30	5	4
HRM-304	Human Resource Metrics and Analytics	100	70	30	5	4
HRM-305	Compensation and Reward Management	100	70	30	5	4
HRM-306	Talent Acquisition and Performance Management	100	70	30	5	4
	Semeste	er-IV	I			I
HRM-401	Group Dynamics and Leadership Excellence	100	70	30	5	4
HRM-402	Strategic Human Resource Management	100	70	30	5	4
HRM-403	Cross Cultural and Global HRM	100	70	30	5	4
HRM-404	Counselling, Mentoring and Negotiation Skills	100	70	30	5	4
HRM-405	Change Management & Organisational Development	100	70	30	5	4
HRM-406	M-406 Competency Mapping & Assessment Centres		70	30	5	4
	INTERNATIONA	AL BUSIN	ESS			I
	Semeste	er-III	-		-	-
IB-301	International Accounting	100	70	30	5	4
IB-302	Foreign Exchange Management	100	70	30	5	4
IB-303	Export-Import Procedures and Documentation	100	70	30	5	4
IB-304	India's Foreign Trade and Policy	100	70	30	5	4
IB-305	International Business Environment	100	70	30	5	4
IB-306	International Logistics	100	70	30	5	4
	Semeste	er-IV	I.		I.	
IB-401	International Financial Markets	100	70	30	5	4
IB-402	International Marketing	100	70	30	5	4
IB-403	International Financial Management	100	70	30	5	4
IB-404	International Strategic Management	100	70	30	5	4
IB-405	Cross-cultural and Global Management	100	70	30	5	4
IB-406Regional Economic Blocks100703054						4

	INFORMATION T	ECHNOL	OGY			
-	SEMESTI	ER-III				
IT-301	Business Intelligence and Analytics	100	70	30	5	4
IT-302	Enterprise Resource Planning	100	70	30	5	4
IT-303	Relational Database Management System	100	70	30	5	4
IT-304	E-Customer Relationship Management10070305		5	4		
IT-305	System Analysis and Design10070305		5	4		
IT-306	Knowledge Management Systems	100	70	30	5	4
	SEMESTI	ER-IV				
IT-401	Data Mining for Business Decisions	100	70	30	5	4
IT-402	Software Engineering	100	70	30	5	4
IT-403	E-Business Financial Modeling	100	70	30	5	4
IT-404	Internet and Web Designing	100	70	30	5	4
IT-405	E-Commerce 1		70	30	5	4
IT-406	406 Information Security and Cyber Laws		70	30	5	4
	PRODUCTION AND OPERA	TIONS MA	NAGEMEN	T		
	SEMESTI	E R-III				
POM-301	Purchasing and Materials Management	100	70	30	5	4
POM-302	Total Quality Management	100	70	30	5	4
POM-303	Production Planning and Control	100	70	30	5	4
POM-304	Logistics Management	100	70	30	5	4
POM-305	Service Operations Management	100	70	30	5	4
POM-306	Technology Acquisition and Diffusion	100	70	30	5	4
	SEMESTI	FR-IV				
POM-401	Applied Operations Research	100	70	30	5	4
POM-402	Goal Programming in Management	100	70	30	5	4
POM-403	Transportation Management	100	70	30	5	4
POM-404	Technology Forecasting	100	70	30	5	4
POM-405	R&D Management	100	70	30	5	4
POM-406	Programme Management	100	70	30	5	4

	ENTREPRENEURSHI	P DEVELO	PMENT			
	SEMEST	ER-III				
ED-301	Fundamentals of Entrepreneurship Development	100	70	30	5	4
ED-302	Creativity and New Venture Creation	100	70	30	5	4
ED-303	Institutional support to Entrepreneur & MSMEs	100	70	30	5	4
ED-304	Family Business Management	100	70	30	5	4
ED-305	Legal Framework for New Age Businesses	100	70	30	5	4
ED-306	Social Entrepreneurship	100	70	30	5	4
	ENTREPRENEURSHI	P DEVELO	PMENT			
	SEMEST	ER-IV			_	
ED-401	Enterprise Planning, Appraisal and Financing	100	70	30	5	4
ED-402	Financial Innovation and Entrepreneurship	100	70	30	5	4
ED-403	Marketing Management in New Age10070305Businesses		4			
ED-404	New Enterprises Human Resource10070305Management		4			
ED-405	MSMEs Policy Framework	100	70	30	5	4
ED-406	D-406 Contemporary Environment in MSMEs		70	30	5	4
	BUSINESS AN	NALYTICS	5			
BA-301	Business Analysis using Excel	100	70	30	5	4
BA-302	Econometrics for Business Forecasting	100	70	30	5	4
BA-303	Business Data Mining	100	70	30	5	4
BA-304	Decision Modeling and Data Analysis	100	70	30	5	4
BA-305	Data Analytics using R	100	70	30	5	4
BA-306	Social Media Analytics	100	70	30	5	4
	BUSINESS AN	NALYTICS				
-	Semeste	er-IV	-	20	-	
BA-401	Time Series Data Analysis	100	/0	30	5	4
BA-402	Applied Multi Variant Analysis	100	70	30	5	4
BA-403	Financial Modeling	100	70	30	5	4
BA-404	Predictive Analysis for Business Decision	100	70	30	5	4

BA-405	Data Analysis using Python	100	70	30	5	4
BA-406	IOT and Big Data	100	70	30	5	4
	AGRI-BUSINESS N	MANAGEN	1ENT		I	
	SEMEST	ER-III				
ABM-301	Agri-Business Management	100	70	30	5	4
ABM-302	Agricultural Economics	100	70	30	5	4
ABM-303	Agricultural Marketing Management	100	70	30	5	4
ABM-304	Agri- Entrepreneurship	100	70	30	5	4
ABM-305	Agri-Business Finance	100	70	30	5	4
	SEMEST	ER-IV				
ABM-401	Changing Paradigm of Agri-Business	100	70	30	5	4
ABM-402	Agri Supply Chain and Logistics Management	100	70	30	5	4
ABM-403	Food Processing Management	100	70	30	5	4
ABM-404	International Trade in Agri-Business	100	70	30	5	4
ABM-405	Marketing of Agri-Inputs	100	70	30	5	4

MBA-101: Management Process and Organizational Behaviour

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objectives of the paper are to familiarize the students with basic management concepts and behavioural processes in the organization. **Course Contents:**

Management: Meaning, Nature, Significance; Evolution of management thought; Managerial Processes, Principles, Functions, Skills and Roles of a Manager in an organization; Planning (Strategies, Decision Making and MBO), Organizing (Organizational Design and Structure), Staffing (HR Functions), Directing (Leadership, Motivation and Communication) and Controlling (Control Measures). Modern Management Approaches & Concepts; Contemporary Management Issues and Challenges.Guidelines for Managerial Excellence and Success in Contemporary business environment;

Understanding and Managing Individual Behaviour: Personality& Personality Attributes; Perception and Attribution; Values and Attitudes; Emotions & Emotional Intelligence, Learning; Understanding and Managing Group Processes- Interpersonal and Group Dynamics; Power & Politics at work, Organisational Culture; Learning Organisations and Organisational Learning; Organizational Change; Organizational Development; Organisational Effectiveness: Concept, Perspectives & Approaches; Conflict Management, Negotiations and Stress Management; Workplace Spirituality; Happiness Quotient.

- 1. Robbins, S.P. Management Concepts, Pearson Education India, New Delhi.
- 2. Koontz, Weilhrich, Management: A Global and Entrepreneurial Perspective, McGraw Hill.
- 3. Jones and George, Contemporary Mangement, McGraw Hill.
- 4. Richard L. Draft, The New Era of Management, Cengage India
- 5. Mullins. J, Management and OB, 8th Edn. Pearson Education
- 6. Stoner, J., Management, Prentice Hall of India., New Delhi
- 7. Koontz.Essentials of Management, Tata McGraw-Hill, 8th Ed.,
- 8. Chandan, J.S. Management Concepts and Strategies, Vikas Publishing House.

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objectives of this course is to acquaint the students with concepts and techniques used in Micro—Economic Theory and to enable them to apply this knowledge in business decision- making. Emphasis is given to changes in the nature of business firms in the context of globalization.

Course Contents:

Nature and Scope of Managerial Economics. Basic concepts of economic used in managerial decision making; Objective of a firm: Wealth, profit and sales maximization.

Demand function: Elasticity of demand and its significance in Managerial decisionmaking; Consumer equilibrium-utility and indifference curve approach; Price, income and substitution effects; Fundamentals of demand estimation and forecasting.

Short-run and long-run production functions; Cost curves and economics of scale; Price and output determination under perfect competition, monopoly, monopolistic competition, and oligopoly; Pricing strategies and tactics. Advance pricing and Auctions-Game theory and Asymmetric informations.

National Income— Alternative concepts, measurement and determination of National income; Inflation—types, measurement and control: Monetary and Fiscal Policies. Currency flows and exchange rate determination

Suggested Readings:

- 1. Peterson, Lewis, Managerial Economics, Prentice Hall of India, N. Delhi.
- 2. Salvatore, Managerial Economics in Global Economy; Thomson learning; Bombay.
- 3. EF. Brigham And J.L. Pappas, Managerial Economics, Dryden Press, illinois.
- 4. Dwivedi, D.N. Managerial Economics, Vikas Publishing House, New Delhi.
- 5. Mebta, P.L. Managerial Economics, Sultan Chand, New Delhi.
- 6. Thomas & Maurice, Managerial Economics: Concepts and Applications (SIE) 9 th edn McGrawHill Education
- 7. Geetika, Managerial Economics 3rd edn. McGraw hill Education

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course objective: Basic objective of this course is to make students familiar with the basic fundamentals of business communication.

Course Contents:

Course Introduction & Communication Basics-Just-A-Minute Presentation Workshop-Jam Feedback and overcoming Glossophobia-Presentation–1 (Planning & Preparing)- Presentation–2 (Visual Aids) Presentation–3 (Delivery)-Graded Team Presentations-Group 1-Graded Team Presentations-Group 2-Reading, listening & Questioning.

Writing Business Communication basics-Writing Reports, Proposals, Emails, Summaries-Graded Individual Presentations- Group 1- Graded Individual Presentations- Group 2-Presentation feedback, Bios and Resumes.

1. Sinha,K.K	:Business Communication, Galgotia Publishing
company.	
 Pradhan, Homai, et al Paul, Rajendra and 	: Business Communication, Himalaya Publishing House : Business Communication, Sultan Chand and Sons Korthalli, J.S.
4. Murphy and Hilderbrantl	h: Business Communication
5. M.K. Sehgal, Vandana Khetarpal	: Business Communication
6. Lesikar, Business Communication	: Connecting in a Digital World (SIE) 13 th edn. Mcgraw Hill Education
7. Murphy,	: Effective Business Communication 7th edn McGraw Hill Education

MBA-104: Business Environment

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents: Macro and micro indicators; assessing risk in business environment; emerging sectors of Indian economy; relative size and growth of public and private sectors- Design and strategy of economic reforms; current state of growth and investment; interest rate structure and present monetary policy; fiscal environment; current inflationary position and its impact on business sector; competitive environment; legislation for anti-competitive and unfair trade practices; consumer and investor protection- Current industrialization trends and industrial policy; environment for the SME sector; infrastructure development and policy; public sector reforms and performance; public-private partnership; intellectual property regime and the R&D environment; trends in service sector growth; banking reforms and challenges; business opportunities in the rural sector.-Globalization trends and investment; exchange rate movements and their impact; India's competitiveness in the world economy; external influences on India's business environment.

Suggested Readings:

- 1. Sundram, KPM, Datt, G and Mahajan, A, Indian Economy, S Chand, 2012 Edition.
- 2. Misra, S.K and Puri, V.K, Indian Economy, Himalya Publisher, 27th Edition.
- 3. Worthington, I and Britton, C, The Business Environment, Prentice Hall, 5th Edition.
- 4. Cherunillam, F, A Course Book on Business Environment, Himalya Publishers, 1st Edition.
- 5. Daniel, JD and Radebangh,LH, International Business, Addison Wesley Publishing Company Hill, CW, International Business, Tata Mcgraw Hill
- 6. Alhuwalia, IJ and Little, IMD, India's Economic Reforms and Development, Oxford University Press
- 7. Aswathapa, K, Business Environment, Excel Books Bedi, SK, Business Environment, Excel Books
- 8. Paul, Business Environment Text and Cases 3rd edn McGraw hill Education

MBA-105: Financial Reporting, Statements and Analysis

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The basic purpose of this course is to develop an insight of postulates, principles and techniques of accounting and application of financial and accounting information for planning decision-making and control.

Course Contents:

Accounting principles, concepts and conventions, Accounting process, Preparation of Financial statements, Financial Reporting, Reporting practices, Analysis of Financial Statements with managerial perspective.

Accounting for Decision Making- A Managerial Perspective, Financial Accounting and Management Accounting, Accounting as an information system, Indian Accounting Standards, IFRS. Preparation of financial statements as per schedule VI of Companies Act, 2013, Financial statement analysis: Meaning, significance, major tools of analysis-Ratio analysis; Funds flow analysis and Cash flow analysis; Marginal costing: Cost Volume Profit and Break even analysis, contribution margin, profit volume graph, make or buy decision, dropping a product line and accepting a special order. Budgeting: conceptual framework; types of budget: Master budget, Zero-base budgeting, fixed and flexible budgeting. Responsibility accounting and segmental analysis- meaning, types process, advantages, Transfer pricing: objectives, transfer pricing methods; Contemporary issues in accounting: HR accounting, Life cycle costing.

- 1. Anthony, R. N., Hawkins, F. D., & Merchant, K. A. (2006). *Accounting: Text and Cases* (12thed.). New Delhi: Tata McGraw Hill.
- 2. Albrecht, W. S., Stice, D. J., E. K., Monte, R., & Swain, R.M. (2010). *Accounting: Concepts and applications* (11th ed.). U.S.A: South Western.
- 3. Belverd, E., Needles, Jr. & Powers, M. (2010). *Principles of Financial Accounting* (11th ed.). South Western Publication.
- 4. Garrison, R.H., Noreen, E.W. (2007). *Managerial accounting* (12th ed.). New Delhi: Tata McGraw Hill.
- 5. Anthony, Accounting: Text and Cases, 13 edn McGraw hill Education
- 6. Khan and Jain, Management Accounting,7th edn McGraw Hill Education

MBA-106: Statistics and Analytics for Decision Making

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to make the students learn about the application of statistical tools and techniques for decision- making.

Course Contents:

Application of Probability and probability distributions in business decision making: probability Theory; Classical, relative and subjective probability, Addition and multiplication probability models; Conditional probability and Baye's Theorem. Probability Distributions: Binomial, Poisson, and Normal distributions: characteristics and applications.

Application of Sampling and sampling methods in business decision-making; Sampling and non-s Sampling errors; Law of Large Number and Central Limit Theorem; Sampling distributions and their characteristics.

Statistical Estimation and Testing; Point and interval estimation of population mean, proportion, and variance; Statistical testing of hypothesis and errors; Large and small sampling tests, Non—Parametric Tests: Chi-square tests; Sign tests; Wilcoxon Signed—Rank tests; Kruskal—Wallis test.

Data Analysis using software packages: Microsoft Excel and SPSS.

Suggested Readings:

- 1. Hooda, R.P. : Statistics for Business and Economics, Macmillan, New Delhi.
- 2. Heinz; Kohler : Statistics for Business & Economics, Harper Collins; New York.
- 3. Heinz, LW : Quantitative Approach to Managerial Decisions, Prentice Hall, NJ.
- 4. Lawrence, B. Morse: Statistics for Business & Economics, Harper Collins, NY.
- 5. Levin, Richard I and David S Rubin : Statistics for Management Prentice Hail, Delhi.
- 6. Watsnam Terry J. and Keith Parramor: Quantitative Methods in Finance international, Thompson Business Press, London.
- 7. Srivastava, Statistics for Management 3rd edn McGraw Hill Education
- 8. Aczel, Complete Business Statistics (with CD) (SIE) 7 th edn McGraw hill Education

MBA-107: Computer Applications for Business

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The basic purpose of this course is to enhance the insight regarding computer fundamentals and information technology and its application in management for planning decision-making and control.

Course Contents:

Introduction and definition of computer; Brief history (Analog, Digital, Binary language); Major components of a computer system; Interfacing with a computer; Hardware and Software, Introduction to languages, compiler, interpreter and assembler; Operating Systems: Definition, Functions, Types and Classification. Computer Networks: Overview and Types (LAN, WAN and MAN) and network topologies; Internet Basics: Basic ways of connecting to the internet, Web Browsers, Search Engines, Internet Protocols and IP Address. E-commerce: Introduction, Comparison between Traditional commerce and Ecommerce, Advantages & disadvantages of E-commerce; Buying & Selling on Internet. Applications of Information Technology: Information Technology (IT) applied to various functional areas of management, such as Production / Operations, Marketing, Human Resource, Finance and Materials Management.MS-Office-Word, Excel and PowerPoint; Application of these software for documentation and making reports; Preparation of questionnaires, Presentations, Tables and reports; Database Management Systems: Overview of DBMS, Components of DBMS.

- 1. Kenneth C. Laudon and Jane P. Laudon, "Information Systems", Pearson Publication.2013. Dorling Kindersley (India) Pvt. Ltd.
- 2. Sudalaimuthu&Hariharan, Information Technology for Managers, Himalaya publications.
- 3. D.Monley& CS Parker, Understanding Computers Today & Tomorrow, Cengage, Thomson.
- 4. Sinha, P. K., & Sinha, P. (2010). *Computer Fundamentals* (6th ed.). New Delhi: BPB Publications.
- 5. Rajaraman, V. &Adabala, N. (2014). Fundamentals of Computers (6th ed.). New Delhi: Prentice Hall of India Pvt. Ltd.
- Kalakota, R. & Whinston, A. B. (1997). Electronic Commerce: A Manager's Guide. Addison-Wesley Professional.
- 7. Behl, Information Technology for Management 2 nd edn McGraw Hill Education

Max. Marks: 50 Internal: 50

MBA-201: Optimization Models for Business Decisions

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to develop an understanding of basic management science techniques and their role in managerial decision—making. **Course Contents:**

Management Science - Basic concepts and its role in decision- making. Linear programming, meaning, scope & assumptions. Formulation of linear programming problem and its solution by graphical and Simplex methods.

THEORY OF GAMES: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2×2 games – dominance principle – m X 2 & 2 X n games.

INVENTORY : Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – Stochastic models– Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

Sensitivity analysis. Integer programming, goal programming, and non-linear Programming. Transportation and Assignment models including trans-shipment and routing problems

Application of Inventory management techniques in business; Role and importance of PERT/CPM in business decision making; Decision theory and decision trees.

SIMULATION: simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages. WAITING LINES: Introduction – Single Channel – Poisson arrivals – exponential service times, Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

Suggested Reading :

- Budnik, Frank S. Dennis Meleavey, Reichard : Principles of Operations Research, 2nd ed., Richard Irwin, Illinois – All India Traveller Bookseller, New Delhi, 1995.
- Gould, F.J. etc. : Introduction to Management Science, Englwood Cliffs, New Jersey, Prentice Hall Inc., 1993.
- Mathur, K and Solow, D. : Management Science, Englewood, New Jersey, Prentice Hall Inc. 1994.
- NarangA.S.: Linear Programming Decision-Making. New Delhi, Sultan Chand, 1995.
- 5. Sharma, J.K. : Operations Research : Theory and Applications, New Delhi, Macmillian India Ltd., 1997.
- Taha, H.A. : Operations Research An Introduction, New York, Macmillan, 1989.
- 7. Theirouf, R.J. and Klekamp, RC. : Decision-Making Through Operations Research, New York, John Wiley, 1989.
- 8. N.D. Vohra : Quantitative Techniques in Management, Tata McGraw Hill, 2001.

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Objective: The objective of this course is to acquaint the students with concepts and basics of research methodology.

Course Contents:

Introduction to Research Methodology: Research-Meaning, Nature. Scope Objectives and Types; Research Process. Hypothesis:- Qualities of Good Hypothesis, Scientific Method of Research. Recent Trends in Usage of Research in Indian Corporate Sector.

Research Design- Meaning and Need of a Research Design, Exploratory, Descriptive, Experimental Research Design, Qualitative Research, Observation Studies, Surveys, Experiments & Test Markets.

Sources of Data- Nature and Types, Sampling Techniques-Nature and Types, Sampling Errors. Scaling & Measurement Techniques

Data Editing, Coding and Tabulation, Analysis & Interpretation of Data Business Research Reports-Format, Criterion for Judgment of good research report

Advance Techniques of Data Analysis: Factor analysis. Conjoint Analysis, Cluster Analysis & Multidimensional Scaling. Use of SPSS & Other Software's in Research. Use of Statistical Tools such as Correlation, Regression.

Suggested Readings:

- 1. Malhotra, Naresh K.: Marketing Research an Applied Orientation, 5th edition, Pearson.
- 2. Cooper, Business Research Methods, 11 th edn McGraw Hill Education.
- 3. Boyd & Westfall: Marketing Research, Prentice Hall.
- 4. Kothari, C. R.: Research Methodology, New Age International Publishers.
- 5. Shekharan& Uma: Business Research Methods-A Skill- Building Approach, 7th ed., New York, John Willy, 2002.
- 6. Creswell, John W.: Research Design-Qualitative & Quantitative Methods, New York, John Willy, 2002
- 7. Sandhi and Chawla: Research Methodology-Concepts and cases, 1st Edition, Vikas
- 8. Nargundkar, Marketing Research Text and Cases 3 rd edn, McGraw Hill Education

MBA -203: Production and Operations Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The Course is designed to acquaint the students with decision making in : Planning, scheduling and control of Production and Operation functions in both manufacturing and services; Productivity improvement in operation through layout engineering and quality management etc.: Effective and effective and efficient flow, replenishment and control of materials with reference to both manufacturing and services organization.

Course Contents:

Operations as a source of competitive advantage; Trade-offs and combinations, Process Analysis, Difference between Manufacturing and Service Operations Product Process Matrix, capacity planning- Process Selection and Facility layout: Designing product and process layouts and line balancing, Forecasting and its types, Inventory Management: Deterministic demand model–EOQ-Continuous and Periodic review Inventory models; Supply chain management; Lean vs Agile supply chains; Aggregate Production Planning; Master Production Schedule and MRP, Project Management, Quality management and Sustainable Operations Management

Suggested Readings:

- 1. Admn, E. E. & Ebert, RJ. : Production and Operations Management, 6th ed., New Delhi, Prentice Hall of India 1995.
- 2. Chary, S.N. : Production and Operations Management, New Delhi, Tata McGraw Hill, 2ndEdition.
- 3. Ashwathapa: Production and Operations Management, Himalaya Publishing House.
- 4. Dobler, Conald W and Lee, Lamar :Pruchasing and Materials Management, New York, McGraw Hill, 1984.
- 5. Chunawalla &Patel : Production and Operations Management, Himalaya Publishing House, Nair: Production and Operations Management, TMH
- 6. Chary, Production and Operations Management 5 th edn, McGraw Hill Education
- 7. Stevenson, Operations Management, 12 edn McGraw Hill Education

MBA-204: Marketing Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The purpose of this course is to develop an understanding of the underlying concepts, strategies and issues involved in the marketing of products and services.

Course Contents:

Marketing: Meaning, Nature, Scope, Evolution and Importance. Modern concept of marketing. Holistic Marketing, Ethics in marketing. Role of Information Technology in marketing. The dynamic marketing Environment. Marketing Mix and STP (Segmentation, Targeting and Positioning) Marketing Information System: Concept and Components of a marketing information system. Marketing Research: meaning, scope and techniques. Consumer Behaviour: meaning and importance, buying motives, buying process, factors influencing consumer behaviour. Product decisions: concept, classification, product-line decisions. New product development process, product life cycle, Packaging and Branding decisions. Pricing Concepts: objectives, policies and procedures, factors affecting pricing, pricing strategy and product life cycle, price changes and organizational strategies, product line pricing. Integrated Marketing Communication: Promotion-Mix; Advertising, sales promotion, public relations, personal selling and direct marketing. Channels of distributions: Concept, types and factors affecting channel selection. Recent developments in marketing.

Suggested Readings:

1	Michael J. Etzel	: Marketing Concepts and Cases, Tata
	Bruce J. Walker	McGraw-Hill Publishing Company Limited.
	William J. Stanton	
	Ajay Pandit	
2	Michael R.Czinkota	:Marketing Management, Thomson, South
	Masaaki Kotabe	Western.
3	Philip Kotler	: Marketing Management, Pearson Prentice-Hall.
	Kevin lane Keller	
4	DhruGreqal	: Marketing, Tata McGraw Hill Publishing
	Michael Levy	Company Limited.
5.	V.S. Ramaswamy	: Marketing Management, Macmillan Publisher
	S. NamaKumari	India Ltd.
6.	Rajan Sexena	: Marketing Management, Tata McGraw Hill
		Publishing Company Limited.
7.	Nargundkar,	Marketing Research - Text and Cases 3 rd edn,
		McGraw Hill Education

MBA-205: Corporate Finance

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The purpose of this course is to acquaint the students with the broad framework of financial decision—making in a business unit.

Course Contents

Introduction to financial management Objectives of financial management; Time value of money, sources of finance, Investment decisions: Importance, Difficulties determining cash flows, methods of capital budgeting Risk analysis : Cost of capital; Concept and importance, Computations of cost of various sources of finance; Weighted Average Cost of Capital; Capital Structure decisions; Theories of capital structure, Factors determining capital structure. Optimum capital structure; Management of working capital - Cash, Receivables and Inventory Management, Internal Financing and Dividend Policy. Financial Modelling, essentials and financial modeling framework.

Suggested Readings:

- Hamton, John; Financial Decision-Making, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1997.
- 2. Khan, M.Y. and Jam, P.K. : Financial Management, McGraw Hill, 2001.
- 3. Pandey, IM. : Financial Management, Vikas Publication House, 2000.
- 4. Van Home, James C. : Financial Management and Policy,10th ed., New Delhi, Prentice Hall of India, 1997.
- 5. Winger, Bemard and Mohan, Nancy: Principles of Financial Management, New York, Macmillan Publishing
- 6. Company, 1991.
- 7. Kishore, Ravi M. : Financial Management, Taxmann Publishers, New Delhi.
- 8. Chandra, Financial Management 9th edn McGraw Hill Education.
- 9. Ross, Corporate Finance 11 th edn McGraw Hill Education

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The content of the course aims at increasing acquaintance of the students with basic as well as advanced HR concepts. In addition to this the course attempts to raise their level of understanding with respect to people dynamics in modern organisations and their subsequent significant impact on Organisational effectiveness and efficiency.

Course Contents:

Human Resource Management- Concept, Scope and Functions of HRM; Evolution of HRM: HR Philosophy, HR Policies.; Theoretical Perspectives; HR Models; HR Challenges in a changing business environment. Human Resource Planning and Forecasting; Job Analysis; Recruitment, Selection and Retention of human resources; Placement, Induction and Socialisation; Learning, Training and Development, Performance Appraisal, Performance Management and Potential Appraisal; Career Management ; Job Evaluation; Compensation Management, Rewards and Recognition Programs; Employee Separations Practices; Industrial Relations and Trade Unions; Industrial Dispute/Conflict Resolution and Grievance Management; Occupational Safety and Health ;HR Ethics;

Recent advance concepts and Contemporary Trends in HRM: Employee Engagement; Social Media and HR; HR Analytics; Competency Based HRM; Six Sigma in HR etc. *Suggesting Readings*

- 1. Dessler&Varakkey, Human Resource Management, Pearson Education
- 2. K.Aswathapa , Human Resource Management: Text and Cases, 8th Ed., Tata McGraw Hill, New Delhi.
- 3. SeemaSanghi , Human Resource Management, Macmillan India Publication. 2012
- 4. Aggarwala, Tanuja , Strategic HRM, Oxford University Press. 2010
- 5. Armstrong, Michael Handbook of HRM Practice, Kogan Page,
- 6. P. Jyothi, Human Resource Management, Oxford University Press.2012
- 7. Lepak&Gowan, Human Resource Management, Pearson Education. 2011
- 8. V.S.P.Rao, Human Resource Management, Himalaya Publication House.
- 9. Ivancevich, Human Resource Management 11 th edn McGraw Hill Education

MBA-207: Legal Environment

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Legal Aspect of Business: Introduction to Business Laws- Business Management and Jurisprudence; structure of the Indian Legal Systems: sources of Law; Manager and Legal System; Fundamentals of contract laws-Formation of Contracts; Principles of Contract Laws-Legality of Object Consideration; Performance of contract-Discharge of contractbreach of contract-Quasi contracts-Contract Management-Special Contracts-Laws of Agency; Principal-Agent Problem-Bailment, Pledge, Guarantee and Indemnity-Sales of Goods- Principles of Sales of Goods- Transfer of Ownership& Property–Performance of contract-Consumer Protection Laws-Law relating to Business Organizations-Partnership Trusts- Company form of organization- Protecting the property of Business-Copyright, Trademark, secret, Geographical Indications-Alternate Dispute resolutions

- 1. Pathak-Legal Aspects of Business 6th edn McGraw Hill Education
- 2. Tulsian, Business Law 3rd edn McGraw Hill Education

MBA-208: Comprehensive Viva-Voce

Max. Marks: 50 External: 50

OE-I Open Elective-I (Only at USM, KUK Campus under CBCS) Max. Marks: 50 External: 50 Credit: 2

MBA-301: Corporate Strategy

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The course aims at imparting knowledge of formulation, implementation and evaluation of Business Strategies.

Course Contents:

An Introduction to Business Policy — Nature, objective and importance of business policy; Strategic Management –meaning, Historical development and significance to Modern Day organisations. Strategic Management Process levels of strategy in organization.

Strategy Formulation- Company's mission, purpose and objectives; corporate strategy - concept, significance and objectives; types of strategies; Environmental and organizational appraisal (Internal & external) techniques of business environment analysis, Strategic alternatives and choice; Business ethics and corporate strategy Concept of value chain and competitive advantage Strategy implementation - Designing organizational structure and activating strategies; matching structure and activating strategy.

Strategy Evaluation - Strategic evaluation and Control, Strategic and Operational Control; techniques of evaluation and control. Role of organizational system in evaluation Current trends in Strategic management- trends in external environment of business, new directions in strategic thinking and new modes of leadership. Role of IT in strategic Management.

- 1. Jauch&Glueek : Business Policy and Strategic Management.
- 2. Thampson LA. and Stickland A.J.: Strategic Management Concept and cases.
- 3. Michael Potter: Competitive Advantage of Nations.
- 4. AzharKazmi : Business Policy and Strategic Management.
- 5. Kennth, A. Andrews : Concepts of corporate Strategy.
- 6. Melvin J. Stanford: Management Policy
- 7. John A. Pearce Hand R.B. Robinson Strategic Management
- 8. Applegate,Corporate Information Strategy and Management,8 th edn McGraw Hill Education
- 9. Thompson, Crafting and Executing Strategy, 19 Th Edn mcGraw Hill Education

MBA-302: Indian Ethos and Business Ethics

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents: History & Relevance, Principles Practiced by Indian Companies, Role of Indian Ethos in Managerial Practices, Management Lessons from Vedas, Mahabharata, Bible, Quran, Kautilya's Arthashastra, Indian Heritage in Business, Management-Production and Consumption. Ethics v/s Ethos, Indian v/s Western Management, Work Ethos and Values for Indian Managers- Relevance of Value Based Management in Global Change- Impact of Values on Stakeholders, Trans-Cultural Human Values, Secular v/s Spiritual Values, Value System in Work Culture, Stress Management-Meditation for mental health, Yoga, Contemporary Approaches to Leadership- Joint Hindu Family Business-Leadership Qualities of Karta, Indian Systems of Learning-Gurukul System of Learning, Advantages-Disadvantages of Karma, importance of Karma to Managers-Nishkama Karma- Laws of Karma, Law of Creation- Law of Humility- Law of Growth- Law of Responsibility- Law ofConnection-Corporate Karma Leadership. Understanding the need for ethics, Ethical values, myths and ambiguity, ethical codes, Ethical Principles in Business; Theories of Ethics, Absolutism verses Relativism, Teleological approach, the Deontological approach, Kohlberg's six stages of moral development (CMD), Managing Ethical Dilemma; Characteristics, ethical decision making, ethical reasoning, the dilemma resolution process; ethical dilemmas in different business areas of finance, marketing HRM and international business, Ethical Culture in Organization, Developing codes of Ethics and conduct, Ethical and value based leadership. Role of scriptures in understanding ethics, Indian wisdom & Indian approaches towards business ethics.

- [1] Chakraborty S.K., "Management Transformation by Values", New Delhi, Sage Publication, 1990.
- [2] Chakraborty S.K., "Management by Values", New Delhi, Oxford University Press, 1992.
- [3] Chakraborty S.K., Chakraborty Debangshu, Spirituality in Management: Means Or End?, Oxford University Press, 2008.
- [4] Chakraborty, S.K., Ethics in Management-Vedantic Approach, New Delhi, Oxford India Ltd. 1995.
- [5] Dwijendra Tripathi, History of Indian Business by Publisher, Oxford University Press India, 2004
- [6] Das Gurcharan, India Unbound: from Independence to the Global Information age, Penguin Books, 2000.
- [7] Murthy, C.S.R. Business Ethics, Himalaya Publishing House, Mumbai, 2009.

MBA-303 Summer Internship/Field Work

Max. Marks : 100 (Presentation on Training Report -Internal Marks 50 (Evaluation of Training report by External Examiner appointed by the University External Marks 50

Max. Marks: 50 External: 50 Credit: 2

MBA-401: Entrepreneurship

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Entrepreneurship and Intrapreneurship-similarities and variance-India's start up revolution-Trends, Imperatives, benefits; the players involved in the ecosystem, Business Incubators-

Rural entrepreneurship, social entrepreneurship, women entrepreneurs- The entrepreneurial mindset-Key attributes an entrepreneur -Desirable and acquirable attitudes and behaviors-Readiness-The right time, right age, right conditions-Myths and realities of entrepreneurship-Transition from college/ regular job to the world of start-ups-Personal finance- Explaining to family-Entrepreneurial Stress- Composition-complementarity-Different life stages- Relative importance-Disagreements- Idea, opportunity and retrospective determinism- To solve something felt and experienced vs I want to be an entrepreneur- Where can ideas come from- Creating and appropriating value- Scarcity, choice and trade offs- Identifying 'paying customer', developing market understanding- Narrowing focus-End user profiling, Ideal Persona-Market segmentation, Market sizing- Marketing plan, pricing- Strategy-Rigor of another kind: Heuristics and Gut-feel-Business Plan -How to develop it-What all should it have, what it shouldn't have-Unit economics, scalability, defensibility-Venture feasibility analysis-Pitching- Legal Matters- Organizational form-partnership, sole proprietorship, corporation- Intellectual property-copyright, trademarks-Tax, Personnel law, contract law-Law vs Ethics-Legal expenses, hiring the service provider-Digital Haves and Havenots- Digital Economy as a resource- Promotion tools-the value of Likes and Shares- Matchmakers-Long Tail markets-Micro-Apps-Funding and Incubation.

- 1. Kumar, Arya (2012); Entrepreneurship, Pearson, New Delhi.
- 2. Greene, Cynthia L (2006), Entrepreneurship, Cengage Learning, New Delhi
- 3. Timmons, Jeffry A and Spinelli, Stephen(2007), New Venture Creation, McGrawHill, seventh edition, New Delhi
- 4. Wickham, Phillip A (1998); Strategic Entrepreneurship, Pitman, UK.
- 5. Shukla, MB, (2011), Entrepreneurship and Small Business Management, Kitab Mahal, Allahabad
- 6. Zenas Block and Ian C Macmillan, Corporate Venturing, Harvard Business School Press, Boston
- 7. Sahay A., A. Nirjar (2006), Entrepreneurship: Education, Theory and Practice, Excel Books, New Delhi.
- 8. BAMford, Entrepreneurship: A Small Business Approach1st edn,McGraw Hill Education
- 9. Hisrich, Entrepreneurship (SIE) 9 th edn McGraw Hill Education

MBA-402: Corporate Social Responsibility and Sustainability

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Definition- Evolution- Need for CSR: Theoretical perspectives-Corporate citizenship-Business practices-Strategies for CSR-Challenges and implementation-Evolution of corporate governance-Governance practices and regulation-Structure and development of boards-Role of capital market and government-Governance ratings-Future of governance- innovative practices-Case studies with lessons learnt. Sustainability: Meaning and Scope- Corporate Social Responsibility and Corporate Sustainability-Sustainability Terminologies and Meanings-Why is Sustainability an Imperative-Sustainability Case Studies-Triple Bottom Line (TBL). Corporate Sustainability Reporting Frameworks-Global Reporting Initiative Guidelines-National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business- International Standards-Sustainability Indices-Principles of Responsible Investment-Challenges in Mainstreaming Sustainability Reporting-Sustainability Reporting Case Studies.

- 1. Tom Cannon, Corporate Responsibility: Governance, Compliance and Ethics in a Sustainable Environment, Pearson Publication.
- 2. Samuel & Celine, Theory and Practice of Corporate Social Responsibility, Springer
- 3. Maria Aluchna, Samuel The Dynamics of Corporate Social Responsibility, Springer
- 4. B.N. Mandal, Corporate Social Responsibility in India, Global Vision Publishing House.
- 5. Subhasis Ray & S.Siva Raju, Implementing Corporate Social Responsibility, Springer.

MBA-403 Research Report and Comprehensive Viva-Voce Max. Marks : 100 Research Report- External Marks 50 Viva-Voce- External Marks 50

FINANCE

FM-301: Quantitative Analysis for Financial Decision Making

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Basic Statistical and Mathematical Concepts

An overview of Descriptive Statistics including Central Tendency, Dispersion, Skewness, Kurtosis, expectations and theoretical distributions.

Risk & Return and Time Series Concepts

Evaluating forecasts of risks and returns, Simple Interest, Compound Interest, Frequency of Compounding, Continuous Compounding, Present Value, determination of best forecast models. Basic time series concepts, fundamental topics in time series analysis: autocorrelation, unit root tests, white noise processes and ARMA processes.

Modelling Asset Return Volatility

Volatility of asset returns, volatility modelling and forecasting methods, the estimation of these models, and methods of testing for volatility predictability. ARCH/GARCH class of models, both univariate and multivariate, leverage effect.

Risk management and Value-at-Risk.

Measuring and managing the exposure to risk, Value-at-Risk (VaR), Common models for measuring VaR.

- 1. Patton, A. (2007). Quantitative Finance, UoL Study Guide. (AP)
- 2. Christoffersen, P.F. Elements of Financial Risk Management. (Academic Press, London, 2003).(PC)
- 3. Diebold, F.X. Elements of Forecasting. (Thomson South-Western, Canada, 2006) fourth edition. (FD)
- 4. Wilmott, P. Paul Wilmott on Quantitative Finance (selected chapters). 2nd ed. Wiley, 2006.
- 5. McNeil, A. J. et al, Quantitative Risk Management. Princeton University Press, 2005.
- 6. Chris Brooks, Introductory Econometrics for Finance. 2nd Edition, Cambridge
- 7. Bradley, T. (2007) Essential Statistics for Economics, Business and Management. 1st edn.Chichester: Wiley.

FM-302: Foreign Exchange Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of this course is to provide the basic knowledge about the foreign exchange dealing including exchange rate determination and exchange risk management.

Course Contents:

International Monetary Systems: Historical background and structure. Foreign Exchange Market: Nature, participants and structure. Foreign exchange quotations: Direct and indirect. Convertibility of Rupee, current account convertibility and capital account convertibility.

Exchange rate: meaning, Spread, official and free market rates, cross currency rates, forward rates, exchange rates determination theories, factors affecting, flexible vs. fixed exchange rates, Exchange rate regime, Liberalized Exchange Rate Management System (LERMS).

Currency Forwards, Currency Futures and Currency Options, Currency Swaps. Currency Forwards vs. Currency Futures Contracts.

Foreign Exchange Exposure: introduction, nature and magnitude. Types of exposure: transaction, translation and economic, their measurement and management.

Tax treatment of Foreign Exchange gains and losses. Foreign Exchange Control in India, RBI guidelines, Important provisions of FEMA.

- 1. Bhorali, D. and Sikidar, S.: International Financial Institution and Monetary Management.
- 2. Chaudhary, B.K.: Financing of Foreign Trade and Foreign Exchange.
- 3. Shapiro, Alan C.: Multinational Financial Management, P.H.I., New Delhi.
- 4. Henning, Pigott& Scott: International Financial Management.
- 5. Keith Pilbeam : International Finance, MacMillan India Ltd., New Delhi.
- 6. Apte P.G.: International Financial Management, TMH, New Delhi.
- 7. Chatterjee, A.K.: Principle of Foreign Exchange.
- 8. Saran (V): International Financial Management, PHI. New Delhi
FM-303: Derivatives Trading in India

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions. Course Contents:

1. Introduction to Commodities and Financial Derivatives

- 2 Introduction to the Underlying Markets
- 3 Introduction to Forwards and Futures
- 4 Strategies Using Futures
- 5 Options and Option Pricing Models
- 6 Option Trading Strategies
- 7 Introduction to Trading, Clearing, Settlement & Risk Management
- 8 Legal and Regulatory Environment
- 9 Accounting and Taxation
- 10 Risk management in Derivatives
- 11 Sales Practices, Code of Conduct and Investor Protection Measures

Suggested Readings:

1. Hull C. John, Basu, Sankarshan (2010), Options, Futures and Other Derivatives, 7th edition, Pearson Educations.

2. Overhaus Marcus. (2008), Equity Derivative - Theory and Application, John Wiley & Sons.

3. Vohra, N.D. and Bagri, B.R. (2009), Futures and Options, 9 th edition, Tata McGraw-Hill.

4. Hand book on Derivatives Trading by National Stock Exchange of India

5. Bansal, (2010), Derivatives and Financial Innovations, 1st edition, Tata McGraw Hill.

6.Gupta S.L. Financial derivatives theory, concepts and problems, PHI

FM-304: Banking and Financial Services

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: This course aims to give the students anoverview of the Indian Financial Systems and developments in the areas of financial services. It will give an insight into the strategic, regulatory, operating and managerial issues concerning various financial services.

Course Contents:

Overview of financial services – overview, environment and importance of financial services in an economy, evaluation and role of financial services companies in India, securitization concept – securitization as a funding mechanism, securitization in India; merchant banking – nature and scope, regulation of merchant banking activity, SEBI guidelines for public issues. Introduction to equipment leasing – introduction, history and development of leasing, concept and classification, evolution of Indian leasing industry, legal aspects of leasing, tax aspects of leasing, appraisal criteria, risks in leasing business, lease evaluation – the lessee's angle, the lessor's angle; hire purchase – concept, characteristics, mathematical evaluation, legal, tax and accounting aspects, leasing *vs.* hire-purchase; mutual funds (MFs) – evolution, types, regulation of MFs, organization, structure, performance evaluation, and tax treatment of MF schemes, MF in India.

Credit rating - concept, rationale, process, methodology, SEBI regulations for credit consumer finance - role of consumer credit in the financial system, features, rating. legal framework, credit screening methods, innovative structuring of consumer credit transactions, credit cards – concept, types, billing and payment, settlement procedure, mechanism of transactions. Factoring - concept, forms, functions of factor, legal aspects, evaluation of factoring, factoring disputes, factoring vs. forfeiting, factoring vis-à-vis bill discounting. BoughtOutDeals:MeaningandNature;MechanismsofBoughtoutDeals; advantages; ThePresent Scenario; venture capital (VC) – nature and scope, role of venture capitalists and private equity firms, types of venture capital funds, VC investment process, evaluation criteria, limitations, VC in India. Depository:Concept,Depositoryparticipants;Functionsofdepositorysystem;Benefits ofdepository.

- 1. Bansal, L.K., Merchant Banking and Financial Services, Tata McGraw Hill.
- 2. Bhole, L.M., Financial Institutions and Markets: Structure, Growth and Innovations, Tata McGraw-Hill.
- 3. Gurusamy, S., Financial Markets and Institutions, Thompson Learning.
- 4. Khan, M.Y., Management of Financial Services, Tata McGraw-Hill.
- 5. Kohn, M., Financial Institutions and Markets, Tata McGraw-Hill.
- 6. Padmalatha, S., Management of Banking and Financial Services, Sultan Chand and Sons.
- 7. Sengupta, A.K., International Factoring in India: Issues, Problems and Prospects,
- 8. Macmillan India.
- 9. Tripathy, N.P., Mutual Funds in India: Emerging Issues, Excel Books.

FM-305: Corporate Restructuring & Control

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Meaning of corporate restructuring, need, scope and modes of restructuring, global scenario, national scenario, Mergers and Amalgamations: Concept, need and reasons, legal aspects, procedural aspects relating to commencing of meetings and presentation of petition including documentation, economic aspects including effect on the interest of small investors; accounting aspects, financial aspects including valuation of shares, taxation aspects, stamp duty and allied matters, filing of various forms. Takeovers Meaning and concept, types of takeovers, legal aspects - SEBI takeover regulations, procedural aspects, economic aspects, financial aspects, accounting aspects, taxation aspects, stamp duty and allied matters, payment of consideration, bail out takeovers, takeover of sick unit,. Funding of Mergers and Takeovers Financial alternatives, merits and demerits, funding through various types of financial instruments including preference shares, non-voting shares, buy-back of shares, hybrids, options and securities with differential rights, takeover financial institutions and banks, rehabilitation finance, management buyouts.

Valuation of Shares and Business, Corporate Demergers/Splits and Divisions Difference between demerger and reconstruction; modes of demerger – by agreement, under scheme of arrangement, by voluntary winding up; tax aspects, tax reliefs, Indian scenario, reverse mergers. Post Merger Re-organisation: Accomplishment of objectives - criteria of success, profitability, gains to shareholders; post merger valuation; measuring post merger efficiency; factors in post merger reorganization. Financial Restructuring: Buyback of shares – concept and necessity; SEBI guidelines; Government's guidelines, procedure and practice for buy-back of shares. Alliances: Integrating alliances into corporate strategy; preparing for alliance, cross cultural alliances; implementing and managing the alliances.

Suggested Readings:

1. Mergers et.al; by S. Ramanujam, Tata McGraw Hill Publishing Company Ltd, New Delhi

- 2. Takeover of Companies by J.M Thakur, Snow White Publications Pvt, Ltd;
- 3. Corporate Takeovers in India by V.K Kaushal, Sarup& Sons, New Delhi
- 4. Corporate Merger and Takeovers by Dr. J.C. Varma, Bharat Publishing House

FM-306: Security Analysis

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of this course is to impart knowledge to students regarding the theory and practice of Security Analysis.

Course Contents:

Investment background – meaning and avenues of investment, concept of risk and return, determinants of required rates of return, relationship between risk and return, security risk and return analysis and measurement; financial assets – type and their characteristics including derivatives; asset allocation decision – individual investor life cycle, the portfolio management process, the importance of asset allocation; organisation and functioning of financial markets in India - primary capital markets, secondary markets, financial intermediaries, listing of securities, securities trading, securities settlement, and regulation, evaluation of securities, and stock exchanges.

Security analysis and management strategies – efficient market hypothesis, macroanalysis and

micro-valuation of the stock market; fundamental analysis – economic analysis, industry analysis, company analysis and stock valuation; technical analysis – techniques, DOW theory; equity portfolio management strategies – passive versus active management strategies; analysis and management of fixed income securities - bond fundamentals, the analysis and valuation of bonds, bond portfolio management strategies – passive, semi-active and active strategies.

- 1. Alexander, G.J., Sharpe, W.F. and Bailey, J.V., *Fundamentals of Investments*, Prentice Hall.
- 2. Bodie, Z., Kane, A., Marcus, A.J. and Mohanty, P., *Investments*, Tata McGraw-Hill.
- 3. Chandra, P., Investment Analysis and Portfolio Management, Tata McGraw-Hill.
- 4. Elton, E.J. and Gruber, M.J., *Modern Portfolio Theory and Investment Analysis*, John Wiley and Sons.
- 5. Fabozzi, F.J. and Markowiz, H.M., *The Theory and Practice of Investment Management:*
- 6. Graham and Dodd, ":Security Analysis Asset Allocation, Valuation, Portfolio Construction, and Strategies, Wiley.
- 7. Fischer, Donald E. and Jordan, Ronald J., *Security Analysis and Portfolio Management*, Prentice Hall.
- 8. Mayo, H.B., Investments: An Introduction, Thomson Asia.

SEMESTER-IV

FM-401: Financial Engineering

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: This course aims at enabling the students to understand and analyze investment problems and developing their skills for the solution of these problems with the help of innovative financial processes, instruments and strategies.

Course Contents: Introduction to financial engineering – meaning and need of financial engineering, financial engineering *vis-à-vis* financial analysis, tools used in financial engineering, growth and contributory factors to increasing need for financial engineering, skills and knowledge required – statistical, modelling, technology, legal, accounting and taxation; financial engineering in India – derivatives and futures markets, features of financial derivatives, types and uses of financial derivates; determinations of value of financial instruments and products – time value of money, the required rate of return, absolute valuation versus relative valuation, measuring return and risk, portfolio consideration and investment horizons.

Pricing and valuation of future and forwards, pricing and valuation of swaps, interest rate swaps, currency swaps, commodity swaps, options - call and put options, payoff profiles, basic principles of options, option trading strategies, option pricing (Black Scholes model), arbitrage restrictions on option prices, hedging approaches with options, future options, swap options, equity related instruments – options, warrants, subscription rights, investment vehicle, index futures and options, foreign equities, treasury bond and notes futures; forward rate agreements. Financial engineering processes and strategies – assets and liabilities management, securitization, asset backed securities, mortgage backed securities, corporate restructuring and leverage buyouts/ management buyout, value at risk (VAR).

Emerging instruments, concepts and issues – hybrid securities, credit derivatives, options on debt instruments, exotic options, synthetic instruments, and issues related to accounting treatment of derivatives, corporate risk management – planning and controlling reasons for hedging, cash flow hedges and value hedges, capital structure and hedging, interest rate risk management.

- 1. Dubofsky, D.A., Derivatives, Oxford University Press.
- 2. Gupta, S.L., Financial Derivatives, Prentice Hall.
- 3. Hull, J.C., Options, Futures and Other Derivatives, Prentice Hall of India.
- 4. Marchall, J.F. and Bansal, V.K., Financial Engineering, Prentice Hall.
- 5. Neftci, S.N., Financial Engineering, Elsevier Academic Press.
- 6. Strong, R.A., Derivatives: An Introduction, Thomson South-Western.
- 7. Varma, J.R., Derivatives and Risk Management, Tata McGraw Hill.
- 8. Walmsley, J., New Financial Instruments, Prentice Hall of India.

FM-402: Project Planning and Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The basic purpose of this course is to understand the framework for evaluating capital expenditure proposals, their planning and management in the review of the projects undertaken.

Course Contents:

Generation and Screening of Project Idea; Capital Expenditure; Importance and Difficulties; Market and Demand Analysis; Technical Analysis; Financial Estimates and Projections; Financing of Projects; Investment Criteria. Analysis of Project Risk : Firm Risk and Market Risk; Social Cost and Benefit Analysis; Multiple Projects and Constraints; Network Techniques for Project Management; Project Review and Administrative Aspects; Assessment of the Tax Burden; Environment Appraisal of Projects; Human aspects of Project Management. Project Financing: BOT, PPP and consortium financing.

- 1. W. Ahuja, G.K. & Gupta, Ravi : Systematic Approach to Income Tax, Allahabd, Bharat Law Hose, 1997.
- Bhalla, V.K. : Financial Management and Policy, 2nd ed., New Delhi, Anmol, 1998.
- 3. Chandra, Prasanna : Projects : Preparation, Appraisal, Budgeting and Implementation, 3rd ed., New Delhi, Tata McGraw Hill, 1987.
- 4. Dhankar, Raj S.: Financial Management of Public Sector Undertakings. New Delhi, Westville, 1995.

FM-403: Behavioral Finance

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The basic objective of this course is to acquaint the new field of behavioral finance and importance of behavioral traits in financial decision making.

Course Contents:

Introduction: Meaning, Nature, Scope and History of Behavioural Finance. Comparison between Behavioural Finance and Conventional Finance. Expected Utility, Non-Expected Utility and classical probability theory: An Overview. Psychology of Investor"s: Beliefs,Attitude,Learning, Herding, Momentum,Biases and Heuristics, Over-confidence and optimism, winner"s curse, Bubbles, advertising to investor"s, over reaction and under reaction and cross-cultural behavior. Preferences: Framing, Prospect Theory and violation of Expected utility, Mental Accounting, Prospect Theory and attention, Saving Behavior. Anomalies: Accounting Based Anomalies, Calendar Anomalies, Attention based anomalies: Value v/s Growth, size, equity premium, myopia. Behavioural Corporate Finance: Introduction, limits of Arbitrage, aggregation. Contemporary issues in Behavioural Finance.

- 1. William Forbes, *Behavioral Finance*, John Wiley.
- 2. Mihe Elvin, An Introduction to the psychology of Trading and Behavioral Finance, John Wiley.
- 3. James Montier, Behavioral Investing: A Practitioners Guide to Applying Behavioral Finance, John Wiley.
- 4. James Montier, Behavioral Investing: Insights into Irrational minds and markets, John Wiley.
- 5. Paragh Parikh, Value Investing and Behavioral Finance, Tata McGraw-Hill.

FM-404: Portfolio Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: This course seeks to acquaint students with the theoretical and practical aspects of investment analysis for security selection and portfolio management purposes.

Course Contents:

Portfolio analysis and valuation principles – meaning, importance, objectives and various issues in portfolio construction and revision; portfolio analysis – diversification, portfolio risk and return; Markowitz portfolio theory; portfolio selection – defining investment objectives, investor preferences; Single index model; introduction to asset pricing models, capital market theory, the capital asset pricing model (CAPM); multifactor models of risk and return, arbitrage pricing theory (APT), multifactor models and risk estimation; valuation principles and practices – value of financial statement analysis, theory of valuation, security valuation process, valuation of alternative investments, relative valuation techniques.

Portfolio performance evaluation and management – SEBI guidelines on portfolio management; asset management – managed portfolios, professional money management companies, investing in alternative asset classes; portfolio performance evaluation, performance measurement techniques, risk adjusted measures of performance evaluation, evaluation criteria and procedures, evaluation of bond portfolio performance, reporting investment portfolio performance.

Wealth Management- Wealth cycle, Risk profiling and assets allocations. Estate planning and taxation of Investment. Client data collections and analysis.

- 1. Chandra, P., Investment Analysis and Portfolio Management, Tata McGraw-Hill.
- 2. Elton, E.J. and Gruber, M.J., Modern Portfolio Theory and Investment Analysis, John Wiley and Sons.
- 3. Fabozzi, F.J. and Markowiz, H.M., The Theory and Practice of Investment Management:
- 4. Asset Allocation, Valuation, Portfolio Construction, and Strategies, Wiley.
- 5. Fischer, Donald E. and Jordan, Ronald J., Security Analysis and Portfolio Management, Prentice Hall.

FM-405: Insurance and Risk Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this subject is to acquaint candidates with the various facets of insurance and risk management.

Course Contents:

Insurance-Concept, Nature, Classification-Life & Non-life, Functions, Importance and Principles of Insurance; IRDA Act 1999 - Organization, guidelines for life & Non-life insurance.

Life Insurance -Concept; Public & Pvt. Sector companies in India - their products, schemes & plans; LIC Act 1956-An overview. General Insurance - Concept, Types; Public & Pvt. Sector companies in India - their products, schemes & plans.

Distribution channel in Insurance-Introduction, Individual Agents-Appointment, functions, code of conduct and remuneration; Claims settlement in Life Insurance and General Insurance.

Risk and its Management, Objectives of Risk Management, Risk Identification and

Measurement, Risk Pooling Arrangements and Diversifications, Process of Risk

Management.

Risk Aversion and Risk Management of Individuals and Corporations, Risk Management

and Shareholder's Wealth.

Analytical tools used in Corporate Risk Management: DOW Index, Fault Tree, Event

Tree, Hedging with Derivative Contracts, Risk Pricing.

Process of Risk Control, Loss Prevention, Techniques of Risk Retention and Reduction.

Case Studies in Enterprise Risk Management.

- 1. NaliniPraveTripathy, Prabir Pal, 'Insurance theory and practice' TMH 2007.
- 2. K.P. Singh, B.S.Bodla and M.C. Garg. Insurance Management, Deep & Deep Publications, Delhi.
- 3. M.N. Mishra, Insurance, Vikas Publication.
- 4. Harrington and Mehaus : Risk Management and Insurance, Tata Mcgraw Hills
- 5. George Rejda: Principles of Risk Management and Insurance

FM-406: Private Equity and Wealth Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Overview of the Private Equity Industry: history, terminology, and categories within the asset class, participants, anatomy of funds and partnership agreements, key terms, economics, GP and LP perspectives and negotiations and perspectives of companies.

The Fundamentals of Private Equity Investing private equity investment perspective, financing, structuring and negotiating buyout and growth capital transactions, and managing the portfolio company over the life of the investment upto and including an exit or value realization transaction.

Understanding and Evaluating Private Equity Firms In Financial Markets Today: Other topics will include understanding and managing LP liquidity options; the rise and role of other alternative investment vehicles, most not ably hedge funds and sovereign wealth funds; the public traded private equity firm; the impact of the financial crisis and current issues under discussion in the area of financial regulation

Introduction To Personal Financial Planning, Personal Financial Planning process, Ethical and professional consideration in Financial planning – Code of ethics Cash flow planning; Budgeting, Personal financial statement Analysis, Financial Mathematics, Time value of Money, Economic environment and Indicators Forms of business ownership/entity relationships. Legal aspects of financial planning.

Risk Analysis and Insurance Planning -Introduction to Risk Analysis, Insurance Concepts Legal principles of Insurance, Insurance Contract, Insurance Policies and Strategies Insurance products, Regulatory framework of Insurance, Motor Insurance, Health and Householders Insurance, Group Insurance Annuities Insurance Pricing

- 1. Evensky, H., Horan, S. M. and Robinson, T. R. (2011) The New Wealth Management: The Financial Advisor's Guide to Managing and Investing Client Assets. Wiley.
- 2. Chorafas, D. N. (2006) Wealth management: private banking, investment decisions, and structured financial products. Amsterdam: Elsevier. EBSCOhost ebook collection [online].
- 3. Reuvid, J. (ed.) (2007) The Handbook of personal wealth management, 3rd ed. London: Kogan Page. MyiLibrary [online].

MM-301: Advertising Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Content:

Understanding advertising: Concept, Evolution, History, classification, objectives and functions Advertising and society: ethical issues in advertising, social criticism of advertising, Laws in advertising, Advertising statutory bodies in India

Advertising strategy and planning process, Consumer behavior and advertising research, Advertising agency; types, functions and structure of advertising agency, client-agency relationship; Building of advertising programme - message, headlines, copy, logo, illustration, appeal, layout;

Media planning and strategy – development of media plan, establishing media objectives, developing and implementing media strategies, evaluation and follow up of media plan; Budgeting- establishment and allocation, budgeting approaches., Measuring the effectiveness of the promotional program- Market testing, pre testing, post testing, laboratory tests, field tests,

Online advertising: objectives, importance, types and challenges of online advertising, advertising on the internet, measuring effectiveness of internet

- 1. Belch, George E and Belch, Michael A. : Introduction to Advertising and Promotion, 3rd ed, Chicago, Irwin, 2002.
- 2. Jethwaney and Jain: Advertising Management, Oxford, 2012.
- 3. Sandage and Fryberger : Advertising, AITBS, Delhi, 2000.
- 4. Batra, Rajeev, Myers, johan G. and Aaker, David A. Advertising Management, 9th ed., New Delhi, Pearson, 2013.
- 5. O, Guinn : Advertising & Integrated Brand Production, Vikas Publishing House, New Delhi.

MM-302: Marketing Research and Analytics

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction to Marketing Research- Meaning and Role of Research in Marketing. Scope of Marketing Research- Consumer Research, Market Potential Research, Image Research and Research Pertaining to 4 Ps. Types of Marketing Research and Their Applications-Exploratory Research, Descriptive Research and Experimental Research.

Marketing Research- Step by Step Execution. Measurement and Scaling Techniques. Data Collection and Sampling Design

Role of Analytics in Marketing. **Big Data** in Marketing and **Marketing Intelligence**. SPSS based Marketing Analytics Techniques-

Conjoint Analysis

Cluster Analysis

Factor Analysis

Regression Analysis

Perceptual Maps

Text Analytics.

- 1. Cooper, Donald R and Pamela S Schindler, Marketing Research- Concepts and Cases, Tata McGraw Hill Publishing Company Limited, New Delhi.
- 2. Malhotra, Naresh K and S Dash, Marketing Research- An Applied Orientation, Pearson.
- Boud, Harper W, Westfall, Ralph L and Stanley F Stasch, Marketing Research-Text and Cases, RD Irwin
- 4. Green, Paul E and Donald S Tull, Research for Marketing Decisions, PHI.
- 5. Beri, GC, Marketing Research, Tata McGraw Hill, New Delhi.

MM-303 Sales and Logistics Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Sales Management- An Introduction. Sales Organisation, Sales Functions and Policies. Tasks and Responsibilities of Field Sales Manager. Planning of Sales Efforts- Sales Planning and Budgeting, Estimation of Market Potential and Sales Forecasting, Setting Sales Territories.

Fixation of Sales Quota, Sales and Cost Analysis. Managing Sales force- Selection, Training, Compensation, Motivation and Evaluation of Sales Performance.

Logistics Management- Meaning and relationship with Supply Chain Management. Logistics as a source of Competitive Advantage.

Warehousing- Alternatives and Strategy. Inventory Management Policies. Transportation Types, Issues and Decision Making. Packaging Issues. Logistics Organisation.

Recent Trends in Logistics- E Logistics, Green Logistics and Reverse Logistics.

- 1. Still, Richard R, Edward Cundiff and Norman Govoni, Sales Management-Decision, Strategies and Cases, Pearson Education/ Prentice Hall of India.
- Dalrymple, Douglas J, William Cron and Thomas Decarlo, Sales Management, John Wiley and Sons Asia Pvt. Ltd.
- 3. Spiro, Stanton and Rich, Management of Sales Force, Tata McGraw Hill.
- 4. Bowersox, D.J and David Closs, Logistical Management, Tata McGraw Hill.
- 5. Sople, Vinod, Logistics Management, Pearson Education, India.
- 6. Bhattacharyya, SK, Logistics Management, S Chand, India

MM-304: Consumer Behaviour

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Consumer Behaviour: Meaning, Nature, Scope and Significance of its Study for Marketers. Consumer Research: Role and Process. Consumer Decision Making Process: A Detailed Study of Various Stages and their Marketing Implications.

Psychological Factors Influencing Consumer Behaviour- A Detailed Study of the Concepts, Theories and Principles of Perception, Learning, Motivation, Personality & Self Concept and Attitude and their Marketing Implications.

Group Influences on Consumer Behaviour- A Detailed Study of the Influences of Family and Reference Groups and their Marketing Implications. Impact of Culture, Subculture and Social Class on Consumer Behaviour

Communicating with Consumers- A Study of the Concepts of Opinion Leadership and Diffusion of Innovation along with their Marketing Implications. Industrial Buying Behaviour, Consumer Behaviour Audit.

- 1. Schiffman, LG and LL Kanuk, Consumer Behaviour, Pearson Education
- 2. Blackwell, RD, PW Miniard and JF Angel, Consumer Behaviour, Cengage Learning India Pvt. Ltd.
- 3. Peter, JP and JC Olson, Consumer Behaviour and Marketing Strategy, McGraw Hill.
- 4. Handerson, S, Consumer Behaviour in Theory and Action, John Wiley and Sons.
- 5. Assel,H: Consumer Behaviour- A Strategic Approach, Houghton Miffin.
- 6. Loudon and A Della, Consumer Behaviour, Tata McGraw Hill.
- 7. Hawkins, DL, DL Mothersbaugh and Amit Mookerjee, Consumer Behaviour: Building Marketing Strategy, Tata McGraw Hill Education Pvt. Ltd., 11th Edition.
- 8. Solomon, Michael R, Consumer Behaviour, Prentice Hall, 10th Edition, 2012.

MM-305: Strategic Brand Management

Max. Marks:

100

External: 70 Internal: 30 Time 3 Hour

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Brand- Definition, Evolution of Brands, Functions of Brand, Branding challenges and opportunities; brand name decisions; Brand Value: Definition, Core Brand values. Value creation, Porter's value chain; Customer-based brand equity: Building strong brands and creating customer value

Brand personality: Dimensions of brand personality, process of personality creation; brand protection; Brand equity and brand image- Defining brand equity, Brand image constellation and brand image dimensions; Brand extension decisions- line extension, line extension trap, brand extension causes and types, brand extendibility.

Brand Identity- Concept, levels and perspectives of brand identity, Brand identity prism; Brand positioning - Meaning, Point of parity & Point of difference, Positioning guidelines and re-launch

Managing the brands over time- Functional brands, symbolic brands, experiential brands, concept management, forces affecting brands, brands revitalization and brand elimination; Brand Valuation- Meaning, approaches of brand valuation; cost based approach, market based approach, royalty approach, discounted cash flow approach, interbrand approach, Choosing the valuation method; Building global brands-Standardization and customization, global brand strategy, building global customer-based brand equity.

- 1. Keller, Kevin Lane, Parameswaran and Jacob : Strategic Brand Management, Pearson, 1998.
- 2. Harsh V Verma: Brand Management: text and cases, Excel Books, 2008.
- 3. S. A. Chunawalla: Compendium of Brand Management, Himalaya Publishing House 2009.
- 4. Kapferer, J N. : Strategic Brand Management, New York, Free Press, 2012.
- 5. Elliot R. and Percy L. :Strategic Brand Management, Oxford University Press, 2009.

MM-306: Digital and Social Media Marketing

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Evolution of digital marketing-The digital consumer & communities online-Digital marketing landscape-Search Engine Marketing-PPC and Online Advertising-Social Media Marketing-Social Media Strategy & Customer engagement-Affiliate marketing & strategic partnerships-Email marketing-Content strategies-CRM & CX in digital marketing-Digital marketing, data, and analytics-Social listening-Web analytics-Social media analytics- Mobile Marketing-Integrating Digital and Social.-Media Strategies

- 1. Hanson, W and KirthiKalyanam, Internet Marketing and E-Commerce, Cengage Learning, 2015.
- 2. Mullen, J and D Daniels, E-Marketing- An Hour a Day, Sybex Publisher, First Edition.
- 3. Chaffey, Dave and Fiona Ellis Chadwick, Digital Marketing- Strategy, Implementation and Practice, Pearson Education Inc., 2012.
- 4. Kotler et. Al, Principles of Marketing, Pearson Education Inc., New Delhi, 13th Edition.
- 5. Kaufman, Era and Chris Hortan, Digital Marketing- Integrating Strategies and Tactics with Values, Routledge, 2014.
- 6. Ahuja, Vandana, Digital Marketing, Oxford University Press, First Edition.
- 7. Harvard Business Review, South Asia Edition, India today Group

SEMESTER-IV

MM-401: International Marketing

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

International Marketing: Definitions, nature, scope and benefits; reasons and motivations underlying International Trade and International Business; Domestic Marketing versus International Marketing; International marketing orientation- EPRG framework; Trade Barriers- Protectionism, Tariff and non-tariff barriers; basic modes for entry; Process of International Marketing;

Market segmentation- Basis, macro and micro segmentation; Target market strategies, positioning decisions,. International Marketing Planning- Process and framework of market planning; Selection process and strategies; Process of marketing Control. International Marketing Mix: International product policy and planning: International product mix, Product life cycle, product standardization and adaptation, and organization of product warranties and services.

Building brands for foreign markets, labeling and packaging decisions, International pricing decisions- pricing policies, the process of price setting, pricing decisions, Terms of payment in international transactions, dumping, counter trade, transfer pricing and grey marketing. International Distribution Decisions: International Distribution Channels, International distribution policy, selecting distribution channels; Communicating with the global world- Global advertising and culture, setting global advertising budget, Advertising standardization vs. adaptation, global media decisions, other means of communication; Global marketing and internet

- 1. Vern Terpestra and Ravi Sarthy : International Marketing, Thosmson.
- 2. Cateora, Graham and Salwan : International Marketing, Tata McGraw-Hill, 2008.
- 3. Kotabe, M. and andHelsen, K. : Global Marketing Management, Wiley, 2011.
- 4. R. L. Varshney and B. Bhattacharya : International Marketing; Sultan Chand Publication, N. Delhi.
- 5. SakOnkvisit and John Shaw : International Marketing (Analysis and Strategy), PHI, N. Delhi.
- 6. Rakesh Mohan Joshi: International Marketing, Oxford University Press.

MM-402: Business Marketing

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Business Marketing: Concept, Importance, Business versus Consumer Marketing, Nature of industrial demand, Reseller market; Understanding B2B Markets- Types of organizational Customers and their purchasing policies, Business products classification and marketing implications

Organizational buying Decisions- Objectives in organizational buying, Buy-phases in purchasing decision process, Buying situations, Buygrid framework; Buying centre roles and influencers; Models of business buyer behavior- Sheth model and Webster and Wind model; Assessing business opportunities- Role of marketing research, research objectives and process in B2B markets.

Segmenting the business markets and evaluating the potential segments, Target Marketing and Product Positioning. Industrial Product Decisions- Product development strategy, Developing business products, product revitalization or elimination; Product pricing- Pricing objectives, costs in industrial pricing, pricing methods, transfer pricing, geographic pricing, leasing; Business marketing logistics and physical distribution, Designing communication strategies for business markets.

- 1. Reader Robert R. Industrial Marketing Analysis, Planning and control Englewood Cliffs, New Jersey, Prentice Hal Inc.
- 2. Vitale; Business to Business Marketing; Thomson Learning, Mumbai.
- 3. Havalder Krishna K, Industrial Marketing, TMH, New Delhi.
- 4. Corey E Raymond, Industrial Marketing: Cases and concepts,. Englewood cliffs, New Jersey Prentice Hall Inc.
- 5. Hill, Richard Industrial Marketing. Homewood Illinois, Richard D. Irwin
- 6. Webster, FE. Industrial Marketing Strategy, New York John Wiley
- 7. Alexender S. Ralph cross Industrial Marketing.
- 8. Reeder Robert R., "Industrial Marketing" PHI.
- 9. M.Govindarajan" Industrial Marketing Management" Vikas Publishing House.

MM-403: Service Marketing

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Services and The Economy- The growing influence of services in the economies of the countries around the globe. Services and the Indian Economy: Contribution and Reasons for Growth of Services in India.

Services and It's Marketing- Unique Characteristics of Services and Problems Associated with Services Marketing on Account of these. Overcoming Challenges Associated with Services Marketing. Goods-Service Categorisation. Types of Services-Core and Supplementary.

Service Marketing Environment and Mix- Prominent Environmental Factors Influencing Service Marketing. A Bird's Eye-View of Service Marketing Mix- Product, Price, Place, Promotion, Process, People, Physical Evidence and Productivity.

Service Management Triangle- An Introduction to the Concept and its Variants viz. Internal Marketing, External Marketing and Interactive Marketing.

Service Quality, Productivity and Recovery- Service Quality- Prominent Models. Service Productivity- Measurement and Productivity Enhancement Strategies. Relationship between Service Quality and Productivity. Service Recovery- Significance. Recovery Techniques.

Service Value Enhancement- Service Differentiation- Significance and Techniques. Service Positioning- Ways. Relationship Marketing- Significance and Tools.

- 1. Zeithaml, V.A, D.D Gremler, M.J Bitner and A Pandit, Services Marketing, Tata McGraw Hill, 4th Special Indian Edition.
- 2. Hoffman, K.D and JEG Bateson, Marketing of Services, Cengage Learning, Indian Edition.
- 3. Lovelock, Christopher, Services Marketing, Pearson Education, 7th Edition.
- 4. Woodruff, H.E, Services marketing, Longman Group.
- 5. Payne, D, The Essence of Services Marketing, Prentice Hall of India.
- 6. Verma, Harsh V, Services Marketing- Text and Cases, Pearson Education.
- 7. Kotler, Philip and Gary Armstrong, Principles of Marketing, Prentice Hall of India. Journal of Services Marketing, Emerald Publications

MM-404: Strategic Marketing

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course contents:

Strategic Marketing-Meaning, Nature and Historical Perspective, Strategic Marketing v/s Marketing Management, Process of Strategic Marketing Planning; Strategic choices and decisions at corporate level, SBU level- Generic competitive strategies- Cost Leadership Strategy, Differentiation Strategy, Focused Strategy, and functional level; Customer Analysis- Process and a Study of Key Factors Pertaining to the Analysis of Individual Customers and Organisational Customers; Competitor Analysis- Rationale and Process. Types of Competitors- Market Leaders, Market Challengers, Market Followers and Market Nichers. An Overview of the Strategic Options Available to Various Types of Competitors; Market Analysis- Dimensions and Process; Environmental and Internal Analysis; An Overview of Alternative Strategies: Product- Market Strategies- Market Penetration Strategy, Market Development Strategy, Product Development Strategy and Diversification Strategy, Global Strategies, Preemptive Moves, Obtaining Sustainable Competitive Advantage. Role of Portfolio Analysis in Strategic Choice- BCG Matrix, GE 9 Cell Model, Shell Directional Policy Matrix; Implementing Marketing Strategies- The Role of Structure, Systems, People and Culture; Evaluation and Control of Marketing Strategy- Rationale and Techniques- Annual Plan Control, Profitability Control, Efficiency Control and Strategic Control.

- 1. Aaker, David A, Strategic Market Management, Wiley Publications
- 2. Kerin, R A and R A Peterson, Strategic Marketing Problems, Pearson Education
- 3. Cravens, W and Nigel F Piercy, Strategic Marketing, McGraw-Hill Publications, Indian Edition.
- 4. Walker, B and Mullins Larrech, Marketing Strategy, McGraw Hills Publications, Indian Edition.
- 5. Jain, S C, Marketing Strategy- Planning, Implementation and Control, Cengage Learning, India Edition.
- 6. Kotler, P and Kevin L Keller, Marketing Management, Prentice Hall India

MM-405: Rural and Agribusiness Marketing

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Rural Marketing- Definition, Nature and Scope. Rural Markets- characteristics, importance and challenges & potential in rural markets. Rural Marketing environment. Understanding rural consumers- buying behavior models, factors affecting consumer behavior, buying process. Rural Markets and STP(Segmenting, Targeting and Positioning).Rural Marketing Mix: Product strategy- product concepts and classification, new product development, product life cycle, packaging and branding in rural India. Pricing strategy- objectives, factors affecting pricing, methods of pricing. Communication strategy- objectives, methods and challenges in rural communication. Rural Distribution strategy- distribution channels and organizing personal selling in rural markets. Role of IT in rural marketing(e-Choupals).

Agribusiness Marketing; concept, process and functions, types of agribusiness markets, problems of agribusiness marketing, Role of Central and State Governments Institutions and organizations in agribusiness marketing. Agribusiness marketing mix. Role of IT in agribusiness marketing.

- 1. Balram Dogra and Karminder Ghuman: Rural Marketing-Concepts& Practices, Tata McGraw-Hill Publishing Company Ltd.
- 2. Awadhesh Kumar Singh and Satyaprakash Pandey: Rural Marketing-Indian Perspective, New Age International (P) limited Publishers.
- 3. Pradeep Kashyap and Siddhartha Raut: The Rural Marketing, Biztantra
- 4. C.S.G Krishnamacharyulu and Lalitha Ramkrishnan: Rural Marketing- Text & Cases, Pearson Education Asia.
- 5. K.S.Habeeb-Ur-Rahman: Rural Marketing In India, Himalaya Publishing House.
- 6. Ramkishen. Y: New Perspectives In Rural and Agricultural Marketing, Jaico Publishing House.
- 7. T.P.Gopalaswamy: Rural Marketing, Vikas Publishing House Pvt. Ltd.

MM-406: Retail and Mall Management

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Retailing – Meaning, Nature and Importance of Retailing in India. Trends & Issues in organized Retailing in India. Retail Buying Behavior.

Store Location - Factors influencing Store Location and procedure of store location.

Designing Store layout. Issues in Retail Pricing. Retail Promotion Strategies. Trends in retailing – CRM, Role of IT and Non-store Retailing.

Shopping Malls – Concept and trends in India. Types of Malls. Strategic Planning for Malls. Mall design, Strategic Financial issues and recovery Management in Malls. HR issues in Mall Management. Mall Marketing Strategies. Measuring Mall Performance.

Suggested Readings:

1. Roger Cox and Paul Brittain: Retailing- An Introduction, Pearson Education.

2. Barry Berman and Joel R. Evans: Retail Management- A Strategic Approach, Pearson Education.

3. Swapna Pradhan: Retailing Management- Text & Cases, The McGraw-Hill Companies.

4. Michael Levy, Barton A Weitz and Ajay Pandit: Retailing Management, TheMcGraw-Hill Companies.

5. Arif Sheikh and Kaneez Fatima: Retail Management, Himalaya Publishing House.

6. Chetan Bajaj, RajnishTuli and Nidhi Srivastava: Retail Management, OxfordUniversityPress.

7. Abhijit Das, Mall Management with Case Studies: Taxmann's Allied Services.

8. Harvinder Singh, Srini R. Srinivasan: Mall Management, The Tata McGraw-Hill Companies.

SEMESTER-III HUMAN RESOURCE MANAGEMENT

HRM-301: HRD: Systems & Strategies

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions. **Objectives:** The purpose of this paper is to facilitate and understanding of the concepts methods and strategies for HRD.

Course Contents:

HRD Introduction- Concept, Goals/Objectives, Scope, Principles, Challenges, HRD Process. Changing paradigm of HRD; HRD culture and climate; Global perspectives on HRD.

HRD Frameworks: Rao and Pareek's Intergrated framework, The strategic HR Framework Approach, The integrative framework, Human Capital Appraisal Approach, HRD Score card approach, P-CMM Approach.

HRD Sub-systems- Performance Management, Potential Appraisal Training & Development, Career Planning, Succession Planning, Quality Circles. Quality of Work Life, Feedback , HRD Audit, OD Interventions. Contribution of sub-systems to HRD goals.

Designing of HRD System: Principles in designing HRD system.

Organizing of HRD Function: Structure and Organisation of HRD and its functions. Role of HRD Managers, Competencies of HRD Professionals, Challenges of future HRD professionals.

Developing HRD strategies: HRD for Workers, HRD for other special groups;; HRD strategies for coping with Organizational Change, HRD in M&A, Technology and HRD

HRD Practices in Organisations: HRD Practices in Government, Manufacturing ,

Service Sector Organisations and MNCs

Recent Trends of HRD in India

- 1. Dayal, Ishwar: Successful Application of HRD, New concepts, New Delhi. 1996.
- 2. DayalIshwar: Designing HRD Systems, Concept, New Delhi, 1993.
- 3. Gupta Santosh & Deep Sachin Gupta: Human Resource Development,2nd Ed. 2008,Deep and Deep Publications.

- 4. Kohli, Uddesh& Sinha, Dharni P.: HRD Global Challanges& Strategies in 2000, AD ISTD, New Delhi. 1995.
- 5. Krishnaveni, R.: Human Resource Development: A Researcher's Perspective, Excel books, 2008
- 6. Kaushal H.: Human Resource Development, McMillan.

HRM-302: Indian Labour Legislation

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The course is designed to assist the students in understanding the legislature related to business activities.

Course Contents:

Introduction: Labour Legislations: Nature, Objectives, Need, Importance Classification/Types of Labour Legislation; Principles of Modern Labour Legislation; Factors Influencing Labour Legislations; Indian Constitution and Labour Legislation. Jurisprudence : meaning and scope of Industrial Jurisprudence, Principles of Industrial Adjudication; Lacunae/Problems in Labour Laws, Approaches to enforcement of law

The Regulative & Protective Labour Legislations: The Trade Unions Act, 1926; The Industrial Disputes Act, 1947, The Industrial Employment (Standing Orders) Act, 1946, The Factories Act, 1948.

Wage-Related Labour Legislations: The Payment of Wages Act, 1936, The Minimum Wages Act, 1948, The Payment of Bonus Act, 1965, The Equal Remuneration Act, 1976. **Social Security Labour Legislations**: The Workmen's Compensation Act, 1923, The Employees' State Insurance Act, 1948, The Employees PF and Miscellaneous Provisions Act, 1952, The Maternity Benefit Act, 1961, The Payment of Gratuity Act, 1972.

Laws Relating to Protection of Child Labour, Contract Labour and Women at Workplace: Major Legal Provisions of The Contract Labour (Regulation and Abolition) Act, 1970 & The Child Labour (Prohibition and Regulation) Act, 1986. Sexual Harassment at Workplace: Meaning and definition, Legal Analysis, Judicial View, International Norms, National Norms, Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013;

Contemporary Issues: Need of Labour Law Reforms, New proposed Labour Codes; Govt , trade unions , employer and employees perspective towards new proposed labour reforms. Gender Justice: Constitutional Aspects, Legal Aspects.

Important Case Laws

Suggested Readings:

- 1. S. C. Srivastav, Industrial and LabourLaws, Vikas Publishing Houses.
- 2. Malik, P.L., Industrial Law; Eastern Book Company, Lucknow.
- Goswami, V.G., Labour and Industrial Relations Law, Central Law Agency, Allahabad.
- 4. Sharma, A.M., Industrial Jurisprudence, Himala Pub. House, New Delhi.
- 5. Mishra P.N., Labour and Industrial Laws, Central Law Publishing, Allahabad.
- Sinha, P.R.N., Industrial Relations and Labour Legislations, Oxford and IBH Publishing Co., New Delhi.

Journals:

- 1. Labour Law Reporter.
- 2. Labour Law Journal.

HRM-303: Management of Industrial Relations

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: Organizational efficiency and performance are intricately interlinked with industrial relations. This course is an attempt to appreciate the conceptual aspects of industrial relations at the macro and micro levels. Management Industrial Relations

Course Contents:

Introduction to IR: Concept, Nature, Objectives, Significance & Factors of Industrial Relations and Approaches/ Models of IR- Unitarist, Pluralist, Dunlop's and Marxist perspectives of IR; Industrial Relations System in India. Industrial Disputes in India: Meaning, Difference between Industrial Disputes and Industrial conflict, Forms of Industrial Disputes, Impact of Industrial Disputes, Prevention and settlement of industrial disputes: Statutory and Non-Statutory Measures, Disputes settlement Machineries stipulated in Industrial Disputes Act 1947. Trade Unionism, Collective Bargaining and Negotiation: Concept, Functions of Trade Unions– Types of Trade Unions-Problems of Trade Unions in India. Trade union act 1926, Collective Bargaining: Concept, Principles, Forms of Collective Bargaining, Theories of Collective Bargaining, Collective bargaining in Practice, Case studies. Negotiation - Effective negotiation, Current trends, issues and practices in Negotiation in Indian Industries.

Employee Discipline: Concept of Discipline, Aspects & Objectives, Causes of Indiscipline, Types, Approaches to deal with Indiscipline activities: Traditional Approach, Judicial Approach, Humanistic Approach, Hot Stove Approach, HRD Approach. Essential of Good Disciplinary System. **Employee Grievance**: Concept and Causes of Grievances, Sources of Grievance, Grievance Redressal Machinery, Grievance Procedure. Regulation of Industrial Relations in India Tripartite Bodies. **Worker's Participation in Management**: Concept, Origin, Growth and Forms of Workers' Participation in India, Effective Workers' International Labour organization (ILO) and industrial relations, **Contemporary Issues and Recent Trends** in Industrial Relations in India

Suggested Readings

1	Venkataratnam	Industrial Relations, Oxford University Press.2009
2	Sinha, P.R.N. et. al	Industrial Relations, Trade Unions, and Labour Legislation.
		Pearson Education. 2009
3	Blyton, P. &	The Dynamics of Employee Relations. Palgrave Macmillan.
	Turnbull, P.	2004
4	Ackers, P. &	Understanding Work & Employment: Industrial Relations in
	Wilkinson, A.	Transition. Oxford: Oxford University Press. 2003
5	Padhi, P.K.	Labor and Industrial Laws. Prentice Hall of India.2010
6	Singh, B.D.	Industrial Relations: Emerging Paradigms. Excel Books. 2009
7	Sen, R.	Industrial Relations: Text and Cases. Macmillan India. 2009
8	Arun,Monoppa	Industrial relations &labour laws, Tata Mc Graw Hill ,Delhi
9 P.N.Singh&Neeraj Kumar		Employee relations management, Pearson, Delhi

The list of cases and specific references including recent articles will be announced in the class.

HRM-304: Human Resource Metrics and Analytics

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Objective: The objective of this course is to develop an understanding of the HR Practices techniques and their role in enchasing the competitiveness of the workforce.

Course Contents:

Introduction to HR Analytics: Concept, Perspectives, Evolution. Need of HR Analytics, Changing HR Dynamics. Analytic Capabilities, Analytic Value Chain, Application of HR Analytics. HR Metrics; HR Scorecard; HR Benchmarking.

Preparation for HR Analytics: Review existing HR Analytics Frameworks and HR Models, Identify the Purpose/Aims and Scope of Analytics, Devise Methodology for using it, preparing for an analytics Unit, Develop Analytics Culture

Requirements for HR Analytics: Engaging with Stakeholders, Work with Consultants and Coaches, Technological Know-how, Build Analytics Team, Involvement of Consultant and Coaches.

Understanding Data: Data Quality, Data Types, Data Governance, Resolving Data Issues: Efficiency Measures, Effectiveness Measures and Business Outcome Measures.

Developing Analytics Culture: Importance of Leadership; Overcoming Resistance to HR Analytics; Communicate with Storytelling and Visualisation.

Execution & Reporting: Determining the Key Performance Indicators; Analyse and Report the Data; Relationships, Optimisation and Predictive Analytics; Interpreting the Results,

Analysis for Insights: Use of Trend Analysis, Regression, Correlation, Benchmarking, Workforce Modelling, Structural Equation Modelling for predictive analysis.

Future of HR Analytics: New Opportunities & Challenges for HR in Future, Emerging Data Sources, Evolving Technology.

- 1. Gene Pease, Boyce Byerly and Jac Fitz-enz, Human Capital Analytics: How to Harness the Potential of Your Organization's Greatest Asset, John Wiley & Sons.
- 2. HR Analytics: The What, Why and How, Tracey Smith. WILEY & SAS Business)
- 3. HR Analytics: Understanding Theories and Applications, Dipak Kumar Bhattacharyya

HRM-305: Compensation & Reward Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The course is designed to promote understanding of issues related to the compensation or rewarding human resources in the corporate sector, public services and other forms of organizations and to impart skills in designing, analyzing and restructuring reward management systems, policies and strategies.

Course Contents:

Compensation Management **Introduct**ion: Concept, Goals, Theoretical Foundations of Compensation Management: Economic and behavioural theories. Internal and External Equity in Compensation System. Wage Differentials: Inter and Intra industry Wage Differentials.

Reward Management: Concept, Aims, Components of Reward system: Monetary & Non-Monetary Rewards, Role of Reward in organisation, Strategic perspectives of Reward. Recent Development in Rewards and Recognition.

Understanding Compensation Packages: Designing Pay Level, Pay Mix and Pay Structures Compensation of Chief Executives, Senior Managers, R & D Staff, Board of Director, Sales Executives.

Incentive Schemes/ Payment –By-Results (PBR), Performance Linked Compensation, Incentives Plans; Fringe Benefits and Supplementary Compensation: Cafeteria Plans, Pensions Schemes and ESOPs

Tax Planning: Tax Implication of Employee Compensation Package to the Employer;

Strategies to deal with the Workforce Redundancy.

Statutory provisions governing different components of reward systems: The Minimum Wages Act, 1948, The Payment of Wages Act, 1936, The Workmen's Compensation Act, 1923, Payment of Bonus Act, 1965.

Institutions related to Reward System: Wage Boards, Pay commissions, Recommendations of 6th Pay Commission, Recommendations of 2nd National Commission on Labour relating to Compensation.

International Compensation Practices: Problems, Objectives and Elements of Expatriate's Compensation Package.

1	Armstrong, Michel and	Reward Management. Kogan Page, 2010
	Murlis, Helen.	
2	Henderson, Richard I.	Compensation Management: Rewarding Performance
		Prentice Hall of India Pvt. Ltd, 2004
3	Milkovich& Newman	Compensation: Tata McGraw Hill, New Delhi, Eighth
		Edition. 2005
4	Henderson I. Richard	Compensation management in a knowledge based world,
		10(894)

5	Singh, B.D.	Pearson Education, New Delhi, 9 th edition Compensation and Reward Management. Excel Books, 2007
6	Gerhart, B. &Rynes,	Compensation, Evidence, and Strategic Implications. Sage
	S.L.	Publication,2008
7	Berger & Berger.	The Compensation Handbook: A State-of -the -Art Guide
		to Compensation Strategyand Design. McGraw Hill, 2008
8	Martocchio, J.	Strategic Compensation: A Human Resource Perspective Approach. Pearson Education. 2004

HRM-306: Talent Acquisition and Performance Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to provide a comprehensive conceptual and practical insight in to the entire cycle of performance management, including performance planning, measurement, evaluation, feedback and potential assessment. The course also shall dwell in to designing performance management system, including evaluation forms, and identifying interventions related to problems and ethical issues in performance management.

Course Contents:

Conceptual Framework of Performance Management; Approaches for defining performance; **Performance Measurement**: classification of measures /metrics: types of metrics, characteristics of performance metrics and managing metrics, approaches to measuring organization performance : Balanced scorecard, European foundation for quality management (EFQM) model, Economic value added (EVA) model and traditional financial measures; Key Indicators for measuring Financial Performance and Non-Financial Performance analysis; Job analysis in performance management system

;Performance Appraisal and Potential Evaluation: Meaning,features,methods,appraisal forms and formats, Features of potential appraisal , indicators of potential /Qualities, steps in potential appraisal ; Performance management and Develpoment:Personal development plan(PDP), 360 degree feedback and BARS as development tool ; Performance management and Pay ; Performance management for teams ; Performance Evaluation; Performance problem solving:Overview of performance problems , managing underperformers , handling problems at performance review meeting ; Ethical issues and dilemmas in Performance Management; Performance Management in Multinational Corporations.

Talent Management: Basics of Talent Management, leveraging talent, talent value chain, elements of talent friendly organizations, talent management process, Talent Management System - Components andbenefits of Talent Management System; creating TMS, challenges of TMSTalent Planning - Concept, succession management process, Integrating succession planningand career planning, designing succession planning program, talent development budget, contingency planfor talent; building a reservoir of

talent Developing and Retaining Talent - Potential identification and development, integrating coaching, employee retention- motivation and engagement, Return on talent; making outplacement as a part of talent strategy, developing talent management information system.

- 1. Aguinis, H. (2008). Performance management (2nd ed.). USA: John Wiley.
- 2. Armstrong, M. (2007). Performance management: key strategies and practical guidelines (3rd ed.). London: Kogan
- 3. Niven, P. R. (2008). Balanced scorecard step-by-step: maximizing performance and maintaining results (2nd ed.). New Jersey: John Wiley.
- 4. Rao, T. V. (2004). Performance management and appraisal systems. New Delhi: Response.
- 5. Armstrong, M. and Baron (2012) Performance Management : A strategic and integrated approach to achieve success , JAICO publication (11th edition)
- 6. SomuendraNarain(2013), Performance Mnagement, Cengage learing publication (2nd edition)

SEMESTER-IV

HRM-401: Group Dynamics and Leadership Excellence

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: This course offers to teach students the importance of raising groups, leadership and turning them into passionate teams in organizations. It gives an understanding of how individuals as team member and as an effective leader must behave to sustain teams

Course Contents:

Nature of Groups at Work: Definition, Types of groups, Dynamics of group formation, Models, Group Decision making Techniques: Delphi Technique; Nominal Group Technique; Traditional Brain Storming; Electronic Brain Storming. Negative Brain Storming **Workgroup Vs. Teams**: Transforming Groups into Teams, Stages of Team Building and its Behavioral Dynamics; **Interpersonal Competence & Team Effectiveness:** Measuring Interpersonal Competence FIRO-B. Context; Goals; Team Size; Team Member Roles and Diversity; Group Dynamics: Norms, Cohesiveness, conformity, polarization, obedience, group shift and group think; Transactional analysis & Johari window helping process ; Team Effectiveness and influencing factors of team effectiveness. Role of Interpersonal Competence in Team Building; **Developing Collaboration in Teams:** Functional and Dysfunctional Cooperation and Competition; Interventions to build Collaboration in Organizations; Social Loafing, Social facilitation, Synergy in Teams, Self-Managed Teams and Interpersonal Trust; **Communication and Creativity**: Communication Process; Communication Effectiveness & Feedback; Fostering Team Creativity;

Leadership- Leader v/s manager- Leadership styles, Concepts, Theories and Styles: Trait, Behavioral and situational; Transactional and Transformational Leaderships, Leadership effectiveness, effective leadership communication;

- 1. Robbins, S. P. (2004). Organizational Behavior. Pearson Education.
- 2. Luthans, F. (2002). Organizational Behavior. McGraw-Hill International Edition.
- 3. Pareek, Udai. (2004). Understanding Organizational Behaviour. Oxford University Press.
- 4. Kolb, D. (1991) Organizational Behaviour: An Experiential Approach. 5th ed. Englewood Cliffs, New Jersey, Prentice Hall Inc.,
- 5. Moore, MD, (1988) Inside Organizations: Understanding the Human Dimensions London, Sage
- 6. Clifford T Morgan, Richard A King, John R Weiz, John Schopler (2009) Introduction to Psychology, Tata MC Graw Hill,
- 7. R.K.Sahu (2010), Group Dynamics & Team Building, Excel Books,

HRM-402: Strategic Human Resource Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note:The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course is to develop the perspective of strategic human resource management. The students should be able to distinguish the strategic approach to human resources from the traditional functional approach. In addition to this they understand the relationship of HR strategy with overall corporate strategy and strategic role of specific HR systems.

Course Contents:

Business Strategy and Organisational Capability; Strategic Human Resource Management; Meaning, Nature, Aims, Significance Conceptual Framework; SHRM Approaches & Models: Universalistic, Contingency and Configurational Approaches, Models, Best Fit and Best Practice Approach, Resource- Based view of the firm. The Strategic role of HR; Need of Aligning HR with Corporate Strategy; HRM Strategy: Its Nature, Development of HR Strategy and Delivering/Implementation of HR Strategy; HRM strategies related to Organizational Capability and Organizational and **Individual performance**: Organization Development strategy, Human Capital Management Strategy, Knowledge Management strategy, Corporate Social Responsibility strategy, Organizational Performance strategy, Individual Performance Management strategy. HRM strategies dealing with specific aspects of HRM: Employee engagement strategy, Resourcing strategy, Talent management strategy, Learning and development strategy, Reward strategy, Employee relations strategy. International Perspective: Strategic international HRM; International HRM strategies. Contemporary Issues: Change, Restructuring and SHRM. Corporate Ethics, Values and SHRM. Diversity & SHRM. Competencies of HR Professional in a SHRM Scenario. Evaluating and Measuring the Impact of Strategic HRM–Overview and Approaches

- 1. Aggarwala, Tanuja. , Strategic Human Resource Management, Oxford University Press.
- 2. Armstrong, M., Strategic Human Resources Management, Kogan Page, London.6th Edition
- 3. Greer, Charles R., Strategic Human Resource Management A General Managerial Approach, Pearson Education (Singapore) Pte. Ltd, New Delhi.
- 4. Mabey, Christopher and Salaman, Graeme, Strategic Human Resource Management, Beacon, New Delhi.
- 5. Salaman, Graeme, Human Resource Strategies, Sage Publications, New Delhi.
- 6. Porter, Michael S., Competitive Advantage: Creating and Sustaining Superior Performance, Free Press, New York.
HRM-403: Cross Cultural and Global HRM

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to develop a diagnostic and conceptual undertaking of the cultural and related Behavioural variables in the Human Resource Management of global organizations.

Course Contents:

Core concepts in managing human resources in the global business environment; Human and Cultural Variables in Global Organisations; Cross Cultural Differences and Managerial Implications; Cultural diversity and role of values, Approaches to Understanding & Managing Cultural Diversity: achieve global model for cultural differences, Halls and Halls Cross cultural classification and Hofstede six key dimensions, cross cultural differences in communications.

The Contingency Matrix approach to GHRM. Global staffing and staff flow practices. Global organisation structures. Training & development of global employees. Performance management in MNCs. Global compensation practices. MNCs and industrial relations trends. International Labour Standards. International transfer and repatriation strategies, Corporate Social Responsibility in Global Scanario. Emerging global HRM practices.

Suggested Readings

1	Gupta, S.C.	International HRM, Macmillan India.2012.
2	Ray and French	International HRM, University Press, 2010
3	Bartlett, Cand Ghoshal,	Transnational Management: Text, Cases and Readings
	S.	in Cross Border Management. Chicago, Irwin, 1995.
4	Hofstede, G.	Cultures Consequence: International Differences in
		Work Related Values. London, Sage, 1984.
5	Mead, R.	International Management: Cross Cultural dimensions.
		BlackWell, Camb., Mass., 1994.
6	Evans, Pucik and	The Global Challenge- framework for international
	Barsoux,	human resource management, Tata McGraw-Hill Irwin.
7	Dowling, Peter J and	International Human Resource Management- Cengage
	Welch, Denice E.,	Learning 2010
8	Aswathappa, K	International Human Resource Management, McGraw
		Hill 2009
9	Tayeb, Monir H.	International Human Resource Management, Oxford
		University Press - 2005
10	Rao, P.L.	International Human resource Management, Excel
		Books, 2009

The list of cases and specific references including recent articles will be announced in the class.

HRM-404: Counselling, Mentoring and Negotiation Skills

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Counselling skills for managers: Definition, Approaches, Types, Values and Goals of Counselling, Counselling Process: Initial encounter with the client, Developing relationship, Problem Identification, Goal Setting, Plan of Action and its Implementation, Termination of Relationship and Follow-up, Guidelines for Effective Counselling. Referral Procedures, Role of Counsellor & Client in various stages, Key Characteristics, Skills, Qualities&Valuesfor a Professional Counsellor, Applications of Counselling Skills in Modern Organisations.

Performance Counselling: Meaning, Objectives and Process.Special Employee related Problems in Counselling.Counselling Therapies: Cognitive Therapy, Behavioural Therapy, Emotive Behaviour Therapy (REBT), Psychoanalytic Therapy, Person-Centered Therapy, Gestalt and Existential Therapy. Ethics in Counselling: Ethical Principles & codes of conduct for professional counselors.

Negotiation Skills for managers: Nature, Characteristics, Strategy and Tactics of Distributive Bargaining, Strategy and Tactics of Integrative Negotiation; Strategy and Planning for Negotiation., Best Practices in Negotiation – Fundamental Structure of negotiation and Best alternative to a negotiated agreement(BATNA)

Mentoring Skills for managers: Key Mentoring Skills, Stages of Formal Mentoring Relationships; Stage I: Building the Relationship, Stage II: Exchanging Information and Setting Goals, Stage III: Working towards Goals/Deepening the Engagement, Stage IV: Ending the Formal Mentoring Relationship and Planning for the Future.

Suggested Readings:

1	Singh, Kavita	Counselling Skills for Managers, Prentice Hall of India, Delhi,
2	Rao , S.	Counselling and Guidance, TMH, 2nd edition, 2007.
	Naranyan	
3	Mitchell and	Counselling and Guidance, Pearson Education India, 2007.
	Gibson	
4	Patterson, Lewis	The Counselling Process, Cengage Learning India.2008
5	Burnard	Counselling Skills Training, Kogan Page India.2009
6	Feltham and	Brief Counselling, Mcgraw Hill Publishing.2012.
	Dryden	
7	Kotler, Jeffrey	Counselling Theories and Practices, Cengage.2008
8	UdaiPareek	Understanding Organizational Behaviour., By Oxford, Second
		Edition Page 410-415
9	SL Rao	Negotiation Made Simple, , Excel Books pp.30-35 and pp. 196- 197)

The list of cases and specific references including recent articles will be announced in the class.

HRM-405: Change Management & Organisational Development

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The course intends to develop an orientation towards the change. It shall coach the students to be proactive towards a planned change. It details the relevant aspects of change that help the students understand the importance of managing change.

Course Contents:

Organization Change: Introduction to Organization Change. Nature of Organization Change. Forces of change , types of organizational change , Resistance to Change at individual and organizational level ; **Organizational Problem Diagnosis**: Introduction to Problem Diagnosis, The Diagnostic Cycle, Phases of Problem Diagnosis; **Models of Organizational Change**: Introduction to Models of Organizational Change, Lewin Model of Organization change, McKinsey 7 S Model, Kotter's Model ,Burke - LitwinModel,Work Redesign Model, ADKAR Model, Bridges' Transition Model and Grief Model; **Organization Development**: Concept, Nature and Scope of O.D.;Process of O.D.;Underlying Assumptions &Values; Foundations of OD: Action Research, Survey Feedback, Systems Theory, Participation And Empowerment; **O.D. Interventions** : Team Interventions, Inter – group Interventions, Personal , Interpersonal and group process interventions, Structural Interventions; Assessment of O.D Implementation – conditions for failure and success in O.D. Efforts.

Suggested Readings:

1) Organization Development: Interventions and Strategies by T. V. Rao, T. Venkateswara Rao, T.V. Rao

2) Organisational Development And Change By Cummings And Worley (7th Edition)

3) Organisational Development By French And Bell (6th Edition)

HRM-406: Competency Mapping & Assessment Centres

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hour

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Competency: Concept and definition of competency, Characteristics of competency, Competency versus competence, Performance versus competency; skills versus competency, behavior indicators, History of competency, Types of competencies generic/specific, threshold/performance, and differentiating and technical, managerial and human, competency culture: Context and Relevance of competencies in modern organizations **Competency mapping** : Frame work of competency mapping, approaches of competency mapping, **process of competencymapping**: preparing organization for competency mapping, identifying jobs/function for competency mapping, setting performance effectiveness criteria, identification, listing, classification and arranging competencies, competency modeling : phases of competency model, classification of competency models ,iceberg's model of competency, resistance and recommendations related implementation of competency model, competency Assessment : perquisites for competency assessment, process of competency assessment, competency based HRM applications : competency based recruitment and selection, training and development, compensation, performance management and career and succession planning system ,mapping challenges of competency based HRM, Advantages of competency based HRM.

Assessment centre: Requirement of assessment centre, Assessment centre Vs development centre, problems and challenges of assessment centre, Techniques used in assessment centre: MAP, MBTI, FIRO-B, SPIRO-M profile, 360 degree feedback.

- 1. The Handbook of Competency Mapping: Understanding, Designing and Implementing Competency Models in Organizations, SanghiSeema. Sage Publications Pvt. Ltd -2007
- 2. Competency based HRM Shermon, Ganesh. Tata Mc Graw Hill 2004
- 3. 360 degree feedback, competency mapping &assessment centers ,Sharma, Radha R. , Tata Mc Graw Hill 2003
- 4. Competency based Human resource management, Srinivas R. Kandula , PHI publications.

SEMESTER-III INTERNATIONAL BUSINESS

IB-301: International Accounting

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objectives of this course are to acquaint the students with the accounting needs of International Financial markets and to analyses the accounting measurement and reporting issues unique to Multinational Business Transactions.

Course Contents:

International dimensions of Accounting; Conceptual and Comparative Developments, International Accounting Standards: Concept and Mechanism of setting International Accounting Standards, disclosure requirements of International Accounting Standards, International Audit Environment.

Dimensions of Financial Reporting : Concept and Development of International Financial Reporting Standards(IFRS), Dimensions of IFRS.Types of Foreign Currency Transactions, Managing International Information system, Accounting for Inflationary Trends.

Analyzing Foreign Financial Statements : Accounting for Foreign Currency Translation, Accounting for Environmental Protection Measures. Concept and setting of Transfer Pricing.

- 1. V. Sharan : International Financial Management, New Delhi, Prentice Hall of India.
- 2. Hennie Van Greuning, World Bank :International Accounting Standards: A Practical Guide.
- 3. Lee H. Radebaugh, Sidney J. Gray, Ervin L. Black International accounting and multinational enterprises.
- 4. ShirinRathore: International Accounts, PHI.

IB-302 : Foreign Exchange Management

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To acquaint the students with the mechanism of the foreign exchange markets, measurements of the foreign exchange exposure and hedging against exposure risk.

Course Contents:

Types of Foreign Exchange markets and Transactions, methods of quoting Foreign Exchange rates, Spread, Official and Free Market Rates, Cross Currency Rates

Organization of Foreign exchange markets, Role of Derivatives in Currency Market

Quoting Forward Rates, Exchange Rate Determination in Forward Market, Trading Mechanism of Forward, Currency Futures : Trading and Settlement Procedure, Forward Vs Futures

Currency Options : Types, Hedging with Options, Option Pricing Model. Currency Swap and its Trading Mechanism

Foreign Exchange Risk and Exposure : Techniques for the Measurement and Management of Currency Risk and Exposure, parameters and constraints of Exposure Management.

Forecasting Exchange Rates : Techniques of forecasting Exchange Rates.

- 1. V. Sharan: International Financial Management, New Delhi, Prentice Hall of India.
- 2. S.L.Gupta: FinancialDerivatives.
- 3. MadhuVig: : International Financial Management.
- 4. Shapiro, Alan C: Multinational Financial Management, New Delhi, Prentice Hall of India.
- 5. David &Eiteman ,Arthru J Stonehill:, Michael H. Moffett: Multinational Business Finance, Pearson Education.

IB-303: Export-Import Procedures and Documentation

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The purpose of this course is to acquaint the students with policy, procedures and documentation relating to foreign trade operations, and to train them to handle the export-import business.

Course Contents:

Significance of Procedures and Documentation in International Trade, procedure and Documentation as Trade Barriers. WTO Provisions . Aligned Document System (ADS), Official machinery for Trade Procedure and Documentation; ITC (HS) classification system; Role of ICC, INCOTERMS; Nature of Export / Trading Houses, EDI and Documentation.

Main Export and Import Documents; Export Order Processing; export contract; Export Price Quotations; Shipping and Custom Clearance of Export and Import Cargo; Central Excise clearance; Role of Forwarding agents; Cargo Insurance and Claim Procedure.

Methods of Payments in International Trade; Documentary Collection of Export Bills; UCPDC Guidelines; Realisation of Export Proceeds- Provisions of RBI's Exchange Control Manual, FEMA- Origin and Objectives, Main Provision of FEMA. Pre Shipment and Post Shipment Finance. Role of EXIM Bank and ECGC in India.

Major Export Promotion Schemes in India- EPCG, Duty Exemption Scheme; DEPB Scheme

SIL; Facility for Deemed Exports; Export Promoting Institutions (EoU's/ EPZs/ SEZ's) – Role of Export Promotion Councils, Commodity Boards and ITPO.

- 1. Paras Ram: Export: What Where and How, Delhi, Anupam Publication.
- 2. Ministry of Commerce, Handbook of Procedures, Government of India, New Delhi.
- 3. Ministry of Commerce, Import Export Policy, Government of India, New Delhi.
- 4. Custom and Excise Law, Various Issues.
- 5. Nabhi's Exporters Manual and Documentation.
- 6. Nabhi's New Import Export policy procedures.
- 7. PervinWadia: Export Markets and Foreign Trade Management, Manishka Publication, New Delhi.
- 8. M.D.Jitendra: Export Procedures and Documentations, Rajat Publications, Delhi

IB-304: India's Foreign Trade Policy

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To acquaint the students with recent trends in India's Foreign Trade, and Management and Policy related Issues in Foreign Trade in Global Context.

Course Contents:

India's Foreign trade in the Global context, structure and Equilibrium of India's Balance of Payments, Recent trends in India's foreign trade, Directional Pattern: Major export commodities- thrust area commodities- their trend, problems and prospects, Major import commodity Groups, Trade Regulation in India, Foreign trade (Development and Regulation) Act, Foreign Exchange Management, Present Export-Import Policy, Export Promotion Policies, EPCG, DEPB, Duty Draw Back Scheme, Export incentives, Financial and Fiscal, the Role of EXIM Bank of India, ECGC, Infrastructure support for Export promotion, Export Promotion Councils, Commodity Boards/Product Export Development Authorities, Specific Service Institutions, Role of State Trading Organizations, Export Processing Zones, Special Economic Zones, Agriculture Export Zones, Clusters, Export Oriented Units and Export Trading House Schemes, Impact of WTO on India's Trade Policy.

Suggested Readings:

1. Bhalla , V.K. International Business Environment and Management, 8thed, Delhi, Anmol, 2001.

2. Jain, S.K.: Export performance and Export Marketing Strategies, Commanwealth Pub., Delhi, 1988.

3. Export- Import Policy , Naleh Publications.

- 4. Paras Ram: Export: What Where and How, Delhi, Anupam Publication.
- 5. Bhattacharya B. : International Marketing Management, Subhash Chand & Sons.

IB-305: International Business Environment

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Objective: The objective of this course is to analyses the operational processes between two or more nations.

Course Contents:

Concept of IB : Nature & importance of International Business, forces of globalization, Modes of International Business. Cultural, Economic , Legal & Political environment faced by International Business. Theories: Adam Smith, Ricardo and Ohlin & Heckler theory, Leontif paradox, PLC. Government Influence on trade, Tarrif& Non-Tarrif barriers, Free trade zones. Bilateral and Multilateral Trade Laws – General Agreement on Trade and Tariffs, (GATT), World Trade Organization – IPR, TRIPS, TRIMS, GATS – Ministerial Conferences. Regional Economic Integrations: NAFTA, EU. International Business Strategies : Geographical, Collaborative & Control strategies, Foreign Exchange Basics: Purchasing Power Parity, Foreign Exchange Exposures (in Brief).External and Internal Sources of finance in International Business.

- 1. Sundram& Black: International Business Environment.
- 2. Francis Charulienum: International Business, Himalya Publishing House.
- 3. Daneil&Radobough: International Business, Pearson Publications.
- 4. S.ShivaRamu: International Business.
- 5. Taggart&Modermtt: International Business.
- 6. Ashwathappa, International Business Environment, Himalya Publishing House.

IB-306: International Logistics

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of this paper is to acquaint the students with the concept of Logistics as applied to International Business. The Various components of the International Logistic System would be studied so as to enable the students to take up an integrated logistic decision.

Course Contents:

Marketing Logistics: Concept, Objective and Scope, System Elements - Relevance of logistics in International Marketing International supply chain management and Logistics. Role of IT in logistics Transportation activity- Internal transportation, Inter state goods movement. Concept of customer service .

General Structure of Shipping, Characteristics, Linear and Tramp Operations, Code of Conduct for Linear Conference, Freight Structure and Practices, Chartering Principles and Practices

Developments in Ocean Transportation- Containerization, CFS and ICD, Dry Ports, Multi-Modal Transportation and CONCOR, Role of Intermediaries Including Freight Booking, Shipping Agents, C & F Agents, Ship Owner and Ship Consultation Arrangements, International Air transport: International Set up for Air Transport, Freight Rates, India's Export and Import by Air- Problems and Prospects, Port System and Sub-System: Port Organization and Management, Responsibilities of Port Trust: Growth and Status of Ports in India, Carriage of Goods-Legal Aspect.

Inventory Control and Warehousing: Inventory Management- Concepts and Application to International Marketing, Significance and Types of Warehousing Facilities, Total Cost Approach to Logistics

- 1. Annual reports of CONCOR.
- 2. Khanna, K.K., Physical Distribution, Himalaya Publishing, Delhi
- 3. Lambert, D et al, Strategic logistics Management, Tata Mc Graw Hill, New Delhi
- 4. Desai, H.P., Indian Shipping Perspectives, Anupam Publication, Delhi. Annual Reports INSA.

SEMESTER-IV

IB-401: International Financial Markets

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objectives of this course is to give students an in-depth knowledge of the working of International Financial Markets.

Course Contents:

Introduction to international financial system: Bretton wood Conference and afterwards.

Creation of European Monetary System: creation of Euro-dollar, Euro-banking and Eurocurrency Centers, syndicated Euro-Credits. Role of IMF, IBRD, IFC, BIS and International Centre for Settlement of Investment Disputes and Regional Developments Banks.

Introduction to International Financial Markets : International Capital Market Instruments and Institutions: International Equities, Euro-Bonds, Euro-Loans, GDR's, ADR's, IDR's

International Money Market Instruments and Institutions : Euro-Notes, Euro-Commercial Papers, Participatory Notes: Issues and Challenges.

Currency Market for lending and Investment: Currency Risk and Exposure, International Banking and Portfolio. Use of Global Markets for Hedging, Arbitrage and Speculations

- 1. Shapiro, Alan C : Multinational Financial Management, New Delhi, Prentice Hall of India
- 2. V. Sharan : International Financial Management, New Delhi, Prentice Hall of India
- 3. MadhuVig : : International Financial Management
- 4. Maurice D. Levi : International Finance, Tata Mcgraw Hill
- 5. David & Eiteman ,Arthru J Stonehill:,Michael H. Moffett: Multinational Business Finance, Pearson Education.

IB-402: International Marketing

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The basic objective of this course is to acquaint the students with environmental, procedural, institutional and decisional aspects of international marketing.

Course Contents:

International Marketing: Nature, scope and benefits; Reasons and Motivations underlying International Trade and International Business; Basic Modes for Entry; Process of International Marketing; Domestic Marketing versus International Marketing.

International Marketing Environment, WTO Framework and International Marketing; Factors Influencing International Market Selection and Segmentation, Selection Strategies. International Marketing Planning and Control.

International Marketing Mix: International product policy and planning International product mix, Branding, labeling, packaging and organization of product warranties and services. International pricing policies strategies, the process of price setting, pricing decisions, information for pricing decisions.

International Advertising: International Advertising Strategy, Elements of Advertising Strategy, Media Strategy. International Distribution Management: International Distribution Channels, International Distribution Policy, Selecting Distribution Channels.

- 1. Vern Terpestra and Ravi Sarthy : International Marketing, Thosmson.
- 2. Simon Majaro : International Marketing.
- 3. John, Fayerweather : International Marketing.
- 4. R. L. Varshney and B. Bhattacharya : International Marketing; Sultan Chand Publication, N. Delhi.
- 5. SakOnkvisit and John Shaw : International Marketing (Analysis and Strategy), PHI, New Delhi.

IB-403: International Financial Management

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Objective: The objective of this paper is to give students an overall view of the international financial system and how multinational corporations operate.

Course Contents:

Concept of International Financial Management, International flow of funds, Overview of Foreign Exchange Markets, International Investment Decisions – Foreign Direct Investment, International Portfolio Investment, International Capital Budgeting, Evaluation and Management of Political Risk. International Financing Decisions : Financial Choices for an MNC, Capital and Money Market Instruments. Multilateral Development Banks : World bank ,IFC, Asian Development Bank. Cost and Risk of financing. Management of Short form Funds: International Working Capital Management, Financing Foreign Trade, International Taxation.

- 1. A.C Shapiro: Multinational financial Management, Prentice- Hall, New Delhi.
- 2. V.Sharan : International Financial Management,
- 3. P.G Apte: International financial management, Tata McGraw –Hill.
- 4. Buckley: Multinational finance, Prentice- Hall of India , New Delhi.
- 5. Maurice D.Levi: International Finance, McGraw Hill, NY

IB-404: International Strategic Management

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The course aims at imparting the knowledge of Formulation, Implementation & Evaluation of business strategies in International Business.

Course Contents:

Nature and Dimensions of Inter National Strategic Management. Domestic versus International Strategic Management, Functions of International Strategic Planning. Pre requisites and Complexities of International Strategy.

Strategies for Foreign Market Entry and Penetration, Growth Strategy, International Business Integration, Strategy for Risk and Stability, Revival Strategies, Restructuring and Divestment.

Approach to Strategic Formulation: The Traditional approach, Modern Approaches-Gap analysis, Capital Investment Theory, ANSOFF, Adaptive Search Approach, Portfolio Approaches- Boston's Model, GE-McKinsey Model, Hofer's Model and Shell's Directional Policy Model, Comparative Strategy vis-à-vis Domestic Firms.

Strategy Implementation : Resource Allocation. Projects and Procedural Issues. Organisation Structure and Systems in Strategy Implementation, Leadership and Corporate Culture, Values. Ethics and Social Responsibility. Operational and Derived functional plans to implement strategy. Integration of Functional Plans. Organisational Systems and Techniques of Strategic Evaluation.

- 1. Dunning J. H (1988); Explaining International Production, Harper Collins, London;
- 2. Garpand, J & Farmer, R.N; International Permissions of Business Policy & Strategy, Kent Publishing Company, Boston ,Massachusettes
- 3. Ansoff, H.I; Corporate Strategy, McGraw Hill, London
- 4. Porter, M.E; Competitive Strategy, Free Press, NY.

IB-405: Cross Cultural and Global Management

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to develop a diagnostic & conceptual understanding of the cultural & related behavioural variables in the management of global organisations.

Course Contents:

Human and Cultural Variables in Global Organisations; Cross Cultural Differences and Managerial Implications; Cross Cultural Research Methodologies and Hofstede's Hermes Study; Structural Evolution of Global Organisations; Cross Cultural Leadership and Decision Making; Cross Cultural Communication and Negotiation; Human Resource Management in Global Organisations; Selection, Source, Selection Criteria for International Assignment; Compensation and Appraisal in Global Perspective, MNG and Compensation System. Ethics in International Business; Western and Eastern Management Thoughts in the Indian context.

- 1. Adler,NJ. International Dimensions of Organizational Behaviour. Boston, Kent Publishing, 1991.
- 2. Bartlett, CandGhoshal, S. TransnationalManagement: Text, Cases and Readings in Cross Border Management. Chicago, Irwin, 1995.
- 3. Dowling. P J. etc. International Dimensions of Human Resource Management 2nd ed. California, Wadsworth, 1994.
- 4. Hofstede, G. Cultures Consequence: International Differences in Work Related Values. London, Sage, 1984.
- 5. Marcic, D and Puffer, S M. Management International: Cases, Exercise and Readings. St. Paul, West Publishing, 1994.
- 6. Mead, R. International Management: Cross Cultural dimensions. BlackWell, Camb., Mass., 1994.
- 7. Mendenhall, M. etc., Global Management. Cambridge Massachusetts., Blackwell, 1995.

IB-406: Regional Economic Blocks

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course to familiarize the students with the theoretical framework of the theory of economic integration, and its impact on trade and investment flows among the region and on the global economy.

Course Contents:

Theory of Economic Integration, Economic Integration and endogenous Growth, Selected Regional Blocks – NAFTA, EU, ASEAN, SAARC, Globalisation Vs. Regionalization; Regional Blocks, Building Blocks or Stumbling Blocks: Ongoing Challenges- Environment Volatility. Rise of Global Mania; Regional Alternatives; Regional Competition; New Organizational Challenges.

- 1. Balassa, Bela: Theory of Economic Integration, London, George Allen & Unwin ltd, 1961.
- 2. Bhalla, V.K.: World economy in, 90s: A Portfolio Approach, Delhi, Anmol Pub. Pvt. Ltd.
- 3. Dreze, Jean and Sen, Aamrtya: Indian Development: Selected Regional Perspective, Delhi, Oxford University Press.
- 4. Jackson, J.: The World Trading system, Cambridge, Mass : MIT Press, 1994.
- 5. Krugman, Paul R. and Obstfeld, M.: International Economics, USA, Harper Collins Pub.
- 6. Machlup, F. A.: History of Thought on Economic Integration, London, Macmillan.

SEMESTER-III INFORMATION TECHNOLOGY

IT-301: Business Intelligence and Analytics

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of the course is to familiarize students to environment of Business intelligence, analytics and its requisite applications.

Course Contents:

Business Intelligence: Definition, concept and need for Business Intelligence, Data, information and knowledge, Role of Mathematical models

Business Analytics at the strategic level: Strategy and BA, Link between strategy and Business Analytics, BA supporting strategy at functional level, dialogue between strategy and BA functions, information as strategic resource

Business Analytics at Analytical level: Statistical data mining, descriptive Statistical methods, lists, reports, automated reports, hypothesis driven methods, data mining with target variables, cluster analysis, Discriminate Analysis, logistic regression, principal component analysis.

Business Analytics at Data Warehouse Level, designing physical database, Deploying and supporting DW/BI system

Business Intelligence Architectures: Cycle of Business Intelligence Analysis, Development of Business Intelligence System, spread sheets, concept of dashboard, OLAP, SOA, decision engineering.

BI Tools: Concept of dashboard. BI Applications in different domains-CRM, HR, Production

- 1. Decision Support and Business Intelligence Systems, Turban, Sharda, Delen, Pearson
- 2. Business Intelligence Success Factors Tools for aligning your business in the global economy by Olivia Parr Rud, John Wiley and sons, 2009
- 3. The Profit impact of Business Intelligence by Steve Williams and Nancy Williams, Morgan Kauffman Publishers, Elsevier, 2007
- 4. Business Intelligence: Practices, Technologies, and Management- Rajiv Sabherwal, Irma Becerra-Fernandez
- 5. Business Analytics for Managers: Taking Business Intelligence beyond reporting by GERT H.N. Laursen, JesperThorlund, Wiley and SAS BusinessSeries, 2010

IT-302: Enterprise Resource Planning

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course is to familiarize the students regarding the concepts and structure of ERP systems and imparts necessary managerial skills for ERP implementation in a business enterprise.

Course Contents:

Introduction: Basic issues, evolution of ERP, advantages, pitfalls, overview of an enterprise; ERP and related technologies: Business process reengineering, management information system, decision support system, executive information system, data warehousing, data mining, supply chain management.

Manufacturing perspective: CAD/CAM, material requirement planning (MRP-I), bill of material, manufacturing resource planning (MRP-II), distribution requirement planning, JIT approach.

ERP Modules: Introduction to ERP modules in Finance, Plant maintenance, quality management, materials management.

ERP Implementation: ERP lifecycle, vendors, consultants and users, ERP market, future directions and developments in ERP.

Suggested Readings:

1. Leon A., Enterprise Resource Planning, Tata McGraw Hill.

2. Ellen Monk, Bret Wagner, *Concepts in Enterprise Resource Planning*, Cengage Learning.

3. Motiwalla, Thompson, Enterprise Systems for Management, Pearson Education.

4. Wallace and Kremzar, *ERP: Making it Happen – The Implementers' Guide to Success with Enterprise Resource Planning*, John Wiley & Sons, Inc.

5. Sadagopan, S., ERP: A Managerial perspective. Tata McGraw Hill.

6. Garg, V. K. and Venket Krishna N. K., ERP Concepts and Practice, PHI Publication.

IT-303: Relational Database Management System

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective:The objective of the course is to familiarize the students with basic understanding of the RDBMS and SQL and the skills to make use of these in business organizations.

Course Contents:

RDBMS: Introduction - Database and DBMS Software, Three Layered Architecture, Advantages and Disadvantages of a Database, History Data Modeling-Object Oriented and Record Based models, E-R Model and E-R diagram Examples and Exercises, Hierarchical Model, Network Model and Relational Model; Normalisation techniques-First Normal Form Second Normal Form and the Third normal Form, Examples and Exercises, E.F. Codd"s 12 Rules for a relational Database; Database concepts-Transaction Management, Properties of a Transaction, Commit and Rollback, Concurrency, Locking, Access Control, Data Integrity, Integrity Constraints, Auditing, Backup and Recovery; Data Dictionary-System Catalogue Distributed Database and Distributed Data Access, Introduction to Client-Server and ODBC connectivity, SQL:SQL Language-DML commands-Selection, Insert, Update, Delete retrieving data, summarizing data, adding data to the database, updating data to the database and deleting data. Simple queries-Use of WHERE, Arithmetic comparison and logical operators, ORDER BY, GROUP BY and Group Functions. Multi table queries, Sub-queries. Views DDL Commands-Table and View, Create, Alter, Drop Integrity Constraints; Transaction Processing-Commit, Rollback, Savepoint, LAB: SQL and MS Access.

- 1. Coleman, Pat and Peter Dyson, IntemetsBSP Publications.
- 2. Keen, Pter and Mark McDonal, The e-Process Edge, Tata McGraw-Hill.
- 3. Oberoi, Sundeep, E-Security and You, Tata McGraw Hill.
- 4. Richart, Alberto Manual and Stephen Asbury Active Server Pages 3, IDG Books.
- 5. Rich Jason R., *Starting an E-Commerce Business* IDG Books.
- 6. Samantha Shurety, E-business with Net Commerce Addition, Wesley.
- 7. Schneider Robert D&J.R.Garbus, Optimizing SQL Server 7, Prentice-Hall

IT-304: E-Customer Relationship Management

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of the course is to familiarize the students with Electronic Customer Relationship Management (CRM) and its role in an enterprise

Course Contents:

Introduction: Knowledge Management, e-Business and CRM. The New Economy's New Face, How We Got Here. The Long-Winded Road. The New imperatives.

Understanding E-Business: CRM and KM, The New Digital Landscape, Getting Down to e-Business, Customer Relationship Management, Knowledge Management, Knowledge-Enabled Customer Relationship Management.

A Roadmap for Success: The Knowledge-Enabled Customer Relationship Management Roadmap Phase I: Evaluation and Strategic Alignment Phase II: Infrastructural Development and Development Phase III: Leadership, Change Management, Measurement and Refinement Aligning Strategy and Technology Choices: Getting Past the Innovator's Dilemma. The KCRM Strategic Framework. Analyzing the Business Environment. Understanding the Context Strategic Technology.

Audit and Analysis: Why Audit Customer Knowledge? Initiating the Audit. Reference Measures and Methodological Choices. The Audit Method. Documenting Customer Knowledge Assets Using the Audit Results to Drive KCRM.

Building an Implementation Team: Tasks and Expertise, Team Composition, Leadership, Risk Assessment and Common Pitfalls.

Blueprinting the Technology Infrastructure: Design Challenges. The Customer Lifecycle Customer Knowledge Management: Technology Framework. The KCRM Architecture, Integration, Long-Term Considerations.

Results-Driven Development and Deployment: Hidden Costs and other Surprises. An overview of Big-Bang, Systems Development Methods. Looking Beyond the Waterfall. Results driven Incremental.

Suggested Readings:

1. Alex Berson, Stephen Smith, Kurt Threarling; *Building Data Mining Applications for CRM*, Tata McGraw Hill

2. Michael J.A.Berry, *Data Mining Techniques: For Marketing, Sales and Customer Support* Gordon Linoff.

3. Michael J.A.Berry and Gordon Linoff, *Mastering Data Mining: The Art and Science of Customer Relationship Management*, John Wiley

IT-305: System Analysis and Design

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The Objective of the course is to familiarize the students with tools and techniques for undertaking Analysis and Design of data processing systems. The course also includes discussion on various aspects of software project management.

Course Contents:

Business Systems Concept; Information System Building Blocks; Systems Development Life Cycle; Project Selection; Feasibility Study. Tools for analysis and design of business systems, Methodologies available; Need for structured techniques; structured techniques available and their relevance for SDLC.

Systems Planning; Preliminary Investigations; System Requirement Specification and Analysis; Evaluating Alternative Strategies of System Requirement Analysis, Data Flow Diagrams; Data Dictionaries; Process Organization and Intersections.

Decision Analysis; Decision Trees and Tables; Expansion and Explosion. Design of databases and Normalization. Rapid Application Development. Flow Charting, Data and Process Modelling Tools; Use Case; Systems Design, Object Oriented Design; Output Design, Input Design; File and Database Design, Normalization. System Implementation -Installation and Evaluation. Managing Software Projects. Project Communication, tracking and reporting;

Software Project Planning. Software Risk Management; System Control and Quality Assurance. Documentation Tools. Software Testing Techniques. Performance and Acceptance testing criteria. Capability Maturity Model. Project management techniques for managing software projects. System Controls and System Audit. System Administration and Training. Conversion and Operations Plan.

Suggested Readings

1. Bennett, S., Mcrobb, S., & Farmer, R. (2006). *Object-Oriented systems analysis and design using UML* (3rd ed.). Boston: McGraw Hill.

2. Hoffer, J. A., & George, J. F. (2006). *Modern system analysis and design*. (4th ed.). New Delhi: Pearson Education.

3. Hughes, Bob. (2006). *Software project management*. 4th ed.). New Delhi:Tata McGraw Hill Education.

4. Kendall, K. E., & Kendall, J. E. (2009). *Systems analysis and design* (8th ed.). New Delhi: Prentice-Hall.

5. Pressman, Roger S. (2009). *Software engineering: A practitioner's approach* (7th ed.). Boston: McGraw Hill.

6. Shelly, G. B., Cashman, T. J., & Rosenblatt, H. J. (2009). *Systemsanalysis and design* (8th ed.). Singapore: Thomson Learning.

7. Whitten, J. L. & Bentley, L. D. (2009). *Systems analysis & design methods*(7th ed.). New Delhi: Tata McGraw Hill.

8. Yourdon, E. L. (1979). Constantine: Structured design. New Delhi: Prentice-Hall.

IT-306: Knowledge Management Systems

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course is to familiarize the students with the knowledge management Systems and its applications in business.

Course Contents:

Basic concept of knowledge, intelligence and experience; data, information and knowledge, types of knowledge, implications of knowledge management, knowledge management life cycle

Knowledge creation; capturing tacit information, expert evaluation, fuzzy reasoning, interviews, onsite observations, brainstorming, protocol analysis, consensus decision making, Nominal Group Technique, Delphi method, concept mapping, black boarding, Knowledge codification.

Quality Assurance; knowledge testing, Logical testing, User acceptance testing; knowledge system deployment; post implementation review.

Knowledge transfer: prerequisites, methods and strategies; Role of internet in Knowledge transfer, overview of data visualization, data mining, knowledge management portals, Ethical, legal and managerial issues in knowledge management

- 1. Irma Becerra-Fernandez, Avelino Gonzalez, Rajiv Sabherwal (2004). *Knowledge Management Challenges, Solutions, and Technologies*. Prentice Hall. ISBN: 0-13-109931-0.
- 2. Elias M. Awad, Hassan M. Ghaziri (2004)Knowledge Management. Prentice Hall. ISBN: 0-13-034820-1.
- 3. Donald Hislop, Knowledge Management in Organizations, Oxford 2nd Edition.
- 4. Ian Watson (2002). Applying Knowledge Management: Techniques for Building Corporate Memories. Morgan Kaufmann. ISBN: 1558607609.
- Madanmohan Rao (2004). Knowledge Management Tools and Techniques: Practitioners and Experts Evaluate KM Solutions. Butterworth-Heinemann. ISBN: 0750678186.
- 6. Stuart Barnes (Ed.) (2002). Knowledge Management Systems Theory and Practice. Thomson Learning.
- 7. KimizDalkir, Knowledge Management in Theory and Practice,
- 8. Elsevier, Butterworth Hinemann. SheldaDebowski, Knowledge Management, Wiley India Edition.

SEMESTER-IV

IT-401: Data Mining for Business Decisions

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The Objective of the course is to familiarize the students with tools and techniques for Data Warehousing and Data Mining.

Course Contents:

Introduction to data mining (DM) :Kind of data, DM Functionalities, Classification of DM Systems, Issues in DM,. What is Data warehousing (DW)?

Multidimensional data model: Data cubes, Stars, snowflakes and fact constellations, Defining schemas, concept hierarchies, OLAP, Types of OLAP servers: ROLAP versus MOLAP versus HOLAP, Steps for design and construction, Three-tier Data

Data Preprocessing, Why to preprocess data? Data cleaning: Missing values, Noisy data, Data Integration and transformation, Data Reduction: Data cube aggregation, Dimensionality reduction, Data Compression, Numerosirty, Reduction Discretization and concept hierarchy Generation.

Data Mining Primitives, Languages and System Architectures: Task relevant data, Kind of Knowledge to be mined, DM Query languages: Syntax, Designing GUI, Architectures of DM Systems, Concept of Cluster Analysis. , Application and trends in Data mining, Data Mining for Financial data analysis, Data Mining for retail industry, Data mining for telecommunication industry

Suggested Readings:

1. Barry Devlin: Data Ware House: From Architecture to Implementation, AddissionWeslay.

2. Alex Berson, Stephen Smith, Kurt Threarling;Building Data Mining Applications for CRM Tata McGraw Hill.

3. Alex Berson, Stephen Smith; Data Warehousing, Data Mining and OLAP, Tata McGraw Hill.

4. Michael J.A.Berry, Data Mining Techniques for marketing sales and Customer Support, Gordon Linoff.

5. Han, Jiawei; Datamining: Concepts and techniques, Harcourt.

6. Pujari, ArunK, Data, Mining Techniques, Hyderabad University Press.

IT-402: Software Engineering

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The Objective of the course is to familiarize the students with tools and techniques for Software engineering.

Course Contents:

Exposure to software development process – Software Lifecycles such as Waterfall, Spiral, Prototyping, Rational Unified Process, Agile Methodologies – Various phases in each Lifecycle model, and the pros and cons of these approaches to software development

Analysis and Design of Information systems, assessing the Feasibility of a system, Gathering detailed requirement, Use of Structured methods such as Data flow, Entity Relationship diagrams etc, Use of Object Analysis and Design, Use Cases and visualization of the IT based solution, Design of Inputs, Outputs and other interfaces

Documenting Software requirements - various documents used at different stages of software development process – User Requirement Specifications

Software Estimation – challenges in Estimation of software – methods of software estimation such as Line of Code, Function Point, COCOMO, Use Case Point Method etc – Estimating a Coding Task versus non-coding activities such as Documentation etc

Software Quality and Testing – Need for testing, Quality assurance of software at each phase in the lifecycle, Various types of tests such as Black box v/s White box, Functional test, code reviews, Stress tests, load tests etc Use of Use Cases for functional testing, Preparing Test Data and Test Cases, overview of Automated methods for testing Review of Student Presentations on exercise which requires them to analyse a business process, document the requirements, Analysis and Conceptual design of the system, estimation of the software size

- 1. Systems Analysis and Design by James Senn
- 2. Software Engineering by OOAD Buch and Rambaugh
- 3. UML by Wrox Publication
- 4. OOAD & UML by Rambaugh
- 5. Software Metrics
- 6. Nasscom Reports and Nasscom website for Industry Perspective
- 7. Structured systems analysis and design: concise study Ed: 1 :Kelkar SA.

IT-403: E-Business Financial Modeling

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives:-The objective of this course is to develop spreadsheet and modeling skills for creating computer-based models for analyzing a variety of decision problems facing today's financial managers and professionals

Course Contents:

Introduction to Excel and Financial Modeling :Introduction to Excel, Overview of Financial Modeling, Types and Purpose of financial models, Navigate Worksheets and Workbooks, Name Manager Exploring Excel as a Tool for Financial Modeling : Excel Functions, Mathematical Functions, Statistical Functions, Financial Functions, Logical Functions, Lookups & Reference Functions, Text Functions, Date & Information Functions.

Advanced analysis techniques :Working named ranges, Working with Charts, Data Validation, Hyperlink, Conditional Formatting, Pivot Tables, Auto & Advance Filter, Grouping & Ungrouping, Sheet Protection, What if Analysis, Financial Statement Analysis

Understanding the Financial Statements and its interlinking: Income Statement, Balance Sheet, Cash Flow Statement, Ratio Analysis, Basic and Diluted EPS,ROE and DUPONT Analysis.

Introduction to Valuation: Need to value companies, Difference between price and value, Different terms of value: Market value/Intrinsic value, Valuation Techniques :Absolute Valuation Free Cash flow to Firm (FCFF)/Free Cash flow to Equity (FCFE)/Cost of Equity (Ke) /Cost of Debt (Kd) /Cost of Capital (WACC)/,Relative Valuation :Equity based Multiples: P/E, P/BV, P/S & PEG/Firm based Multiples: EV/EBITDA, EV/EBIT & EV/Sales.

Project Finance Modeling: Types of funding: Equity funding sources – cost, pros and cons/Debt funding sources – cost, pros and cons, Characteristics of project finance, Risks &Mitigants, Contractual arrangements to mitigate risk, Developing a fully integrated project finance modeling spreadsheet, Interest during construction, Escrow arrangement, Cash flow Feasibility Analysis, Scenario Building, Project IRR, Equity IRR,NPV Profiling.

- 1. Simon Benninga, (2014). Financial Modelling,4th Edition, MIT Press Itd.
- 2. Tom Y. Sawyer, (2014). Financial Modeling For Business Owners & Enterprenuers,1st Edition, ApressYemiOnigbode, (2011). Oracle E-business suite 12 financials cookbook,
- 3. Simon Benninga, (2010). Principles of Finance with Excel,2nd Edition, OUP USA.
- 4. Tom Y. Sawyer, (2000). Pro Excel Financial Modelling,1st Edition,Apress.
- 6. Danielle Stein Fairhurst, (2012). Using Excel For business Analysis,: A Guide to financial modeling Fundamentals,1st Edition, Wiley Publications

IT-404: Internet and Web Designing

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course is to familiarize the students with environment for web-publishing and developing programming skills for the same.

Course Contents:

Introduction to WWW: Evolution and basic features of WWW, the concept of web-site and browsers, introduction to WWW servers.

File Transfer Protocol: Introduction to FTP, Business Applications of FTP, public domain software, types of FTP servers (including anonymous) FTP clients, common FTP commands. Web-Browsers: Basic features, bookmarks, history progress indicators, customizing browsers, saving and printing web-pages and forms, saving web pages; Searching and downloading information from web-sites; Netscape communicator; Internet Explorer.

Introduction to Web-Publishing technologies, Components of a web-site, applications of each components in business, features of a smart web site, process of planning for development of an effective web-site, Domain name selection; selecting host for web-site, maintaining a web-site, web-publishing tools.

Internet: ISP, Search Engine, URL, DNS, Security, E-Mail, HTTP, HTML, Building a simple HTML document, Tables, Frames, Links, adding Multi Media documents, Home Page, introduction to PHP,PERL, Java etc.

- 1. Douglas E. Comer, *Computer Network and Internet*, Pearson Education.
- 2. Corner, Douglas: The Internet Book, Prentice Hall.
- 3. Leon, Alexis and Mathews Leon: Internet for Everyone-Leon, TECH World.
- 4. Xavier: World Wide Web Design with HTML, Prentice Hall.
- 5. Molly, Using HTML 4, PHI Learning.

IT-405: E-Commerce

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of the course is to familiarize the students with environment for E-commerce and developing application skills for the same.

Course Contents:

Introduction to E-commerce: Meaning, nature and scope; Channels of e-commerce; Business applications of e-commerce; Global trading environment and adoption of e-commerce, Business models of E-commerce and Infrastructure; B2B, B2C, B2G and others; Application of E-commerce to Supply Chain Management; product and service digitization; Remote service procurement and online marketing and advertising.

Business to consumer E-commerce Applications: Cataloging; Order planning and order generation; Cost estimation and pricing; order receipt and accounting; Order selection and prioritization: order scheduling, fulfilling and delivery, order billing and payment management; post sales services.

Business to Business E-commerce: Need and alternative models of B2B e-commerce, Using Public and private computer networks for B2b trading; EDI and paperless trading: characteristics, feature of EDI service arrangement; Internet based EDI; EDI architecture and standards; VANs; Costs of EDI infrastructure; Reasons for slow acceptability of EDI for trading; E-marketing

Electronic Payment Systems and order fulfillment: types-e-cash and currency servers, echeques, credit cards, smart cards, electronic wallets and debit cards; operational, credit and legal risks of e-payment, Risk management options.

Security issues in e-commerce: types and sources of threats; protecting e-commerce assets and intellectual property

Regulatory environment of electronic commerce

Suggested Readings:

1. Kalakota and Whinston, *Electronic Commerce: A Manager's Guide*, Pearson Education.

2. Greenstien and Vasarhelyi, *Electronic Commerce: Security, Risk Management and Control*, Tata McGraw Hill.

3. Joseph, E-Commerce: An Indian Perspective, Prentice Hall of India.

4. Turbon, et. al., Electronic Commerce: A Managerial Perspective, Pearson Education.

IT-406: Information Security and Cyber Laws

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course is to familiarize the students with various aspects of Information Security and cyber Laws.

Course Contents:

Overview of basic concepts of security, confidentiality, integrity and availability, security threats, Information Security principles, operational and human issues in information and network security, Security policies: types, development and management.

Authentication, Access control mechanisms, Physical security control, operations security, cryptography: basic concepts, Symmetric and asymmetric cryptography, key management, firewalls, intrusion detection, malware detections.

Legal Issues in Information communication Technology, Cyber Crime and IT Act 2000, Legal resources against hacking, Cyber Fraud, defamation and abuse and other IT offences; contracts in Cyber world and jurisdiction

Cybersquatting, legal and other innovative moves against cybersquatting, copyright and protection of contents; software piracy; E-commerce taxation, protection of cyber consumers in India

- 1. Mark merkow and James Breithaupt, Information security: Principles and Practices, Pearson Education, New Delhi.
- 2. VivekSood, cyber Law Simplified, Tata McGraw Hill, New Delhi.
- 3. Matt Bishop, Introduction to computer Security, 1/e, Pearson Education, New Delhi.

SEMESTER-III PRODUCTION AND OPERATIONS MANAGEMENT

POM-301: Purchasing and Materials Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The Key objectives of this course is to acquaint the students with Decisionmaking for effective and efficient purchase, storage and flow of materials in manufacturing and service organisation; Cost reduction techniques in Pre-Purchase, Purchase and Post Purchase Systems; Modern Material Planning and delivery system like MRP and JIT and material handling and logistics systems.

Course Contents:

Role of purchasing and Materials Management - Objectives, Organisation and Interrelationships, Determination and Description of Material Quantity, Material Planning in Push and Pull System, MRP and JIT; Determination and Description of Material Quality - Receiving and Incoming Quality Inspection, Acceptance Sampling Plans, Vendor-Process Capability; Cost- Reduction Techniques - Standardization, Simplification & Variety Reduction; Value Analysis and Engineering, Make or Buy Decisions, Purchasing Research, Source of Supply, Price Determination and Negotiation, Vendor Rating, Selection and Development, Legal Aspects of Purchasing, Public Purchasing and Tendering; International Purchasing - Procedures and Documentation; Purchasing of Capital Equipment - Appraisal Methods, Evaluating Suppliers' Efficiency, Stores Layout, Classification and Codification; Material Logistics - Warehousing Management, Material Handling, Traffic and Transportation, disposal of Scrap, Surplus and Obsolete Materials, Inventory Control of Spare Parts, Materials Information System.

Suggested Readings:

- 1. Ansari, A. and Murdemess B: JIT Purchasing, New York, Free Press, 1990.
- 2. Baily P. etc.: Purchasing Principles and Management, London. Pitman, 1994.
- 3. Burt, David N.: Proactive Procurement, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1994.
- 4. Dobler, D. W. etc.: Purchasing and Materials Management, New York, McGraw Hill, 1990.
- 5. Dutta, A. K.: Integrated Materials Management, New Delhi, PHI, 1986.
- 6. Farringtoc, B. and Waters, Derek W. : Managing Purchasing, London, Chapman & Hall, 1994.
- 7. Gopalakrishnan, P and Sundarshan, M. Handbook of Materials Management, New Delhi, Prentice Hall of India, 1994.

The list of cases and specific references including recent articles will be announced in the class.

POM-302: Total Quality Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to acquaint the students with to make clear to candidates the basic concept of Total Quality (TQ) from design assurance to service assurance; to give emphasis on International Quality Certification Systems - ISO 9000 and other standards and their applicability in design manufacturing quality control and services, to closely inter-link management of quality, reliability and maintainability for total product assurance; to focus on quality of services in contemporary environment.

Course Contents:

Quality Philosophies Concept of Quality, Quality as the basis of market competition, Historical review, Quality philosophy of Deming, Juran, crossby etc., Obstacles, Integrating productivity and Quality.

Organization of Quality, Quality council, Total Quality Culture, Quality leadership, Quality awards, Total employee involvement, Quality circles, Attitude of top management, executives and workers, Operators responsibility of Quality, causes of operator's errors, Motivation.

Introduction to TQM, Models for TQM. TQM implementation, Advantages of TQM, Obstacles to TQM, TQM in service sector.

Concepts of Quality function deployment, cause and effect diagram, SWOT analysis, Continuous improvement, PDCA cycle, Supplier partnership, Supplier certification, Pareto diagram, Scalier diagram, Benchmarking, Taquchi's Quality Engineering, Failure mode and effect analysis, Total productive maintenance, Quality management, SQC, SPC.DPR, Kaizen, Six sigma concept.

Quality Systems: Introduction to ISO 9000 series of standards, other quality systems, Implementation, Documentation, Internal audits', Registration, Closing Comments. Beyond ISO 9000 horizon, Introduction to ISO 14000, Series standards, Concepts of ISO 14001, EMS Benefits, ISO 1001110014, Quality Audit.

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Production Planning and Control

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To develop a broad conceptual framework based on the research which has been done in the recent past and to bridge the gap between the theoretical solutions on one hand and the real world problems on the other in production planning and control.

Course Contents:

Production Planning and Control Function; Material Requirement Planning; Production-Inventory Systems; Forecasting for Inventory and Production Control; Aggregate Planning; lob Shop Planning; Scheduling and Control; Just-in- Time Production; Line Balancing; Planning for High Volume Standardized Products; Procedures and Documentation in Production Planning and Control; Application of Computers; ERP

- 1. Burbidge, John L. : Principles of Production Control, London, Donald and Evans, 1981.
- 2. CaubangTegC. : Readings on Production Planning and Control, Geneva, ILO.
- 3. Greene, James H. : Production and Inventory Control Handbook, New York, McGraw Hill, 1987.
- 4. Mc Leavey, Dennis W and Narasimhan, S.L. : Production and Inventory Control, Boston, Allyn and Bacon, 1985.
- 5. Peterson, R and Silver, E. A. : Decision Systems for Inventory Management and Production Planning, New York, John Wiley, 1979.
- 6. Vollmann, T. E. etc. : Manufacturing Planning and Control, Homewood, Illinois. Richard D. Irwin, 1988.

POM-304 : Logistics Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The Course is designed to explain basic theory and techniques of logistics to examine the issues and problems associated with logistics in a changing business environment, and to show how logistics can improve an enterprises effectiveness and competitiveness. Students would be encouraged to use computer software packages for problem-solving.

Course Contents:

Logistics Management: Logistics as part of SCM, Logistics costs, different models, logistics sub-system, inbound and outbound logistics, bullwhip effect in logistics, Distribution and warehousing management.

Vendor Rating, Use of mathematical model for vendor rating / evaluation, single vendor concept, management of stores, accounting for materials.

Inventory Management: Concept, various costs associated with inventory, various EOQ models, buffer stock (trade off between stock out / working capital cost), lead time reduction, re-order point / re-order level fixation, exercises -numerical problem solving , ABC, SDE / VED Analysis, Just-In-Time & Kanban System of Inventory management.

Recent Issues in SCM : Role of Computer / IT in Supply Chain Management, CRM Vs SCM, Benchmarking- concept, Features and Implementation, Outsourcing-basic concept, Value Addition in SCM-concept of demand chain management.

Suggested Readings:

1. Raghuram G. (I.I.M.A.) - Logistics and Supply Chain Management (Macmillan, 1st Ed.)

- 2. Krishnan Dr. Gopal Material Management, (Pearson, New Delhi, 5th Ed.)
- 3. Agarwal D.K. A Text Book of Logistics and Supply chain management (Macmillan, 1st Ed.).
- 4. Sahay B.S. Supply Chain Management (Macmillan, 1st Ed.)
- 5. Chopra Sunil and Peter Meindl Supply chain management (Pearson, 3rd Ed.

POM-305 : Service Operations Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The key objective of this course is to acquint the students with decisionmaking in planning, design, deleivery, quality and scheduling of service operations. The candidates are also expected to appreciate the role of service quality and operations in emerging services economy of India.

Course Contents:

Matrix of Service Characteristics; Challenges in Operations Management of Services; Aggregate Capacity Planning for Services; Facility Location and layout for Services; lob Design - Safety and Physical Environment: Effect of Automation; Operations Standards and Work Measurement; Measurement and Control of Quality of Services; Dynamics of Service Delivery System; Scheduling for Services Personnel and Vehicles; Waiting -Line Analysis; Distribution of Services; Product- Support Services; Maintenance of Services; Inventory Control for Services; Case Studies on Professional Services

- 1. Bowmen David E. etc. : Service Management Effectiveness: Balancing Strategy, Organization and Human Resources, Operations and Marketing, SanFrancisco. Jossey Bass, 1990.
- 2. Collier, David A. : Service Management Operating Decisions, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1987.
- 3. Fitzsimmons, James A. and Sullivan, Robert S. : Service Operations Management New York, McGraw Hill, 1982.
- 4. Heskett, James L. etc. : Service Breakthroughs Changing the Rules of the Game, New York, Free Press, 1990.
- 5. Murdiek, R. G. etc. : Service Operations Management, Boston, Allyn and Bacon, 1990.
- 6. Sharma, J. K. : Service Operations Management, Delhi, AnmoL, 2001.
- 7. Voss, C etc.: Operations Management in Service Industries and the Public Sector, Chichester, Wiley, 1985

POM-306 : Technology Acquisition and Diffusion

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: This course will highlight at the indicators of Technology and market survey for technology with a point of view of diffusion also the parameters on which technology is assessed and evaluate and the key words for the success of an effective diffusion strategy will be discussed.

Course Contents:

Technological Indicators; Make vs. Buy Decisions; Techno- maiket Survey; Assessment & Evaluation of Technology (TA & TE); Methodology of TA; TA Imperatives; Organisation& Management of TA; TE Parameters; Financing the Technology : Government Funding : CSIR, IDBI, ICICI, CII and UNDP, etc.; Venture Capital; Identification of Core Competence; Technology' Absorption and Diffusion; Terminology and Concepts: Constraints in Technology Absorptions; Technology Absorption Efforts-Case Studies DRDO; Management of Technology Absorption; Benefits of Technology absorption; Future Thrust for Technology Absorption; Importance of Diffusion; Diffusion | Strategies; Case Studies-Indian Experiences; Technology Marketing Issues, Strategies - Internal Transfers, Export etc.

- 1. Coates, V.T. : AHadbook of Technology Assessment, U.S. Department of Energy, Washington, D C. 1978.
- 2. Howthorne, Edward P: Management of Technology, London, McGraw-Hill, 1978. I
- 3. Fransman, Matrin& Kenneth King Technological Capabilities in the Third World, Macmillan, 1984
- 4. Jain, Ashok, S. Pruthi, K.C. Garg, S. Anabi : Indicators of Indian Science & Technology, Segment Books Pub., 1996.
- 5. Twiss, Brain & Goodridge : Managing Technology for Competitive Advantage, Pitman, 1989.

SEMESTER-IV

POM-401: Applied Operation Research

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The course is designed to introduce the students to the principles of operations research techniques and their applications in decision-making. Students will also be required to use computer package for data processing purposes.

Course Contents

Parametric and Sensitivity Analysis; Inventory Control Models Under Uncertainty; Applied Queuing Models; Networks Models; Non-linear optimization Techniques-Quadratic Programming Portfolio Management Problem; Replacement Models and Policies; Dynamic Programming; Reliability Models.

- 1. Ahuja, A K. etc. : Network Flows, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1993.
- 2. Gould, F. J. etc. : Introduction to Management Science; Englewood Cliffs, New Jersey, Prentice Hall Inc., 1993.
- 3. Gupta, M. P. aid Sharma J. K. : Operations Research fa- Management, New Delhi, National, 1997.
- 4. Taha Hamby A. : Operations Research : An Introductions, MacMillan, New York, 1992.
- 5. Mathur, K and Solow D. : Management Science, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1994.
- 6. Sharma, S. J. K. Operations Research : Theory and Applications, New Delhi, Macmillan India, 2001.
- 7. Srinath, L S. : Operations Research for Executive, New Delhi, Affiliated East West Press, 1994.

POM-402: Goal Programming in Management

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of this course is to acquaint the students with the concepts, solution methods and applications of goal programming to real-world problems.

Course Contents:

Goal Programming - Basic Concept Model Formulation, Graphical and Simplex Method; Integer Goal Programming Post-Optimal Sensitivity Analysis; Parametric Goal Programming; Goal Programming under Uncertainty, Application of Goal Programming in Functiorial Areas of Management; Implementation of Goal Programming. Introduction to some Application Software such as - QSB, Micro Manager and LIGO.

Suggested Readings :

- 1. Cook, Thomas M and Russell, Robert A. : Introduction to Management Science, 3rd ed., Englewood Cliffs, New Jersey, Prentice Hal] Inc., 1985.
- 2. Eppen, G D etc. : Quantitative Concepts for Management, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1994.
- 3. Ignizio, J P.: Goal Programming and Extensions, Lexington, Lexington Books, 1976.
- 4. Liier, Y. : Management Goals and Accounting for Control, Amsterdam, North Holland. 1965.
- 5. Lee, S M. : Goal Programming foj Decision Analysis, Philadelphia, Auerbach, 1971.

The list of cases and specific references including recent articles will be announced in the class.
POM-403: Transportation Management

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours ion No. 1, comprising of 5 short

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: The objective of the course is to acquaint the students with the problem faced in planning policy and executing the transportation systems.

Course Contents:

Growth of Urbanisation and Problems of Transportation; Transport-Challenges and Limitations; Government Activities in Transportation; Transportation Systems -Planning, Operation and Management; Trip Generation and Distribution; Load Planning; Transportation Modes and their Selection; Sequential Travel Demand Forecasting Models; Future Developments in Transportation; Motor Vehicle Act 198S and its Impact on Urban Transport System; Emission Norms.

Suggested Readings :

- 1. Baerwal, J. E : Transportation and Traffic Engineering Handbook, ~Englewood Cliffs, New Jersey, Prentice Hall Inc., 1976.
- 2. Bell, G. etc. : The Business of Transport, Plymouth, McDonald and Evans, 1984.
- 3. Dickey J. W. : Metropolitan Transportation Planning, New Delhi, Tata McGrawHill, 1980.
- 4. Grey, G E. and Hole, L. A. : Public Transportation Planning; Operations and Management; Englewood Cliffs, New Jersey, Prentice Hall Inc., 1979
- 5. Gupta, M. P. : Metropolitan Transportation System, New Delhi, National, 1983.
- 6. Papacostas, C. S. : Fundamentals of Transportation Engineering, Englewood Cliffs, New Jersey, Prentice Hall Inc., 1987.

POM-404: Technology Forecasting

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To study various qualitative and quantitative technology forecasting methods with their relative merits and demerits.

Course Contents:

Exploratory Methods of TF; Delphi Technique; Cross Impact Matrix; Curve Fitting; Morphological Methods. Trends Extrapolation; Regression Analysis; Econometric Models; Normative Methods of TF; OR Models and Simulation; Networks Techniques; Relevance Trees; System Dynamics : Qualitative Methods; Futurology; Activities of TIF AC - Case Studies

Suggested Readings:

- 1. Ayres, Robert U: Technology Forecasting and Long Range Planning.
- 2. Bowonder, B and Miyake, T., 1990 : Technological Forecasting: Methodologies and Case Studies (Report III) TIF AC, New Delhi, 1990.
- 3. Bright, James R, Schoeman, Milton, EF., 1973: A Guide to Practical Technological Forecasting, Prentice Hall.
- 4. Jones, H and Twiss, B.C., 1979 : Forecasting Technology for Planning Decisions, MacMilan, London.
- 5. Makridakis, Spyros Gand *et. al.* : Forecasting, Methods and Applications, Wiley, 1983.
- 6. Makridakis Sprogs G. : Forecasting Planning and Strategy for the 21^s' Century, N.Y., Free Press, 1990.
- 7. Martino, Joseph Paul: Technological Forecasting for Decision-Making, N.Y., McGraw-Hill, 1993.

POM 405 : R&D Management

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective: To develop middle level scientists in the modern concepts of R&D management with a view to make them effective project managers and to enhance their human and behaviour skills to make them effective member of a large multi-disciplinary projects.

Course Contents:

Survey of Emerging Technologies; Environment Analysis; Project Proposals; R&D Management : Management of knowledge workers, R&D environment; Management of High value Instruments Test Facilities, Workshops etc., Identification of partners/contractors for R&D Projects; R&D Budget; Technology Scanning : Procurement Procedure; Material Management Policy; Discard Policies and Procedure; Contract Management; Vendor Development; Procurement and Utilization of Capital Equipment; Test Equipment; Test Facilities; Sharing of resources with other Institution -Sponsored Resources; Development Tools; Design Methodologies; CAD/CAM7CIM; Design for Manufacturing; Design for Maintenance

Suggested Readings :

- 1. Cetron, Marvin J and Goldhar, Joel D (ed.) : The Science of Managing Organised Technology, N.Y.. Gordon & Research Science Pub., 1970.
- 2. Jain, R. K. and Tiaindis, H. C. : Management of Research and Development Organisations, Managing the Unmanageable, N.Y., Wiley, 1990.
- 3. McLeod, Tom : The Management of Research, Development and Design in Industry, England, Gower, 1988.
- 4. Meredith, Jack R and Mantel, Samuel, J : Project Management a Managerial Approach, N.Y., Wiley, 1985.
- 5. NTIS : The Management of Government R&D Projects ; The effects of The Contractual Requirement to Use Specific

POM—406 : **Programme Management**

Max. Marks: 100 External: 70 Internal: 30 Time: 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To train the scientist and managers in the practical application and modern tools and techniques of planning, scheduling, monitoring and control of multiple projects.

Course Contents:

Project Feasibility Study; Programme Management Concepts - Society Model ADA, IGMDP Model. Deemed University Model, MOUs etc. PMBOK ISO standards; Project Appraisal; Project Selection; Networks Models and their applications - PERT, CPM, GERT, Precedence Network; Resource Allocation and Scheduling; Project Costing-Zero-base Budgeting, Budgetary Control, CAG Report; Project Monitoring and Control - CASM (DRDL Model): Time and Cost Over Run; Concurrent Engineering; Project Closure-Cube Model; IEEE Models; Proeject Management Software; Major Projects in DRDO/DAE/CSIR/HAL etc. SARVATRA; IGMDP; MBT; FALCON; SAMYUKTA; INSAS; LCA.

Suggested Readings:

1. Chaoudhury, S^dhan: Project Scheduling and Monitoring in Practice, Delhi,

South Asian Pub., 1986.

- 2. Harrison, F. L. : Advanced Project Management, London, Gower, 1985.
- 3. Lockyer, K G. : An Introduction to Critical Path Analysis. London, Pitman Books, 1992.
- 4. Martino, R.L. : Project Management and Control; Finding the Critical Path; Applied Operational Planning : Allocating and Scheduling Resources; N.Y., American Management Association, 1965.
- 5. Meredith, Jack R and Mantel, Samuel, J : Project Management: A Managerial Apporach, N.Y., Wiley, 1985.
- 5. Srinath, L.S. : PERT and CPM; Principles and Applications, Delhi, East-West Press, 1975.
- 6. United Nations Industrial Development Organisation: Guide to Practical Project Appraisal; Social Benefit -Cost Analysis in Developing Countries, Delhi, Oxford and IBH Pub. Co., 1978.

Semester-III

ENTREPRENEURSHIP DEVELOPMENT

ED-301: Fundamentals of Entrepreneurship Development

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours comprising of 5 short

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions. **Objectives:** To give the basic understanding of the conceptual framework of entrepreneurship and overview of government support in promoting entrepreneurship.

Course Contents:

Entrepreneur: Concept, ecosystem, functions of Entrepreneur, entrepreneur & Entrepreneurship, Classification of entrepreneurs, Distinction between Entrepreneur and Manager, Intrapreneur and Entrepreneur, Theories of Entrepreneurship: Schumpeter, McLelland and Drucker, Stages in entrepreneurial process, Micro, Small and Medium Business: Definition, Role in the economy and significance, Factors affecting success of a new Business. Environment assessment (PESTEL): political, economic, social, Technological, ecological and legal environment. Developing an effective business plan: components and procedure to prepare a business plan. Entrepreneurial Venture Initiation: Assessment of business opportunities. Business creation: Methods and Procedures to start and expand one's own business. Managing growth: using external parties to help grow a business, franchising, advantages and limitations; Joint ventures- types; role of government and various institutions in developing entrepreneurship in India; women entrepreneurship.

- 1. Kumar, Arya (2012); Entrepreneurship, Pearson, New Delhi.
- 2. Greene, Cynthia L (2006), Entrepreneurship, Cengage Learning, New Delhi
- 3. Timmons, Jeffry A and Spinelli, Stephen(2007), New Venture Creation, McGrawHill, seventh edition, New Delhi
- 4. Wickham, Phillip A (1998); Strategic Entrepreneurship, Pitman, UK.
- 5. Shukla, MB, (2011), Entrepreneurship and Small Business Management, Kitab Mahal, Allahabad
- 6. Zenas Block and Ian C Macmillan, Corporate Venturing, Harvard Business School Press, Boston
- **7.** Sahay A., A. Nirjar (2006), Entrepreneurship: Education, Theory and Practice, Excel Books, New Delhi.

ED-302: Creativity and New Venture Creation

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To provide the basic understanding of concept of creativity and innovation that promotes idea generation, opportunity recognition and venture creation.

Course Contents:

Entrepreneurship Development in emerging markets: types of start-ups, entrepreneur as a career option, International entrepreneurship, role of educational institutions, Entrepreneurial leadership: leader Vs manager; principle centered leaders, entrepreneurial leadership and components, Creativity: concept, creativity and entrepreneurship, blocks to creativity, Unblocking Creative Potential ,characteristics of creative people, Creativity Techniques (Brainstorming; lateral Thinking; Forced Relationship; Morphological Analysis; Attribute Listing, etc.), Managing Creativity in Organization. Innovation: opportunity, creating, shaping, recognizing and seizing. Idea generation: sources & techniques of ideas. Idea to opportunity mapping: meaning, process, recognition, sources of opportunity; business opportunities with specific reference to Indian economy; Assessing business potential of an idea; steps involved in tapping opportunity, Strategies for Innovation. Creativity in start-ups: case studies and Business plan presentation.

- 1. Kumar, Arya (2012). Entrepreneurship: Creating and Leading an entrepreneurial Organization. Pearson, India.
- 2. Timmons, Jeffry A and Spinelli, Stephen (2007), New Venture Creation: Entrepreneur for the 21st century, McGrawHill, seventh edition, New Delhi
- Sahay A., A. Nirjar (2006), Entrepreneurship: Education, Theory and Practice, Excel Books, New Delhi.
- 4. Zenas Block and Ian C Macmillan, Corporate Venturing, Harvard Business School Press, Boston

ED-303: Institutional Support to Entrepreneur & MSMEs

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To provide the basic understanding of the Institutional support system available to MSMEs and their functioning with specific reference to Indian economy.

Course Contents:

Institutional Support Mechanism: SIDO, SIDBI, NSIC, SISI, Commodity Boards, State Directorate of Industries, SIDC'S, SFC, District Industries Centre. MUDRA Bank. Institutional Support Mechanism: Testing Laboratories, Product and Process Development Centres, NISEBUD, National Service and Technology Entrepreneurship Development Board. Institutional Support Schemes: Role of RBI, RBI Guidelines to commercial banks, lending by Commercial and Development Banks, Equity Fund Scheme, Credit Guarantee Scheme, Institutional Support Schemes: Interest Subsidy, Seed/Margin Money, DRI, Refinance Scheme, Composite Loan Scheme, Single Window Scheme, National Equity Fund Scheme, Bills Rediscounting Scheme. Assistance from MSME: Marketing Assistance, Research Development and Training Facilities, Export Assistance to MSMEs, Technology Up gradation, Assistance to Ancillary Industries, Incentives for MSMEs in Backward Areas and contemporary ED programmes.

Suggested Readings

1. Krishnamurthi, S. Guide to Micro, Small and Medium Enterprises Policy, Rules and Regulations (3rd Ed.). Orient Publishing Company.

www.msme.gov.in, www.laghu-udyog.com, www.dcmsme.gov.in, www.nimsme.org, www.niesbud.nic.in, www.kssidc.kar.nic.in/dic.in

ED-304: Family Business Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To provide the basic understanding of the various concepts related to setting

up of and carrying family business and management.

Course Contents:

Family Business: nature, importance and uniqueness of family business; families in business: building trust and commitment (through case discussion); ownership of an enterprise build to last including assessment of different forms of business organizations: Sole Proprietorship, Partnership, LLP, Joint Stock Companies, HUF and OPC. Leadership imperatives for family and business: succession and continuity power. Best practices for the management and governance of family business: creating the strategy; planning the estate. Financial considerations and valuation of family business; family business governance: Advisory boards and board of directors. Family communication: family meetings, family councils and family offices; change, adaptation and innovation: the future of family business.

- 1. Poza, Ernesto J (2009); family-owned Business, Cengage learning
- 2. Wickham, Phillip A (1998); Strategic Entrepreneurship, Pitman, UK.
- 3. Shukla, MB, (2011), Entrepreneurship and Small Business Management, Kitab Mahal, Allahabad
- 4. Hill, Michal A., Inland Durama R et al; Strategic Entrepreneurship: Creating a New Mindset, Blackwell Publishers, Oxford.

ED-305: Legal Framework for New Age Businesses

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The basic purpose of this course is to develop an insight of basics of legal framework for startup businesses in India and role of Information Technology in Businesses.

Course Contents:

Incorporation of a company: Meaning, types of companies, character documents, legal formalities for incorporation of company, key managerial personnel. Companies Act, 2013: Various provisions relevant for new ventures, compliances under the Act. An Introduction to Legal aspects for startups: IT Laws, Accounting and Tax Laws, SEBI Regulations, Business Finance, Contract Laws, Trade Marks: Concept of trademarks, Importance of brands and the generation of "goodwill", Trademark as a marketing tool, Trademark registration procedure ,Infringement of trademarks and Remedies available, Assignment and Licensing of Trademarks, Trademarks and domain names, Concept of Geographical Indication; Patents (Amendments) Act, 2005: Introduction to Patents ,Procedure for obtaining a Patent, Licensing and Assignment of Patents, Infringement of Patents; The Indian Copyrights (Amendments) Act, 2012: Concept of Copyright Right, Assignment of Copyrights, Registration procedure of Copyrights, Infringement (piracy) of Copyrights and Remedies; Industrial Designs Act, 2002: Concept of Industrial Designs, Registration of Designs, Piracy of registered designs and remedies IP Management, Concept of IP Management :Intellectual Property and Marketing and protection of trade secrets.

- 1. Bhandari, M.K. Law Relating To Intellectual Property Rights. Central Law Publications.
- 2. SatyawratPonkse. (1991). The Management of Intellectual Property.

ED-306: Social Entrepreneurship

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The objective of the course is to acquaint students with the concept and implications of social entrepreneurship and ventures.

Course Contents:

Introduction to Social Entrepreneurship: meaning, Social Entrepreneurs, social entrepreneur vis-a vis corporate entrepreneur; relationship with traditional nonprofits and government services; legal structure of social enterprises ;social impact investor; difference among venture philanthropists, traditional venture capital and market investors Social Venture Opportunity Identification; Social Venture Plan; Social Impact Theory; The Process of Social Entrepreneurship: Creating Opportunities ; Disruptive Innovations for Social Change ; Social Venture Strategy and Plan; Social Ventures funding; impact and effectiveness of social enterprises.

Suggested Readings:

- Schwartz, Beverly. Rippling: How Social Entrepreneurs Spread Innovation Throughout the World. (Jossey Bass, 2012, ISBN 978-1-118-13859-5).
- 2. Grayson, David, McLaren, Melody, Spitzeck, Heiko. "Social Intrapreneurs-An Extra Force for Sustainability."
- 3. Drucker, Peter, E. Innovation and Entrepreneurship.
- 4. Social Enterprise Alliance, Succeeding at Social Enterprise: Hard-Won Lessons for Nonprofits and Social Entrepreneurs. (Jossey Bass, 2010, ISBN 978-0-470-40532-1).
- 5. The Social Intrapreneur: A Field Guide for Corporate Changemakers, http://www.sustainability.com

Social Impact Exchange website: http://www.socialimpactexchange.org

SEMESTER-IV ED-401: Enterprise Planning, Appraisal and Financing

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: The syllabus intends to create an awareness of the need for systematic management of projects. This application-oriented course will escalate the skill of the student in executing enterprise projects, starting from identification till completion.

Course Contents:

An Overview and Key Concepts of Project Management, Project Feasibility Studies: Project Identification, Market and Demand Analysis, Technical Analysis. Project Cost Estimate: Financial Appraisal of Single Projects and Financial Appraisal of Multiple Projects. Human Aspects in Project Management: Project Organization, Project Leadership, Motivation in Project Management, Communication in the Project Environment, Conflict in Project Management. Project Scheduling with PERT/CPM. Time-Cost Trade-Off and Crashing of Projects, Project Cost Control (PERT/Cost). Resource Scheduling and Resource Levelling, Risk Analysis in Project Management, Project Audit and Project Termination, Project Control

- 1. Prasana Chandra: *Projects*-Planning Analysis, Selection, Implementation & Review, Project Managemnt, Tata McGraw Hill, New Delhi eighth edition.
- 2. P. Gopalakrishnan &V.E.Ramamoorthy (2008), Project Management, Macmillan.
- 3. Anderson, E.S., Grude, K., Haug, T. and Turner, J.R. (1990) Goal directed project management, London, Kogan Page.
- 4. Anthony, R.N., and Young, D.W. (1999) Management Control in Non-profit Organizations, 6th edn, Boston, MA, Irwin/McGraw-Hill.
- 5. Elbeik, S. and Thomas, M. (1998) Project Skills, Oxford, Butterworth-Heinemann.
- 6. Lock, D. (1993) 'Project management' in Handbook of Management, 3rd edn, Aldershot, Gower Publishing Company Limited.
- 7. Maylor, H. (1996) Project Management, London, Pitman Publishing.
- 8. Young, T.L. (1998) The Handbook of Project Management, London, Kogan Page.

ED- 402: Financial Innovation and Entrepreneurship

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions. **Objectives:** To familiarize the students with the concepts of financial management in the

MSMEs and their use.

Course Contents:

Meaning, objectives and significance of Financial Management, Project Appraisal Technique- Payback Period, NPV, IRR, PI. Cost of capital and capital structure. Sources of Finance, Working Capital Management: Concept, Importance, Cash Management, Inventory Management, Management of Accounts Receivables. Budgeting Control: Meaning, Importance, Limitation, Types of Budgets, Fixed vs Flexible Budget. Financial Planning, Estimation of Financial Requirements, Sources of Finance : Internal sources and External sources of Financing including Term Loans and Financial Accommodation from Financial Institutions, Venture Capital, Profitability Analysis: Factors Affecting Profits, Profit Planning: characteristics, advantages and limitation, Break Even Analysis, Profitability Ratios, Cash Flow Statement. Concept of Risk, Types of Risk, Risk mitigation Strategies

Suggested Readings:

1. Singh, Surender and Kaur, Rajeev. Basic Financial Management Mayur Paperbacks,

New Delhi

- 2. S.N. Maheshwari, Management Accounting & Financial Analysis S. Chand & Sons
- 3. S.C. Kuchhal, Financial Management, Vikas Publishing House
- Steward C. Myers, Richard A. Brealey Principles of Corporate Finance (International Edition)
- 5. M.Y. Khan & R.K. Jain "Financial Management Text & Problems" Tata McGraw

ED- 403: Marketing Management in New Age Businesses

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions. **Objectives:** To familiarize the students with the concepts of marketing management:

product, price, place and promotion in the new age businesses.

Course Contents:

Business Marketing: Concept of Marketing, Scope of Marketing, Assessment of Demand, Market Segmentation, Marketing Mix, Product Mix, Processing of Products and Processing Strategies. Product Life Cycle – Introduction Stage Strategies, Growth Stage Strategies, Maturity Stage Strategies, Decline Stage Strategies. Introduction to Pricing and revenue management: History of Pricing and Revenue Optimization (PRO) Techniques; Traditional Pricing Techniques; factors driving PRO and the workings of a PRO system; Microeconomics of Pricing; Review of Pricing Theory : Recap of the monopoly price theory; Price Discrimination and role of Consumer Surplus; Concept of Price Waterfall; Behavioral Theory of Pricing; Value Creation and Capturing; Market Segmentation and Pricing : Market Segmentation with Differential Pricing: Concept of different reservation prices; focusing on customer needs and segmentation. Value Based Pricing; Pricing and CRM. Channels of Distribution: Concept, Objectives & Importance of Channels of Distribution, Types of Channels of Distribution, Factors Affecting Choice Of Distribution Channels. Role of Middlemen, Distribution Strategies, Franchising -Concepts and Benefits. Logistics: Meaning, Importance, Objectives, Marketing Logistics Task, Approaches Of Logistics.

Suggested Readings:

1. Kotler, Keller, Koshy and Jha, Marketing Management, 13th Edition Pearson

Education

2. Ramaswamy Vs. Namakumari, Marketing Management, 4th, Macmillan

3. Shukla A.K., Marketing Management, 1st Edition, VaibhavLaxmiPrakashan

- 4. Lamb Charless W. et. Al; Principals of Marketing; South Western Publishing
- 5. Cravens David Wet al;,Marketing Management Richard D. Irwin

6. Kotler Philip and Armstrong Gary, Principles of Marketing, Pearson

7. Bushkirk, Richard H: Principles of Marketing; Dryden Pren, Illinois 10(949)

ED-404: New Enterprise Human Resource Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To familiarize the students with the concepts of Human Resource management in the MSMEs and their use.

Course Contents:

Role of HRD in MSMEs: Manpower Planning in MSMEs, Hiring Process – Recruitment and Selection, Training and Evaluation of Performances, Wage and Salary Administration in MSMEs, Employment Motivation Management of Industrial Relation: Causes of Industrial Dispute, Methods of Resolution of Disputes, Procedure and Role of Arbitration and Conciliation, Strikes, lockout Relevant Regulations for MSMEs: Factories Act 1948, Industrial Employment (Standing Orders) Act 1946, Minimum Wages Act 1936, Employment Provident Fund and Miscellaneous Provisions Act 1952, Relevant Regulations for MSMEs: Trade Union Act 1926, Bonus Act, Industrial dispute Act 1947 Executive Development Programme: Meaning, Need, Relevance, Holistic Training Model, Evaluation of EDPs, Techniques for enhancing effectiveness of EDPs

Suggested Readings

1. Dessler Garry & BijuVarkky, "Human Resource Management" 10th edition, Pearson

education.

- 2. Dessler Garry & BijuVarkky, "Fundamental of HRM" Pearson education
- 3. Ivancevich M John"HRM"10th Edition, The McGraw Hill company
- 4. Prasad LM "HRM" Sultan Chand & Sons.
- 5. Gupta CB "HRM" Sultan Chand & Sons.
- 6. Wilson P John "Human Resource Development" Kogan Page 2nd Edition.

ED-405: MSMEs Policy Framework

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions. **Objectives:** To familiarize students with the different policies applicable to MSMEs and

their implications on MSMEs.

Course Contents:

Policy Environment for Small Scale Sector, Pre and Post 1991 Industrial Policy, New Policy Measures, Reports of various Working Groups on SSIs: Kothari Committee 2,000, Ganguly Committee 2004. Policy Support Mechanism: Reservation of Items for Small Scale Industries, Rationale, Procedures, Criticism, De-reservation, Removal of Quantity Restrictions, Government's Purchase Preferences Policy for Small Industries Products, Price Preference Policy for SSI products. Policy of Priority Credit, Equity Participation, Equity issues by small enterprises through OCTEI, Policy of Technology Up gradation in small enterprises, Technology Bureau for Small Enterprises. Taxation Benefit to SSI: Need for tax benefits, Tax Holiday, Rehabilitation Allowances, Expenditure on Scientific Research, Amortization of certain Preliminary Expenses, Tax concession to SSI in rural and backward areas, Expenditure on acquisition of Patents and Copyrights. Policy on Handling Sickness in Small Industries: Causes and consequences of Sickness, Measures to prevent sickness in small units Measures for Export Promotion: Export Processing Zones (EPZs), Special Economic Zones (SEZ), Measures for Export Promotion, Organizational support for Export Promotion

Suggested Readings:

1. Personal Finance by Jack R. Kapoor, Les R. Dlabay and Robert J. Hughes, Tata

McGraw Hill Publishing Company Ltd. New Delhi.

- 2. Personal Finance coloumns in The Economic Times, The Business Line and Financial
- 3. Express Daily News Papers
- 4. Kothari Committee Report
- 5. SSI Policy
- 6. Sick Industries Companies Act'
- 7. www.iasb.org
- 8. Internet Sources- BSE, NSE, SEBI, RBI, IRDA, AMFI etc

ED-406: Contemporary Environment in MSMEs

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objectives: To familiarize them with the understanding of contemporary environment of MSMEs.

Course Contents:

Changing scenario of MSMEs in the era of Liberalisation& Globalisation, Competitiveness, Quality control and Branding, Need for professionalism in management of small business in India, social responsibilities of small business owners. Micro, Small and Medium Enterprises Development Act (MSMEDA) 2006, Objective, Definition, Provisions pertaining to promotion and development of MSMEs. Rural Entrepreneurship: Concept, Need, Problems, Methods of Developing Rural Entrepreneurship. Women Entrepreneurship: Concept, Challenges, Strategies, Institutional Support to Women Entrepreneurs, Self Help Groups (SHG) International Entrepreneurship: Concept and Nature, International versus Domestic Entrepreneurship—Political, Legal, Cultural and Technological Environment; Strategic Issues in International Entrepreneurship; Barriers to International Trade- Protectionism, Trade Blocs; GATT: Entrepreneurial entry into International Business- Exporting, Licensing, Turnkey Projects, Joint Ventures, Management Contracts

- 1. Hisrich, Robert D., Michael P Peters, Entrepreneurship: Starting, Developing and Managing a New Enterprise, Irwin, London
- 2. Shukla, MB, (2Shukla, MB, (2013), Entrepreneurship and Small Business Management, KitabMahal, Allahabad
- 3. Baporikar, Neeta, Enterpreneurship Development and Project Management: Text & Cases, Himalaya Publishing, Mumbai.
- 4. Charantimath, Poornima M, (2009), Entrepreneurship Development Small Business Enterprise, Dorling Kindersley India Pvt Ltd.(Pearson), Delhi

SEMESTER-III

BA-301: Business Analysis using Excel

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction- Turning Numbers into Better Business Decisions, The Business Analyst's Excel Toolbox:- Essential Excel for Business Analysis, Professional Tools for Business Analysts, Collecting and Managing Business Data: Importing and Exporting Data, Power Functions for Managing Business Data, Communicating Your Message: Your Stakeholders and Their Needs, Data Presentation Formats That Work, Winning Charts for Business Communication: Professional Charting, Dynamic Charts, Looking Inside Your Data (Analysis): Analysing Data with Pivot Tables, Comparing Business Scenarios, Looking Outside Your Data (Forecasting): Time Series and Forecasting, Regression.

- 1. Manohar Hansa Lysander, Data Analysis and Business Modelling Using Microsoft Excel, PHI.
- 2. Whigham David, Business Data Analysis Using Excel, Oxford.
- Winston Wayne, Microsoft Excel 2013 Data Analysis and Business Modelling, PHI
- 4. Fairhurst Danielle Stein, Using Excel for Business Analysis- A guide to Financial Modelling, Wiley.
- 5. Enders W. Applied Econometric Time Series. John Wiley & Sons, Inc., 1995
- 6. Brooks Cheris, Introductory Econometrics for Finance, Cambridge.
- Day Alastair L. Mastering Financial Modeling in Microsoft Excel, Pearson,2nd Edition
- 8. Hanke John E., Dean W. Wichern, Arthur G. Reitsch, Business Forecasting.

BA-302: Econometrics for Business Forecasting

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction to correlation and regression Meaning and definition ; correlation coefficient: Pearson's r, rank correlation coefficient, regression technique, Simple linear regression simple linear regression, Least squares method, Accuracy of results, coefficient of determination, high R2 , relevance and significance of estimated coefficients, presentation of estimation results; Trend Analysis Changes in trend and slope, gradual changes in trend: estimation of non-linear trends, polynomial forms, higher order polynomials, log-transformed forms, inverse forms, Multiple regression models Multiple independent variables, the problem of irrelevant independent variables: adjusted R2 , significance of coefficients taken together: F test, choosing the correct functional form; Econometric modeling and problems Problems of Multicollinearity, hetero skedasticity and autocorrelation; cross-section and time-series regression analysis, Stationary and non-stationary time series, Lagged dependent variables/autoregressive models, dummy variable regression, qualitative/categorical dependent variable regression, logit, probit and binomial regression models. Overview of Forecasting Process-Exploratory Data Analysis-Regression Analysis-

Logistic Regression-Time Series Forecasting-Lifetime Value Models-Credit Scoring Models-Loss

Forecasting Models

Suggested Readings:

1. D.N.Gujarati, G.C. Porter, S. Gunasekar, Basic Econometrics, TMH publication, New Delhi,

2. J.M.Woolridge, Introductory Econometrics: A modern approach, 4th edn, Cengage learning

- 3. Levin and Rubin, Statistics for Management, TMH publication.
- 4. B.H. Baltagi, Econometrics, Springer,
- 5. Barreto and Howland, Introductory Econometrics, ,Cambridge University Press
- 6. H.R. Seddighi, Introductory Econometrics: A practical approach, Routledge
- 7. Deepak K. Gupta, Analyzing public policy; concepts, tools and techniques, CQpress,

BA-303 Business Data Mining

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Data warehousing Components –Building a Data warehouse - Mapping the Data Warehouse to aMultiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

DATA MINING: Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns –Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining Systemwith a Data Warehouse – Issues –Data Preprocessing.Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification

Suggested Readings:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.

2. K.P. Soman, ShyamDiwakar and V. Aja, "Insight into Data Mining Theory and Practice", EasternEconomy Edition, Prentice Hall of India, 2006.

3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall ofIndia, 2006.

4. Daniel T.Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006.

BA-304 Decision Modeling and Data Analysis

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Decision Analysis: Introduction to Decision Modeling, Sensitivity Analysis Using Excel, Sensitivity Analysis, Introduction to Monte Carlo Simulation, Introduction to Decision Trees, Strategies in Decision Trees, Sensitivity Analysis for Decision Trees, Decision Trees with Multiattribute Outcomes, Value of Information in Decision Trees

Data Analysis: Introduction to Data Analysis, Univariate Numerical Data, Simple Linear Regression, Multiple Regression, Regression Models for Cross-Sectional Data, Time Series Data and Forecasts, Autocorrelation and Autoregression, Time Series Smoothing, Time Series Seasonality, Regression Models for Time Series Data

Suggested Readings

1. Enders W. Applied Econometric Time Series. John Wiley & Sons, Inc., 1995

2. Brooks Cheris, Introductory Econometrics for Finance, CambridgePrss.

3.Mills, T.C. The Econometric Modelling of Financial Time Series. CambridgeUniversityPress 1999.

4. Chawla Deepak and NeenaSondhi, Research Methodology: Concepts and Cases, Vikas Publishing House.

BA-305 Data Analytics using R

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Objective:

Course Contents:

- Introduction to R
- Getting Started with R
- Loading and Handling Data in R
- Exploring Data in R
- Linear Regression using R
- Logistic Regression
- Decision Tree
- Time Series in R
- Clustering
- Association Rules
- Text Mining
- Parallel Computing with R

- 1. Seema Acharya.: Data Analytics Using R. McGraw Hill Education
- 2. Maindonald & Braun : Data Analysis and Graphics Using R, Cambridge University Press
- 3. Michael Milton: Head First Data Analysis, O'Reilly Media.
- 4. Rakshit-R Programming for Beginners (McGraw hill education)

BA-306 Social Media Analytics

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Phenomenology of social media; Analysis Basics; Sentiment Analysis ; Network Analysis Basics; Influence and Centrality in Social Networks; Information diffusion; Social ties and information diffusion; Social ties and link prediction; Social Spam and Malicious Behavior; Geospatial social data mining; Privacy in a Networked World; Predicting the future with social media; Emotional contagion; Social tagging and folksonomies.

- 1. Marshall Sponder, Social Media Analytics, McGraw Hill Publication.
- 2. Siddharatha Chatterjee & Michal Krystyanczuk, Python Social Media Analytic
- 3. Matthew Gains

Semester-IV

BA-401: Time Series Data Analysis

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Stochastic process and its main characteristics Stochastic process. Time series as a discrete stochastic process. Stationarity. Main characteristics of stochastic processes (means, autocovariation and autocorrelation functions). Stationary stochastic processes. Stationarity as the main characteristic of stochastic component of time series. Wold decomposition. Lag operator. Autoregressive-moving average models ARMA (p,q) Moving average models MA(q). Condition of invertability. Autoregressive models AR(p). Yull-Worker equations. Stationarity conditions. Autoregressive-moving average models ARMA (p,q). Coefficient estimation in ARMA (p,q) processes. Box-Jenkins' approach Coefficients estimation in autoregressive models. Coefficient estimation in ARMA (p) processes. Quality of adjustment of time series models. AIC information criterion. BIC information criterion. "Portmonto"-statistics. Box-Jenkins methodology to identification of stationary time series models. Forecasting in the framework of Box-Jenkins model Forecasting, trend and seasonality in Box-Jenkins model. Non-stationary time series Non-stationary time series. Time series with non-stationary variance. Nonstationary mean. ARIMA (p,d,q) models. The use of Box-Jenkins methodology to determination of order of integration.

Suggested Readings:

1. Enders W. Applied Econometric Time Series. John Wiley & Sons, Inc., 1995

2. Mills, T.C. The Econometric Modelling of Financial Time Series. CambridgeUniversity Press, 1999

3. Andrew C. Harvey. Time Series Models. Harvester wheatsheaf, 1993.

4. Andrew C. Harvey. The Econometric Analysis of Time Series. Philip Allan, 1990.

5. Econometric Views 4.0 User's Guide. Quantitative Micro Software, LLC.

6. Banerjee, A., J.J. Dolado, and D.V. Hendry. Co-Integration, Error Correction, and Econometric Analysis of Non-Stationary Data. OxfordUniversity Press, 1993

7. Maddala, G.S. And Kim In-Moo. Unit Roots, Cointegration, and Structural Change. CambridgeUniversity Press, 1998

8. P. J. Brockwell, R. A. Davis, Introduction to Time Series and Forecasting. Springer, 1996

9 J. Johnston, J. DiNardo. Econometric Methods. McGraw-Hill, 1997.

BA-402: Applied Multi Variant Analysis

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Basic concepts of multivariate distributions, Multinomial and multivariate normal distributions, Principal component analysis and other multivariate data visualization techniques, Profile analysis, Multivariate analysis of variance (MANOVA), Multiple correlation coefficient, Multidimensional Scaling, Exploratory Factor Analysis Cluster analysis, Discriminant analysis and classification, Confirmatory Factor analysis and structural equation modeling.

- 1. Chawla Deepak and NeenaSondhi, Research Methodology: Concepts and Cases, Vikas Publishing House.
- 2. Alvin C. Rencher, Methods of Multivariate Analysis, Wiley.
- 3. Hair, Anderson, Talham and Black, Multivariate Data Analysis.
- 4. C. Chatfied, Introduction to multivariate Analysis, Springer.

BA-403: Financial Modeling

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Corporate Financial Statements Spreadsheet skills: Organizing and creating spreadsheets; entering and formatting data values; entering expressions for calculating values; linking worksheets; splitting screens to facilitate working between several worksheets. Financial management skills: Understanding the three key financial statements (i.e., a company's income statement, balance sheet, and cash flow statement) and the relationships between the various items on them.

Analysis of Financial Statements Spreadsheet skills: Using logical IF statements; using conditional formatting to call attention to conditions that need correcting; pasting an Excel document into a Word document. Financial management skills: Analyzing the year-to-year changes in financial statements and various financial ratios; performing vertical analysis of financial statements; using financial ratios to benchmark a company's performance against competitors; inserting spreadsheet results into company reports.

Forecasting Annual Revenues Spreadsheet skills: Creating, validating, and using linear, quadratic, cubic, and exponential regression models to fit the trends of historical data; creating various types of charts (e.g., scatter diagrams, forecast charts, error patterns, and downside risk curves); estimating the accuracy of forecasts; expressing forecast accuracy in terms of confidence limits and downside risk curves. Financial management skills: Making forecasts; recognizing the difference between valid and invalid forecasting models; handling the risks inherent in forecasts; adjusting regression models for changes in trends.

- Day Alastair L. Mastering Financial Modelling in Microsoft Excel, Pearson 2nd edition
- 2. Benninga Simon, Financial Modelling.
- 3. Pignataro Paul, Financial Modelling and Valuation: A Practical Guide to Investment Banking And Private Equity.
- 4. Rees Michael, Financial Modelling in Practice.

BA-404: Predictive Analysis for Business Decision

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Supervised Learning and Unsupervised Learning - Preparing Data for predictive modeling - Data Exploration - Decision Trees - Cultivating Decision Trees Optimizing the Complexity of Decision Trees - Interpreting Decision Trees - Logistic Regression Simple and Multiple Logistic Regression - Selecting Regression Inputs Optimizing Regression Complexity - Interpreting Regression Models - Transforming Inputs -Categorical Inputs Treatment - Categorical Input Consolidation Data Reduction/Selection Strategy - Introduction to Machine Learning Algorithms - Model Assessment - Model Fit Statistics - Statistical Graphics for Comparing and Assessing Models Implementing Predictive Models-Ensemble Models-Clustering and Segmentation Analysis K-Means Clustering-Profiling and Interpreting Clusters.

- 1. Larsoe and Larose, Data Mining and Predictive Analysis, Willey Publishing
- 2. Seymour Geisser, Predicative Inference: An Introduction, Spring
- 3. Ralph Writers, Practical Predictive Analysis, Packet
- 4. Dean Abbott, Applied Predictive Analytic, Willey Publishing

BA-405: Data Analysis using Python

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

PYTHON:

- Introduction to Computer and Python Programming
- Basics of Python Programming
- Variables, Expressions and Statements
- Decision Statements
- Conditional and Looping Construct
- Functions
- Strings
- Lists
- List Processing: Searching and Sorting
- Object-oriented Programming: Class, Objects and Inheritance
- Tuples, Sets and Dictionaries
- Graphics Programming: Drawing with Turtle Graphics
- File Handling

- 1. Kamthane-Programming and Problem Solving with Python(Mcgraw Hill Education)
- 2. Brown:Python : The Complete Reference(Mcgraw hill education)
- 3. R. Nageswara Rao-Core Python ProgrammingDreamtech Press/2016
- 4. John Paul Mueller-Beginning Programming with Python For Dummies, Wiley/ 2014
- 5. Paul Barry-Head First Python: A Brain-Friendly GuideShroff/O'Reilly/ 2016

BA-406: IOT and Big Data

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

INTERNET OF THINGS:

- The Internet of Things: An Overview
- Design Principles for Connected Devices
- Design Principles for the Web Connectivity for connected-Devices
- Internet Connectivity Principles
- Data Acquiring, Organizing and Analytics in IoT/M2M Applications/ Services/Business Processes
- Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services
- Sensors, Actuators, Radio Frequency Identification, Wireless Sensor Networks and Participatory Sensing Technology
- Prototyping the Embedded Devices for IoTs
- Prototyping Devices, Gateways, Internet and Web/Cloud Services Software Components
- Internet of Things Privacy, Security and Governance
- Business Models
- IoT Project Case Studies

BIG DATA:

Wholeness of Big Data,Big Data Sources and Applications,Big Data Architectures,Distributed Computing using Hadoop, Parallel Processing with MapReduce, No SQL Databases, Stream Processing with Spark,Ingesting Data,Cloud Computing,Web Log Analyzer Application Case Study,Data Mining Primer,Big Data Programming Primer

- 1. Raj Kamal: Internet of Things, McGraw Hill Education
- 2. Anil Maheshwari : Big Data, McGraw Hill Education
- 3. Arshdeep Bahga & Vijay Madisetti: Internet of Things -A Hands-on Approach(University press)

SEMESTER-III

ABM-301: Agri-Business Management

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours comprising of 5 short

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction to ABM: Meaning, definition, history, Importance and scope of agribusiness, Changing dimension of agricultural business, Agribusiness Managementdistinctive features, nature and components, Classification of Agricultural Products With Particular Reference to Seasonability; **Cooperative management**- nature, functions and purpose of cooperatives-

procurement, storage, processing, marketing, process of cooperative formation;**Overview** of agribusiness cooperative – credit cooperatives, cooperative marketing, dairy cooperative; financing agribusiness cooperative; **Control** :Price Quotations, Evolution of Agricultural Price Policy, Regulatory Measures by theGovernment, Market Reports Classification and Grading, Quality Control and Standardization,Storage and Warehousing, Government Policy on Storage and Warehousing;**Issues**:Marketing and Financial Management Issues in Co-operative, Micro Credit Financing Concept, Procurement & Distribution Management in Co-operatives, Legislative Framework of Cooperative.

Suggested Readings

1. Marketing Agricultural products, R.L. Kohls, Printice Hall

2. Agricultural Marketing in India, S.S Acharya & N.L Agrawal, Oxford & IBH

3. New dimensions of cooperative management, G.S Kamat, Himalaya Publishing House

4. Marketing in agricultural products ,Prabhakar Rao, Himalaya Publishing House

5Akmat JS. 1978. New Dimensions of Cooperative Management. Himalaya Publ. House.

6. Ansari AA. 1990. Cooperative Management Patterns. Anmol Publ.

7.Sah AK. 1984. Professional Management for the Cooperatives. Vikas Publ. House.

8.Srivastava, U.K. Vathsala. Agro-processing Strategy for Acceleration and Exports Oxford

University Press, YMCA, Library Building, Jai Singh Road, New Delhi – 110001.

9. Rajagopal. Organizing Rural Business Policy Planning and Management. Sage Publication, NewDelhi.

10. Pandey, Mukesh and Deepak Tiwari. Rural and Agricultural Marketing International Book

Distribution Co.New Delhi.

11Diwase, Smita. Agri-Business Management. Everest Publishing House, Everest Lane, 536,

ShaniwarPeth, AppaBalwantChowk, Pune-4110030

10(965)

ABM-302: Agricultural Economics

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Ouestion No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction to Agricultural Economics Meaning, concepts, definitions, scope and importance of Agricultural, Structure & Dynamics of Indian Agricultural: Place of agricultural in National economy, Special characteristics of agriculture in Indian economy, Pattern of agricultural holdings, Agricultural productivity: Trends, causes and consequences of low productivity in India, Green revolution: Strategy in development of Indian agriculture

Indian Agricultural Policy & Reforms: Meaning, types and importance, Evolution of agricultural policy, Famine Commission Report, Royal Commission on Agriculture: Recommendations, Land Reform Policy, Nature and objectives of land reforms, Major agricultural input policies including seed, fertilizer, pesticides, credit and irrigation, National Rural Employment Assurance Programme& other recent Agricultural Development Programs Role of NABARD & Other agricultural credit societies, Current Agricultural Export Polices for different commodities, Role of APEDA, National Rural Employment Assurance Programme& other recent Agricultural Development Programs

Suggested Readings:

1. Agrawal, A.N. - Indian Agriculture: Problems, Progress and Prospects. Vikas Publishing

House Pvt. Ltd., Delhi.

2. Mamoria, C.B. - Agricultural Problems of India.-Kitab Mahal, Allahabad

3. Owen Oliver, - Natural Resources Conservation and Ecological Approach.- MacMillan Co.866, Third Avenue, New York-10022.

4. Mamoria, C.B. - Agricultural Problems of India.-Kitab Mahal, Allahabad.

5. Bansil, P.C. - Agricultural Problems of India- Vikas Publishing House Pvt. Ltd., Delhi. 6. Jain, S.C. - Agricultural Policy in India.- Allied Publishers Pvt.Ltd. Mumbai, Kolkatta, New

Delhi.

7. James P.G.- Agricultural Policy in wealthy Countries.- Ague and Robertson Publishers,

Sydeny.

8. Karla, O.P.- Agricultural Policy in India.- Bombay Popular Prakashan, Mumbai.

9. Datta, K.K. and K.P.M. Sundaram. - Indian Economy.- Latest Edition, S. Chand and Co.,

Ltd., 7361, Ram

Nagar, Qutab Road, New Delhi-110055.

10. Banerjee, G.C.- Text Book of Animal Husbandry.- Oxford and IBH Publishers, New Delhi.

11. Mahanta, K.C. - Animal Husbandry in India.

12. Patnkar, S.V.- Financial Management.- Everest Publishing House Everest, Parshuram

ABM-305: Agri-Business Finance

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction to Agribusiness Finance: Agribusiness Finance; Agribusiness producers; Flow of fund in the economy; Importance of finance to agribusiness; Domestic trends in agribusiness finance; International trends.

Agribusiness loans: Legal issues, terms, interest rates; Promisory Note; Parties to loan Transactions; Security Agreement; Mortgages versus deeds of trust; other loan terminology; life cycle of loan; default and foreclosure; determinants of interest rates.

Time value of money, loan calculations and analysis; compound interest; the process of discounting; annuities; present value of an annuity; basic loan calculations; building an amortization schedule; loan balance; refinance analysis; cash budgeting.

Capital budgeting and leasing; cost of capital; capital budgeting techniques other considerations regarding capital budgeting; lease and leasing.

Financial statements; Generally accepted accounting principles and the farm financial standard council; the income statement; owner's equity; the balance sheet; accrual adjusted income statement; statement of cash flows.

Financial statement analysis; ratios analysis; common-size statement and horizontal analysis; risk in agribusiness; sources of business risk in agriculture; risk management in agriculture.

Agriculture lending industry: commercial banks and farm credit system; other agribusiness lenders; venders/ trade credit; life insurance financing.

Suggested Readings:

1. Battles Ralph W. Robert C. Thompson, Fundamental of agribusiness finance, Wiley

ABM-303 Agricultural Marketing Management

Max. Marks:

100

External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Introduction to Agricultural Marketing- Meaning, Nature, Scope and Problems.

Similarities and Differences between Consumer and Agricultural Marketing. Agriculture

Market Structure.

Agricultural Marketing Environment- Prominent Environmental factors influencing

Agricultural Marketing.

STP Approach with Respect to Agricultural Marketing.

Agricultural Marketing Mix-

Concept and Types of Agri Products. The Concepts of New Product Development and

Product Life Cycle as Applicable in Agri Products; Pricing Policies and Practices for

Agribusiness; Agri Distribution Management; Basic Concepts of Promotion as

Applicable in Agribusiness.

Role of Retail Institutions and Cooperative Agencies in Agribusiness Marketing in

India- A Reference to Organisations Like FCI, NAFED, STC, Reliance Fresh and Easy

Day etc.

Role of **IT** and **Telecommunications** in Agribusiness Marketing.

- 1. Acharya, S S and N.L Agarwal, Agricultural Marketing in India, Oxford Publications
- 2. Gupta, A P, Marketing of Agricultural Produce in India, Vora and Company Publishers.
- 3. Kotler et. Al, Principles of Marketing, Pearson Education Inc., New Delhi, 13th Edition.
- 4. Pandey M and D Tiwari, Rural and Agricultural Marketing, International Book Distribution Co.

ABM-304: Agri- Entrepreneurship

Max. Marks: 100 External: 70 Internal: 30 **Note:** The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Agribusiness Entrepreneurship - Key Concepts in entrepreneurship, entrepreneur in economic theory – Types of entrepreneur and the entrepreneurial process; Business planning process; Factors affecting success of a new Business; Environment assessment (PESTEL): political, economic, social, Technological, ecological and legal environment. Developing an effective business plan: components and procedure to prepare a business plan. Entrepreneurial Venture Initiation: Assessment of business opportunities. Business creation: Methods and Procedures to start and expand one's own business. Managing growth: using external parties to help grow a business, franchising, advantages and limitations; case studies of progressive farmers and successful Agri-business enterprises. Institutions supporting entrepreneurs; Assistance from MSME to Agri entrepreneurs: Marketing Assistance, Research Development and Training Facilities, Export Assistance, Technology Up gradation, Assistance to Ancillary Industries, Incentives for MSMEs in Backward Areas and contemporary ED programmes.

- 1. Kumar, Arya (2012); Entrepreneurship, Pearson, New Delhi.
- 2. Greene, Cynthia L (2006), Entrepreneurship, Cengage Learning, New Delhi
- 3. Timmons, Jeffry A and Spinelli, Stephen(2007), New Venture Creation, McGrawHill, seventh edition, New Delhi
- 4. Wickham, Phillip A (1998); Strategic Entrepreneurship, Pitman, UK.
- Krishnamurthi, S. Guide to Micro, Small and Medium Enterprises Policy, Rules and Regulations (3rd Ed.). Orient Publishing Company. www.msme.gov.in

ABM-401: Changing Paradigm of Agri-Business

Max. Marks: 100 External: 70 Internal: 30 Time 3 Hours

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Concept of E-agribusiness: Need & importance of E-agribusiness, Different models in E-agribusiness, Microfinance with special reference to SHGs.

Green house / Polyhouse techniques Basic concept of Green house / Polyhouse, Constructing Green House / Polyhouse, Differentcommercially important horticultural and other plants grown in Green House / Polyhouse, Importance & future scope of the technique.

Agro-tourism :Concept of agro tourism, Agro-tourism as a new potential business**Information Technology and telecommunication in marketing of agricultural commodities** :Market research-Market information service - electronic auctions (e-bay), e-Chaupals, Agri market and Domestic and Export market Intelligence Cell (DEMIC) – Market extension, role of IT in Agri. Supply Chain Management

Suggested Readings:

1. "Commercial Agri-enterprises-Strategy Achievement and Future prospects", S. N. Misra, Deep &Deep Pulications, New Delhi.

2. Indian Agriculture & Agri-business management, Dr. SmitaDiwse, Krishi Resource ManagementNetwork

3. B. Misra, G. C. Kar, S. N. Misra, 2004," Agro Industries and Economic Development, A vision of the 21st Century", Deep & Deep Publications Pvt. Ltd., New Delhi

4. Dairy Technology, By Sukumar De, Tata MC Grew Hills Publication, New Delhi

5. Food biotechnology, S N Tripathy, Dominant Publishers and Distributors, New Delhi

ABM-402: Agri Supply Chain and Logistics Management

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Supply Chain- Concept, Evolution and Significance. Role and Models of Supply Chain

as Applicable to Agribusiness. Traditional v/s Modern Agri Supply Chain Management.

Demand Planning and Forecasting in Agri Supply Chain. Operations and Manufacturing

Management in Agri Supply Chain.

Procurement Management in Agri Supply Chain: Purchasing Cycle, Type of Purchases

and Contract/Corporate Farming.

Performance Measurement and Controls in Agri Supply Chain Management.

Logistics Management in Agribusiness- Elements of Logistics as Applicable to

Agribusiness.

Distribution Strategies and Pool Distribution in Agribusiness.

Transportation Management in Agribusiness.

Warehousing, Packaging and Third Party logistics in Agribusiness.

Role of Information Technology in Logistics Management.

- 1. Altekar R V, Supply Chain Management: Concepts and Cases, Prentice Hall of India.
- 2. Satish C. Ailawadi, Rakesh Singh: Logistics Management, Prentice Hall of India, 1stEdition, 2005
- 3. Janat Shah: Supply Chain Management-Text and Cases, Pearson Education India. 20091stedition.
- 4. Tapan K. Panda, Sunil Sahadev: Sales and Distribution Management, Oxford UniversityPress, 2008.
- 5. S.A.Chunawala: Sales and Distribution Management, Himalaya Publishing House, 2ndEdition, 2008.

ABM-403: Food Processing Management

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Managerial aspects in Food Processing Industry: Organization of a food processing unit: Different department involved in a food processing company andimportance of coordination in those departments' etc., Food processing planning ,Scheduling and control,Importance of production, marketing & distribution aspects in food processing sector. Management of Agro Processing Industry: Factors to be considered while establishing food processing plant including government norms &requirements, Actual processing of Agri-produce into final products, Waste management in food processing , Utilization of byproducts in agroprocessing industry, Food quality management systems,Market study of processed food products: Introduction to different research institutions and corporations involved in food processing sector,

Suggested Readings:

1. "Commercial Agri-enterprises-Strategy Achievement and Future prospects", S. N. Misra, Deep &Deep Pulications, New Delhi.

2. Indian Agriculture & Agri-business management, Dr. SmitaDiwse, Krishi Resource Management

Network

4. Dairy Technology, By Sukumar De, Tata MC Grew Hills Publication, New Delhi

5. Food biotechnology, S N Tripathy, Dominant Publishers and Distributors, New Delhi
ABM-404: International Trade in Agri-Business

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

International Trade – Basic concepts and importance of international trade, gains from trade, trade policies-instruments of trade policy- tariffs, subsidies, quotas, Case for protectionism and for free trade; Importance of Agriculture in development, trade and agriculture, globalization and agriculture, emerging scenario of international trade in agricultural commodities ; WTO-Agreement on agriculture -main provisions - market access, domestic support, export subsidies and other provisions, issues for further negotiations, implications of WTO provisions on Indian Agriculture-reduction commitments for India, Foreign Trade of India, trade policy, Indian agricultural trade, trends in exports and imports, changing structure and pattern of agricultural trade, export potential of various agro-commodities, export and import procedures and documentations. Competitiveness of Indian Agriculture, measures of competitiveness, competitiveness of various crops, measures for improvement

Suggested Readings:

- 1. Datta Samar K. and Satish Y. Deodhar (2001), Implications of WTO Agreements for Indian Agriculture, Oxford and IBH PubCo., New Delhi
- 2. Chadha G. K. (2003), WTO and Indian Economy. Deep and Deep Publications
- 3. Hooda and Gulati (2007), WTO Negotiations on Agriculture and Developing Countries, Oxford University Press, New Delhi
- 4. Gulati, Ashok and Tim Kelley (1999), Trade liberalization and Indian Agriculture: Cropping Pattern Changes and Efficiency Gains in Semi-Arid Tropics, Oxford University Press in New Delhi, New York .
- Vashisht A. K. and Singh Alka (2003), WTO and New International Trade Regime- Implication for Indian Agriculture. Advance Publishing Concept.

ABM-405: Marketing of Agri-Inputs

Note: The examiner will set nine questions in all. Question No. 1, comprising of 5 short answer type questions of 4 marks each, shall be compulsory and remaining 8 questions will be of 10 marks out of which a student is required to attempt any 5 questions.

Course Contents:

Agricultural input marketing – meaning and importance; Management of distribution channels for agricultural input marketing; Agricultural Inputs and their types – farm and non-farm, role of cooperative, public and private sectors in agri input marketing.

Seed- Importance of seed input; Types of seeds- hybrid, high yielding and quality seeds; Demand and supply of seeds; Seed marketing channels, pricing, export-import of seeds; Role of NSC and State Seed Corporation.

Chemical Fertilizers- Production, export-import, supply of chemical fertilizers, Demand/consumption, Prices and pricing policy; subsidy on fertilizers; marketing system – marketing channels, problems in distribution; Role of IFFCO and KRIBCO in fertilizer marketing.

Plant Protection Chemicals- Production, export/import, consumption, marketing system – marketing channels; Electricity/Diesel Oil- marketing and distribution system; pricing of electricity for agriculture use; subsidy on electricity.

Farm Machinery- Production, supply, demand, Marketing and distribution channels of farm machines; Agro-industries Corporation and marketing of farm machines / implements/Equipment.

Suggested Readings

- 1. Acharya SS & Agarwal NL. 2004. *Agricultural Marketing in India*. 4th Ed. Oxford & IBH.
- 2. Broadway AC & Broadway Arif A. 2003. A Text Book of Agri-Business Management. Kalyani.
- 3. Singh AK & Pandey S. 2005. Rural Marketing. New Age.
- 4. Singh Sukhpal 2004. *Rural Marketing- Focus on Agricultural Inputs*. Vikas Publ. House.

Paper 803

B.A.LL.B. (Hons) 5- Year Integrated Course 8th - Semester Indirect Taxation Laws

Internal Assessment: 20 Marks Theory: 80 Marks Total: 100 Marks Time: 3 hours

Note:

(a) Nine questions shall be set in all, two questions in each unit I-IV and one compulsory question in Unit-V.

(b) The compulsory question in Unit-V shall consist of four parts, one from each Unit I-IV.

(c) The candidate shall be required to attempt five questions in all, selecting one question from each Unit I-IV and question no. 9 in Unit-V shall be compulsory.

(d) Each question in Unit I-IV shall carry 15 marks and question no.9 in Unit-V shall carry 20 marks.

Unit- I

Goods and Services Tax Act, 2017:

Definitions: Business, Capital Goods, Consideration, Continuous Supply of Goods and Services, Exempt

Supply, Goods, Input Tax, Local Authority, Manufacturer, Market Value, person, Place of Business, Reverse Charge, Service.

Historical Background, Nature & Scope, Object and Constitutional Amendment.

Principles and Kinds of GST- CGST, SGST & IGST.

Tax liability on Composite Supplies- Input Tax Credit.

Eligibility and Conditions for Taking Input Tax Credit.

Unit –II

Officers under the Act; Appointment & Powers; Scope of Supply.

Levy and Collection; Powers to Grant Exemption from Tax.

Time of Supply of Goods and Services.

Assessment: Accounts and Records, Return, Assessment, Audit, Payment of Tax, Refund, Search and Seizure

Unit-III

Registration, Return, demand & Recovery, Appeals & Revision:

Registration- Person liable for Registration, Persons not Liable for Registration.

Procedure for Registration, Compulsory Registration, Cancellation of Registration, Exemption from GST Registration.

Returns –Furnishing Details of Outward and Inward Supplies, Furnishing of Returns, Payments of Tax, Interest, Penalty and other Amounts, Tax Deduction at Source, Collection of Tax at Source.

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Demand and Recovery- Advance Ruling, Definitions for Advance Ruling. Appeal and Revision- Appeals to Appellate Authority, Powers of Revision Authority. Constitution of Appellate Tribunal and benches thereof, Offences and Penalties

Unit-IV

The Integrated Goods and Services Tax Act,2017:

Definitions - Central Tax, Export and Import of Goods or Services or both, Integrated Tax, Intermediary, Location of the Recipient and Supplier of Services Non Taxable Online Recipient, Online Information Data Base Access or Retrieval Services, Output Tax, Special Economic Zone, Supply. Administration and Collection of Tax Determination Nature of Supply, Place of Supply Refund: Zero Rated Supply Apportionment of Tax and Settlement: Taxability of E-Commerce, Anti –Profiteering, Avoidance of dual control, E-way bills, Offences and Penalties, Appeals.

Statutory Material:

The Constitution (One hundred and First Amendment) Act,2016. The Goods and Services Tax Act, 2017. The Central Goods and Services Tax act, 2017. The Union Territory Goods and Services Tax Act,2017. The Integrated Goods and Services Tax Act, 2017.

Suggested Readings:

Government of India	GST Law Manual and Vastu and Sevakar Vidhan.
V.S Datey,	GST Law & Practices with Custom & FTP, 2018.
Singhania, Dr. Vinod K. &,	Student's Guide to Income Tax including GST, 2018.
Dr. Monica Singhania	
Jain, Sweta,	GST Law and Practice- A Section Wise Commentary on GST.
V S Datey	GST E-way bill
C A Kashish Gupta	GST (Goods and Services Tax)

KURUKSHETRA UNIVERSITY, KURUKSHETRA

SCHEME OF COMPUTER AWARENESS TO BE INTRODUCED AT UNDER

GRADUATE LEVEL

Paper	Paper	Pass	Examination	
Code	Name	Marks	Marks	Duration
	COMPUTER AWARI	ENESS (LEVEL – I) w.e.f. 2018-1	19
L1 – (I)	Basic Computer Education	100	35	3 hours
L1 – (II)	Software Lab – I	100	35	3 hours

Important Instructions:

- 1. The theory question paper will be provided by the University.
- 2. The practical question paper will be set by the examiner on the spot.
- 3. The workload for theory paper is 03 (three) periods per week.
- 4. The practical of students will be held in groups.
- 5. Each group will comprise of maximum 30 students.
- 6. The workload for practical paper is 06 (six) periods per group per week.

COMPUTER AWARENESS (LEVEL – I) L1 – (I) BASIC COMPUTER EDUCATION (w.e.f. 2018-2019)

Max. Marks: 100

Pass Marks: 35

Exam Duration: 3 Hrs

Workload: 3 periods/week

Note: The examiner will set total 10(ten) questions covering the entire syllabus. Student will attempt any five questions. All questions will carry equal marks.

- **Operating System -** Definition & Functions of Operating System, Basics of Popular Operating Systems; The User Interface, Exploring Computer, Icons, taskbar, desktop, Using Menu and Menu-selection, managing files and folders, Control panel – display properties, add/remove software and hardware, Running an Application, Using help; Creating Short cuts, Basics of O.S Setup; Common utilities.
- **Word Processing:** Introduction to Word Processing, Menus, Creating, Editing & Formatting Document, Spell Checking, Printing, Views, Tables, Word Art, Mail Merge, Macros.
- **Spread Sheet:** Elements of Electronics Spread Sheet, Applications, Creating and Opening of Spread Sheet, Menus, Manipulation of cells: Enter texts numbers and dates, Cell Height and Widths, Copying of cells, Mathematical, Statistical and Financial function, Drawing different types of charts.
- **Presentation Software:** Creating, modifying and enhancing a presentation, Delivering a presentation, Using sound, animation and design templates in presentation.
- **Computer Communication:** Internet and its applications, Connecting to internet, Surfing the Internet using web browsers, Web Browsing softwares, Search Engines, Understanding URL, Domain name, IP Address, Creating Email Id, Viewing an E-Mail, Sending an E-Mail to a single and multiple users, Sending a file as an attachment.

REFERENCES BOOKS

- 1. Help files from Apache Open Office, https://wiki.openoffice.org/wiki/Documentation
- 2. Channelle Andy, "Beginning OpenOffice 3 : From Novice to Professional", aPress Publications
- 3. Begining OpenOffice 3: From Novice to Professional, Andichannele, Apress.
- 4. Microsoft Office 2016 Step by Step: MS Office 2016 Step by S_p1, By Joan Lambert, Curtis Frye
- 5. Computer Fundamentals By Pradeep K. Sinha, Priti Sinha, BPB Publications, 6th Edition
- 6. Getting Started with LibreOffice 5.0, Friends of OpenDocuments Inc., Http://friendsofopendocument.com
- 7. Documentation from LibreOffice, https://documentation.libreoffice.org/en/englishdocumentation/

L1 – (II) SOFTWARE LAB – I

Max. Marks: 100

Exam Duration: 3 Hrs

Pass Marks: 35

Workload: 6 periods/week

Based on the syllabus mentioned above.

Operating System: Starting with basics of Operating Systems and its functionalities **Word Processing:**

- Create and format word documents.
- Use tables, wordArt and other features in your documents.
- Use macros to simplify the tasks in a document.
- Use mail merge to write once for many.

Spread Sheet:

- Use spreadsheet for basic data handling
- Apply formulas to sheet for automation.
- Use if-else to make certain decisions in a sheet.
- Use Charts & Shapes for better visualization of data.
- Use filters and data validation controls for control of data

Presentation Software:

- Prepare and format presentations.
- Apply slide transitions, animations and sequencing for slides.
- Apply different formatting and insert options to make presentation better.
- Use rehearse and timing options for a presentation with handouts.

Computer Communication:

- Search any topic related to your syllabi using any search engine and download the relevant material.
- Create your E-Mail ID on any free E-Mail Server, Login through that and implement various operations provided in it.
 - Send and Read email to one and multiple recipients.
 - o Manage emails using labels and sub folders in listing using filters.
 - Manage contacts with groups and labels.
 - Use of features like vacation Responder, Signature, forwarding of mails, spam mails etc.

Other than features written above, teacher can use other features to enhance the knowledge of students and make them employable. Also a type-test should also be conducted and to qualify it the required typing speed should be minimum 15 wpm (Words Per Minute) with final practical exam.

KURUKSHETRA UNIVERSITY KURUKSHETRA Scheme of Examination for Bachelor of Vocation (Networking and Mobile Applications) (Three Year Programme) w.e.f. academic session 2018-19

Semester 5

Paper	Nomenclature	Duration	External	Internal	Max	Туре	Hours	Credits
Code		of Exam			Marks		per	
							Semester	
BVNM-	Data	3 Hours	80	20	100	General	60	4
16-51	Structures - I							
BVNM-	Web	3 Hours	80	20	100	General	60	4
16-52	Engineering							
BVNM-	Trends in	3 Hours	80	20	100	General	60	4
16-53	Computing							
	Technologies							
BVNM-	Programming	3 Hours	80	20	100	Skill	60	4
16-54	with JSP/							
	Servlet							
BVNM-	Practical -	3 Hours	80	20	100	Skill	75	5
16-55	JSP/ Servlet							
BVNM-	Case Study	3 Hours	160	40	200	Skill	135	9
16-56								

Semester 6

Paper	Nomenclature	Duration	External	Internal	Max	Туре	Hours in	Credits
Code		of Exam			Marks		Semester	
BVNM-	Data	3 Hours	80	20	100	General	60	4
16-61	Structures - II							
BVNM-	Advanced Web	3 Hours	80	20	100	General	60	4
16-62	Engineering							
	Web	3 Hours	80	20	100	General	60	4
BVNM-	Programming							
16-63	for Graphics							
BVNM-	Programming	3 Hours	80	20	100	Skill	60	4
16-64	with Python							
BVNM-	Practical -	3 Hours	80	20	100	Skill	75	5
16-65	Python							
BVNM-	Implementation	3 Hours	160	40	200	Skill	135	9
16-66	of Case Study							

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

Introduction to Data Structures: Elementary Data Organization, Data Structure, Data Structure Operations, Algorithm Complexity and Time-space Tradeoff, Classification of Data Structures.

String Processing: Storing Strings, String Operations, Pattern Matching Algorithms.

Unit - II

Arrays: Linear Arrays, Multidimensional Arrays, Representation of linear and Multidimensional arrays in memory, Operations on Arrays: Traversing, Insertion of element, Deletion of element, Sorting, Searching, Sparse Matrices.

Linked Lists: Representation of Linked List in Memory, Traversal, Searching, Memory Allocation, Garbage Collection Insertion, Deletion, Sorted Linked List, Header List, Two-way List,

Unit - III

Stacks: Linked and Array Representation of Stacks, Applications of Stack: Recursion, Polish Notation, Ouick Sort, Implementation of recursive procedures by stacks

Queues: Linked and Array Representation of Queues, Operations on Queues, Applications of queues; Dequeues, Priority Queues.

Unit - IV

Trees: Binary Trees, Representation of Binary Trees in Memory, Threaded Binary Trees, Balanced Tree, Different Tree Traversal Algorithms using recursion and stacks. Binary Search Tree: Searching, Insertion, and Deletion in a Binary Search Tree

Graphs: Graph Theory Terminology, Sequential Representation of Graphs: Adjacency matrix, path matrix,; Dijkstra algorithm for shortest path

Text Books:

- Lipschutz Seymour, Data Structures, Tata Mc Graw Hill Publishing Company Limited, Schaum's • Outlines, New Delhi, 1986
- Langsam Yedidyan, Augenstein Moshe J. and Tanenbaum Aaron M., Data Structures using C, Prentice Hall of India Pvt. Ltd., New Delhi, 2009

Reference Books:

- Terembley J.P. and Sorenson P.G., An Introduction to Data Structures with Applications, Mc-Graw • Hill, International Student Edition, New York, 1988
- Weiss Mark Allen, Data Structures and Algorithm Analysis in C, Addison Wesley (An Imprint of Pearson Education), Mexico City, Prentice Hall of India Pvt. Ltd., New Delhi

External: 80

Internal: 20

BVNM-16-52 Web Engineering

Maximum marks: 100

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

Introduction to Web Engineering: Categories and Characteristics of Web Applications, Web Applications Vs Conventional Software, Need for an Engineering Approach. Introduction: Introduction to www, History, Understanding Client/Server Roles, Apache, PHP, My SQL, XAMPP Installation.

PHP Fundamentals: PHP Basic Syntax, PHP Data Type, PHP Variables, PHP Constants, PHP Expressions, PHP Operators, PHP Control Structures, PHP Loops.

Unit - II

PHP Arrays: PHP Enumerated Arrays, PHP Associative Arrays, Array Iteration, PHP Multidimensional Arrays, Arrays Functions.

PHP Function: PHP Functions, Syntax, Arguments, Variables, References, Pass by Value & Pass by References, Return Value, Variable Scope, PHP include(), PHP require().

Unit - III

PHP Forms: PHP Form Handling, PHP GET, PHP POST, PHP Form Validation, PHP Form Sanitization. PHP Cookies & PHP Sessions: PHP Cookies Handling, PHP Session Handling, PHP Login Session, Managing user ACL.

PHP Strings Handling: Strings and Patterns, Matching, Extracting, Searching Replacing, Formatting, PCRE.

Unit - IV

Database Basics, Indexes, PHP MyAdmin, Connect & P-connect, My SQL Create, My SQL Insert, My SQL Select, My SQL Update, My SQL Delete, My SQL Truncate, My SQL Drop. Connectivity of PHP with My SQL.

Text Books:

- Holzner Steven, The Complete Reference PHP, Mc-Graw Hill Professional, 2008
- Balagurusamy E., Programming in C#, Tata Mc-Graw Hill, 2010

Reference Books:

- Jain V.P., The Complete Guide to C# Programming, 2001
- Schildt Herbert, C# : A Beginner's Guide, Tata Mc-Graw Hill, 2009

External: 80 Internal: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

(Cloud Computing)

Cloud Computing Basics: Cloud Computing Definition, Cloud Types, Characteristics, Laws of Cloudonomics, Cloud Computing Drawbacks, Cloud Adoption, Measuring Cost;

Cloud Architecture: Cloud Computing Stack, Connecting to Cloud;

Cloud Services and Applications: Infrastructure as a Service, Platform as a Service, Software as a Service, Defining identity as a Service, Defining Compliance as a Service.

Unit – II

Abstraction and Virtualization: Virtualization Technologies, Load Balancing, Hypervisors, Machine Imaging, Porting Applications.

PaaS Application Frameworks: Drupal, Eccentex Appbase, Long Jump, Square Space, Wave Maker, Wolf Framework.

Google Web Services: Google Application Portfolio, Google Toolkit, Google Application Engine;

Amazon Web Services: Elastic Compute Cloud, Amazon Storage System, Amazon Database Services; Microsoft Cloud Services: Windows Azure Platform, Windows Live;

Unit - III

(Internet of Things)

Introduction: Internet of Things: Physical Design, Logical Design, IoT Enabling Technologies, IoT Levels & Deployment Templates, Domain Specific IoTs: IoT and M2M

IoT Architecture: M2M high-level ETSI architecture, IETF architecture for IoT, OGC architecture, IoT reference model, Domain model, information model, functional model, communication model. IoT reference architecture

Unit - IV

IoT Protocols: Protocol Standardization for IoT, Efforts, M2M and WSN Protocols, SCADA and RFID Protocols

Unified Data Standards: Protocols IEEE 802.15.4, BACNet Protocol

Text Books:

- Sosinsky Barrie, Cloud Computing Bible, Wiley Publishing Inc., 2011
- Raj Kumar Buyya, Internet of Things Principles and Paradigm, Amir Vahid, Morgan Kaufmann

Reference Books:

- Kunze Marcel, Cloud Computing Web based Dynamic IT Services, Springer, 2011
- Peter Wahar, Learning Internet of Things, Packt Publishing

External: 80

Internal: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

Servlet: Background, Life cycle of Servlet, Using Tomcat for Servlet development, Example of simle Servlet

Servlet API: Javax.servlet Package: The Servlet Interface, ServletConfig Interface, ServletContext Interface, ServletRequest Interface, ServletResponse Interface, GenericServlet Class, ServletInputStream Class, ServletOutputStream Class

Unit - II

Reading Servlet parameters, Javax.servlet.http Package: HttpServletRequest Interface, HttpServletResponse Interface, HttpSession Interface, HttpSessionBindingListener Interface, Cookie Classes, Session Tracking

Unit - III

JSP Overview, JSP Syntax and Semantics, Expressions and Srcriptlets, Declarations, Request Dispatching, The Page Directive, JSP tag Extensions

Unit - IV

HTML Forms, Database Access, Session and Thread Management, JSP Testing and Debugging, Developing Simple application

Text Books:

- Phil Anna, The Complete Reference JSP, The McGraw Hill, 2001
- Herbert Schildt, The Complete Reference-Java, The McGraw Hill, 20013

Reference Books:

- Joel Murach, Java Servlets and JSP, Mike Murach & Associates, 2014
- Bryan Basham, Head First Servlets and JSP, O'Reilly Media, 2008

External: 80 Internal: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

Tree: Introduction, AVL Search Trees, Operations on AVL Tree: Insertion, Deletion; m-way Search trees, Operations on m-way search trees: Searching, Insertion, deletion; B Trees, Operations on B Trees: Searching, Insertion, deletion; Heap; Huffman's algorithm; General trees.

Unit - II

Graph: Introduction, linked representation of graphs, operations on graphs: Searching of node and edge, Insertion of Node and edge, Deletion of node and edge, traversal algorithms in graphs and their implementation, Spanning Tree.

Unit - III

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Comparison of various sorting and searching algorithms on the basis of their complexity. Searching: Linear Search, Binary Search and their complexities

Unit - IV

Files: Introduction Attributes of a file, Classification of files, File operations, Comparison of various types of files, File organization: Sequential, Indexed-sequential, Random-access file. Hashing: Introduction, Hash functions, Collision resolution.

Text Books:

- Seymour Lipschutz, "Data Structure using C", Tata-McGraw-Hill
- Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

Reference Books:

- Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw-Hill International Student Edition, New York.
- Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

jQquery Overview: Introduction, Using jQuery, Strings, Numbers, Boolean, Objects, Arrays, Functions, Built-in functions Selectors: Name selector, ID selector, Class selector, Universal selector, Multiple selector jQuery Attributes: Get attribute value, Set attribute value, Applying styles, Attribute methods DOM Traversing, DOM manipulation, Event handling

Unit - II

Introduction of ajax, ajax technologies, ajax-Browser Support, applications using ajax, advantages and drawback of ajax. XmlHttpRequest object and their Methods. Ajax - request to a server, Ajax - server response, Get resquest, post request, The onreadystatechange property, Retrieve Database Information

Unit - III

Introduction of JSON, JSON Data Types, JSON Syntax Rules, JSON Objects: Object Syntax, accessing Object Values, Looping an Object, Nested JSON Objects, Modify Values, Delete Object PropertiesArrays as JSON Objects: Looping Through an Array, nested Arrays in JSON Objects, Modify Values, Delete Array Items

Unit - IV

JSON.parse(); JSON From the Server, Array as JSON Parsing Functions. Exceptions in Parsing Dates JSON.stringify(): Stringify a JavaScript Object, Stringify a JavaScript Array, Stringify dates, Stringify Functions, Woking with JSON PHP

JSON HTML: HTML Table, Dynamic HTML Table, HTML Drop Down List

Text Books:

- Jonathan Chaaffer, Karl Swedberg, Learning jQuery fourth edition, Packt Publishing Ltd. 2013.
- Steven Holzhu, Ajax (A Begineer's Guide), Tata Mc Graw Hill, 2009
- Thomas A. Powell, Ajax: The Complete Reference, Tata Mc Graw Hill, 2008
- Bensmith, Apress, 2015

- Richard York, Web Development with jQuery, John Wiley & Sons, 2015
- Paul J Deitel, Harvey M. Deitel, Ajax, Rich Internet Application and Web Development for programmers, Prentice Hall, 2009
- Lindsay Dassett, Introduction to Java Script Object Notation, O'Reilly Media, 2016

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

Introduction to computer Graphics and its applications, Components and working of Interactive Graphics, Input Output devices used with graphics, Display Processors, Graphics Software. Coordinate representation

Point Plotting Techniques: Scan conversion of straight line: Symmetrical and simple DDA line drawing algorithm, Bresenham's algorithm, Circle drawing using polar coordinates, Bresenham's circle drawing algorith

Unit - II

2D transformation: Translation, rotation, scaling, matrix representation and homogeneous coordinates, composite transformation, shearing, reflection

3D Graphics: 3D modelling of objects, transformation - translation, rotation, scaling, Introduction to parallel and perspective projection

Unit - III

Introduction: OpenGL, WebGL, Development of WebGL, Rendering, GPU, Browser Support, Advantages of OpenGL, HTML- 5 2D canvas, The Rendering Context, WebGL Context Basics: WebGL Co-ordinate System, WebGL Graphics, WebGL Graphics Pipeline: JavaScript, Vertax Shader, Primitive Assembly, Rasterization, Fragment shader, Fragment Operations, Frame Buffer

Unit - IV

Structure of WebGL Applications, Creating WebGL Canvas Element, Defining the required Geometry, Bugger Objects, Creating a Buffer, Bind the Buffer, Passing Data to Buffer, Types Array, Unbind the buffers, Associating attributes and buffer objects

Drawing Point, Drawing Triangles, Drawing Quad, Translation, Scaling, Rotation

Text Books:

- Donald Hearn, M. Pauline Baker, Computer Graphics, Pearson Education.
- D.P. Mukherjee, Fundamentals of Computer Graphics and Multimedia, PHI.
- Kouichi Matsuda Rodger Lea, WebGL Programming Guide, Addison-Wislley

Reference Books:

- Newmann & Sproull, Principles of Interactive Computer Graphics, McGraw Hill.
- Rogers, Procedural Elements of Computer Graphics, McGraw Hill.

10(987)

External: 80

Internal: 20

BVNM-16-64 Programming with Python

Maximum marks: 100

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus.

Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Unit - I

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elifelse, for, while, break, continue, pass

Unit - II

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

Modules: Creating modules, import statement, from. Import statement, name spacing, **Python packages** Introduction to PIP, Installing Packages via PIP, Using Python Packages

Unit - III

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding.

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

Unit - IV

Brief Tour of the Standard Library - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, Turtle Graphics **Testing:** Why testing is required ?, Basic concepts of testing, Unit testing in Python, Writing Test cases, Running Tests.

Text Books

- Vamsi Kurama, Python Programming: A Modern Approach, Pearson Education New Delhi, 2017,
- Mark Lutz, O'Rrilly, Learning Python- Second Edition, 2003

Reference Books

- Allen Downey, Think Python, Green Tea Press, 2009
- W.Chun, Core Python Programming, , Pearson, 2006
- Kenneth A. Lambert, Fundamentals of Python, Cengage Learning 2011

External: 80 Internal: 20

KURUKSHETRA UNIVERSITY KURUKSHETRA

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS SCHEME OF EXAMINATION FOR M.TECH. (COMPUTER SCIENCE & ENGINEERING) w.e.f. Academic Session 2018-2019 (CHOICE BASED CREDIT SYSTEM (CBCS) ONLY FOR UTD)

Paper Code	Nomenclature of Paper	Sch G Stu P W	Scheme of Studies Per Week		External Marks		Internal Marks	To Ma	tal rks
		L	Р	-	Max.	Pass	-	Max.	Pass
	Semester	: – I							<u> </u>
MT-CSE-18-11	Mathematical foundations of Computer Science	4	0	4	100	40	50	150	60
MT-CSE-18-12	Advanced Data Structures	4	4 0 4		100	40	50	150	60
MT-CSE-18-13	Elective- I	4	4 0 4		100	40	50	150	60
MT-CSE-18-14	Elective- II	4	0	4	100	40	50	150	60
MT-CSE-18-15	Research Methodology and IPR	3	3 0 3		100	40	50	150	60
MT-CSE-18-16	Laboratory- I (Advanced Data Structures)	0	5	2.5	100	40	50	150	60
MT-CSE-18-17	Laboratory- II (Based on Electives)	0	5	2.5	100	40	50	150	60
Total		19	10	24	700	280	350	1050	420
Elective – I		Elective – II							
MT-CSE-18-13(i): Machine Learning MT-CSE-18-13(ii): Wireless Sensor Networks MT-CSE-18-13(iii): Introduction to Intelligent Systems			MT-CSE-18-14(i): Data Science MT-CSE-18-14(ii): Distributed Systems MT-CSE-18-14(iii): Advanced Wireless and Mobile Networks						

Paper Code	Nomenclature of Paper	Scheme of Studies Per Week		Scheme of Studies Per Week		Credits		External Marks	Internal Marks	Tota	ll Marks
		L	Р		Max.	Pass		Max.	Pass		
	Semes	ster – I	Π								
MT-CSE-18-21	Advance Algorithms	4	0	4	100	40	50	150	60		
MT-CSE-18-22	Soft Computing	4	0	4	100	40	50	150	60		
MT-CSE-18-23	Elective- III	4	0	4	100	40	50	150	60		
MT-CSE-18-24	Elective- IV	4	0	4	100	40	50	150	60		
MT-CSE-18-25	Laboratory- I (Advance Algorithms)	0	5	2.5	100	40	50	150	60		
MT-CSE-18-26	Laboratory- II (Based on Electives)	0	5	2.5	100	40	50	150	60		
MT-CSE-18-27	Mini Project with Seminar	2	0	2	100	40	50	150	60		
(OE-201 to OE- 209)	OPEN ELECTIVE (Students has to select a paper from other department(s) of Faculty of Sciences of KUK)	2	0	2	35	14	15	50	20		
Total		20	10	25	735	294	365	1100	440		
Elective III		Elective IV									
MT-CSE-18-23(i): Data Preparation and Analysis MT-CSE-18-23(ii): Computer Vision MT-CSE-18-23(iii):Secure Software Design & Enterprise Computing			CSE-1 CSE-1 CSE-1	8-24(i 8-24(i 8-24(i): Adv i): Hu ii): Dig	vanced man an gital Fo	Comp d Com orensic	uter Ara puter In	chitecture nteraction		
OPEN ELECTIVE PAPERS: Students of UTD (University Teaching Department) are required to select an one paper out of option given below: OE-201 : Environmental and Analytical Chemistry OE-203 : Fundamentals of Nanomaterials OE-204 : General Geography of India OE-205 : Geosciences and SocietyOE-206 : Dynamics of the Earth OE-206 : Dynamics of the Earth OE-207 : Applied Algebra and Analysis OE-208 : Elements of Nano-science & Nano-technolog OE-209 : Statistics-I					echnology						

Paper Code	Nomenclature of Paper	Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Scheme of Studies Per Week		Credits		External Marks	Internal Marks	To Ma	rtal arks
		L	Р		Max.	Pass		Max.	Pass																		
	Semester	· – III																									
MT-CSE-18-31	Elective- V	4	0	4	100	40	50	150	60																		
MT-CSE-18-32	Dissertation-I / Industrial Project	0	20	10	250	100	100	350	140																		
(OE-301 to OE- 309)	• OPEN ELECTIVE (Students has to select a paper from other department(s) of Faculty of Sciences of KUK)		0	2	35	14	15	50	20																		
Total		6	20	16	385	154	165	550	220																		
Elective V MT-CSE-18-31(MT-CSE-18-31(MT-CSE-18-31(i): Mobile Applications and Servicesii): Compiler for HPCiii): Optimization Techniques																										
OPEN ELECT select any one pa OE-301 : Applie OE-303 : MEMS OE-304 : Genera OE-305 : Natura OE-306 : Earth (OE-307 : Applie OE-308 : Radiat OE-309 : Statisti	IVE PAPERS: Students of UTD (aper out of option given below: d Chemistry S : An Interdisciplinary Approach al Geography of World l Disasters Quake Hazard and Mitigation d Numerical Methods ion Physics cs-II	Univer	sity 7	Feachi	ng De	partme	nt) ar	e requi	red to																		
	Semester	- IV																									
MT-CSE-18-41	Dissertation – II	0	32	16	350	140	100	450	180																		
Grand Total of All Semesters		45	72	81	2170	868	980	3150	1260																		

MT-CSE-18-11: Mathematical foundations of Computer Science

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.
- To study various sampling and classification problems.

Learning Outcomes:

At the end of this course students should be able to:

- To understand the basic notions of discrete and continuous probability.
- To understand the methods of statistical inference, and the role that sampling distributions play in those methods.
- To be able to perform correct and meaningful statistical analyses of simple to moderate complexity.

Unit 1

Probability mass, density, and cumulative distribution functions, parametric families of distributions, Expected value, variance, conditional expectation, Applications of the univariate and multivariate Central Limit Theorem, Probabilistic inequalities, Markov chains

Unit 2

Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood, Recent Trends in various distribution functions in mathematical field of computer science for varying fields

Unit 3

Statistical inference, Introduction to multivariate statistical models: regression and classification problems, principal components analysis, the problem of over fitting model assessment.

Unit 4

Graph Theory: Isomorphism, Planar graphs, graph coloring, Hamilton circuits and Euler cycles.

Permutations and Combinations with and without repetition.

Specialized techniques to solve combinatorial enumeration problems Permutations and Combinations with and without repetition.

- John Vince, Foundation Mathematics for Computer Science, Springer.
- K. Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications. Wiley.
- M. Mitzenmacher and E. Upfal, Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
- Alan Tucker, Applied Combinatorics, Wiley

MT-CSE-18-12: Advanced Data Structures Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The student should be able to choose appropriate data structures, understand the ADT/libraries, and use it to design algorithms for a specific problem.
- Students should be able to understand the necessary mathematical abstraction to solve problems.
- To familiarize students with advanced paradigms and data structure used to solve algorithmic problems.
- Student should be able to come up with analysis of efficiency and proofs of correctness.

Learning Outcomes:

At the end of this course students should be able to:

- Understand the implementation of symbol table using hashing techniques. Develop and analyze algorithms for red-black trees, B-trees and Splay trees. Develop algorithms for text processing applications.
- Identify suitable data structures and develop algorithms for computational geometry problems.

Unit 1

Dictionaries: Definition, Dictionary Abstract Data Type, Implementation of Dictionaries. Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

Unit 2

Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees. Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists

Unit 3

Text Processing: Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

Unit 4

Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, k-D Trees.

Recent Trends in Hashing, Trees.

- Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004
- M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002

MT-CSE-18-13(i): Machine Learning

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To learn the concept of how to learn patterns and concepts from data without being explicitly programmed in various IOT nodes.
- To design and analyse various machine learning algorithms and techniques with a modern outlook focusing on recent advances.
- To explore supervised and unsupervised learning paradigms of machine learning.
- To exploring Deep learning technique and various feature extraction strategies.

Learning Outcomes:

At the end of this course students should be able to:

- Extract features that can be used for machine learning approach in various IOT applications and
- To get an insight of when to apply a particular machine learning approach.
- To mathematically analyze various machine learning approaches and paradigms.

Unit 1

Supervised Learning (Regression/Classification) Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, Naive Bayes, Linear models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Nonlinearity and Kernel Methods.

Unit 2

(Unsupervised Learning) Clustering: K-means/Kernel K-means, Dimensionality Reduction: PCA and kernel PCA, Introduction to ICA, Evaluating Machine Learning algorithms and Model Selection.

Unit 3

Ensemble Methods (Boosting, Bagging and Random Forest), Modeling Sequence Problems, Time-Series Data, Deep Learning and Feature Representation Learning Forests.

Unit 4

An Introduction to some other advanced topics, e.g., Semi-supervised Learning, Active Learning, Reinforcement Learning, Inference in Graphical Models, Bayesian Learning and Inference.

- Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online)
- Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.

MT-CSE-18-13(ii): Wireless Sensor Networks

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To understand Architect sensor networks for various application setups.
- Devise appropriate data dissemination protocols and model links cost.
- Understanding of the fundamental concepts of wireless sensor networks and have a basic knowledge of the various protocols at various layers.
- Evaluate the performance of sensor networks and identify bottlenecks.

Learning Outcomes:

At the end of this course students should be able to:

- Describe and explain radio standards and communication protocols for wireless sensor networks.
- Explain the function of the node architecture and use of sensors for various applications.
- Be familiar with architectures, functions and performance of wireless sensor networks systems and platforms.

Unit 1

Introduction to Wireless Sensor Networks: Introduction, Motivations, Applications, Issues and Challenges in designing sensor networks;

Sensor Network Architecture: Layered architecture, Unified Network Protocol Framework(UNPF), Clustered architecture, Low-Energy Adaptive Clustering Hierarchy (LEACH); Wireless Sensor Node architecture; Cross-layer designs

Unit 2

Medium Access Control Protocol design: Fixed Access, Random Access, WSN MAC protocols: synchronized, duty-cycled; SMACS, EAR; CSMA-Based MAC Protocols

Location Discovery: Indoor Localization, Sensor Network Localization

Unit 3

Security: Possible attacks, countermeasures, SPINS, Static and dynamic key Distribution, LEAP, INSENS Evolving Standards: Energy-Efficient Design, Synchronization, Transport Layer Issues

Unit 4

Routing protocols for WSN: Resource-aware routing, Location- based protocols, Data-centric protocols, Hierarchical protocols, Mobility-based and Heterogeneity based protocols, Geographic Routing, Broadcast, Multicast; Data Dissemination, Data Gathering;

Quality of Sensor Network: Coverage, Exposure

- W. Dargie and C. Poellabauer, "Fundamentals of Wireless Sensor Networks –Theory and Practice", Wiley 2010
- KazemSohraby, Daniel Minoli and TaiebZnati, "wireless sensor networks -Technology, Protocols, and Applications", Wiley Interscience 2007
- Takahiro Hara, Vladimir I. Zadorozhny, and Erik Buchmann, "Wireless Sensor Network Technologies for the Information Explosion Era", springer 2010

MT-CSE-18-13(iii): Introduction to Intelligent Systems Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To introduce to the field of Artificial Intelligence (AI) with emphasis on its use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach.
- To explore the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with uncertainty, learning from experience and following problem solving strategies found in nature.

Learning Outcomes:

At the end of this course students should be able to:

• Demonstrate knowledge of the fundamental principles of intelligent systems and would be able to analyze and compare the relative merits of a variety of AI problem solving techniques.

Unit 1

Biological foundations to intelligent systems: Artificial neural networks, Back-Propagation networks, Radial basis function networks, and recurrent networks.

Fuzzy logic, knowledge Representation and inference mechanism, genetic algorithm, and fuzzy neural networks.

Unit 2

Search Methods Basic concepts of graph and tree search. Three simple search methods: breadth-first search, depth-first search, iterative deepening search. Heuristic search methods: best-first search, admissible evaluation functions, hill-climbing search. Optimization and search such as stochastic annealing and genetic algorithm.

Unit 3

Knowledge representation and logical inference Issues in knowledge representation. Structured representation, such as frames, and scripts, semantic networks and conceptual graphs. Formal logic and logical inference. Knowledge-based systems structures, its basic components. Ideas of Blackboard architectures.

Unit 4

Reasoning under uncertainty and Learning Techniques on uncertainty reasoning such as Bayesian reasoning, Certainty factors and Dempster-Shafer Theory of Evidential reasoning, A study of different learning and evolutionary algorithms, such as statistical learning and induction learning. Recent trends in Fuzzy logic, Knowledge Representation

- Luger G.F. and Stubblefield W.A. (2008). Artificial Intelligence: Structures and strategies for Complex Problem Solving. Addison Wesley, 6th edition.
- Russell S. and Norvig P. (2009). Artificial Intelligence: A Modern Approach. Prentice-Hall, 3rd edition.

MT-CSE-18-14(i): Data Science

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Provide you with the knowledge and expertise to become a proficient data scientist.
- It will demonstrate an understanding of statistics and machine learning concepts that are vital for data science.
- One can critically evaluate data visualizations based on their design and use for communicating stories from data.

Learning Outcomes:

At the end of this course students should be able to:

- Explain how data is collected, managed and stored for data science.
- Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists.

Unit 1

Introduction to Data Science: Big Data and Data Science Hype, Statistical Inference, Exploratory Data Analysis and Data Science Process, Data Science Toolkit, Types of data, Example applications of Data Science.

Unit 2

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data.

Mining Data Stream: The Stream Data Model, Sampling data is a stream, Filtering Streams, Counting distinct elements in a stream.

Unit 3

Page Rank: Definition, Structure of the Web, Avoiding Dead Ends, Spider traps and taxation, Using Page Rank in search engines. Page rank iteration using map reduce.

Introduction to machine learning models, Training sets, Approaches to machine learning. Machine learning architecture.

Unit 4

Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Techniques for Data Visualization. Introduction and implementation to SQL and Python.

- Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly.
- Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.

MT-CSE-18-14(ii): Distributed Systems

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

• To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems.

Learning Outcomes:

At the end of this course students should be able to:

• Design trends in distributed systems. It will help in applying network virtualization, remote method invocation and objects.

Unit 1

Introduction to distributed data processing and distributed database system; Advantages and disadvantages of DDBS; Types of DDBS, Promises and Complications in a distributed DBMS; Distributed DBMS architecture.

Unit 2

Distributed Database Design: Top-down design process, Designing Process and Issues, Fragmentation, Allocation, Database Integration: Schema Matching, schema integration, schema mapping. Data and access control: view management, data security, semantic integrity control.

Unit 3

Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition; Localization of distributed data, Optimization of Distributed Queries: Centralized query optimization; Distributed Query optimization.

Unit 4

Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management, Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery protocols.

Introduction and implementation to SQL and Python.

- Principles of Distributed Database Systems, M.T. Ozsu and P. Valduriez, Prentice-Hall, 1991.
- Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.

MT-CSE-18-14(iii): Advanced Wireless and Mobile Networks

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The students should get familiar with key concepts of wireless networks, standards, technologies, • their basic operations and the future needs and challenges.
- To learn how to evaluate MAC and network protocols using network simulation software tools.
- The students should get familiar with the wireless/mobile market and the future needs and challenges.

Learning Outcomes:

At the end of this course students should be able to:

- Demonstrate advanced knowledge of networking and wireless networking and understand various types of wireless networks, standards, operations and use cases.
- Design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performance analysis.

Unit 1

Introduction: Wireless Networking Trends, Key Wireless Physical Layer Concepts, Multiple Access Technologies - CDMA, FDMA, TDMA, Spread Spectrum technologies, Frequency reuse, Radio Propagation and Modeling, Challenges in Mobile Computing: Resource poorness, Bandwidth, energy etc.

Wireless Local Area Networks: IEEE 802.11 Wireless LANs Physical & MAC layer, 802.11 MAC Modes (DCF PCF) IEEE 802.11 standards, Architecture & protocols, Infrastructure vs. Ad-hoc Modes, Hidden Node & Exposed Terminal Problem, Problems, Fading Effects in Indoor and outdoor WLANs, WLAN Deployment issues.

Unit 2

Wireless Cellular Networks: 1G and 2G, 2.5G, 3G, and 4G, Mobile IPv4, Mobile IPv6, TCP over Wireless Networks, Cellular architecture, Frequency reuse, Channel assignment strategies, Handoff strategies, Interference and system capacity, Improving coverage and capacity in cellular systems, Spread spectrum Technologies.

Unit 3

WiMAX (Physical layer, Media access control, Mobility and Networking), IEEE 802.22, Wireless Regional Area Networks, IEEE 802.21 Media Independent Handover Overview

Wireless PANs Bluetooth AND Zigbee, Introduction to Wireless Sensor Networks

Unit 4

Security: Security requirements in wireless Networks, Issues and challenges, Vulnerabilities, Network security attacks, Secure routing in Ad Hoc Wireless Networks, Wi-Fi Security.

Advanced Topics: IEEE 802.11x and IEEE 802.11i standards, Introduction to Vehicular Ad-hoc Networks. References

- Schiller J., Mobile Communications, Addison Wesley 2000
- Stallings W., Wireless Communications and Networks, Pearson Education 2005
- Stojmenic Ivan, Handbook of Wireless Networks and Mobile Computing, John Wiley and Sons Inc 2002 •
- Yi Bing Lin and Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley and Sons Inc 2000
- Pandya Raj, Mobile and Personal Communications Systems and Services, PHI 200
- C.Siva Ram Murthy and B.S.Manoj, Ad Hoc Wireless Networks- Architecture and Protocols, Pearson • Education 2004

MT-CSE-18-15: Research Methodology and IPR

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 3

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

Learning Outcomes:

At the end of this course students should be able to:

- Understand research problem formulation.
- Analyze research related information Follow research ethics

Unit 1

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.

Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2

Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 3

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.

International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 4

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Computer Software.

- Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"
- Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- Ranjit Kumar, 2 nd Edition, "Research Methodology: A Step by Step Guide for beginners"
- Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
- Niebel, "Product Design", McGraw Hill, 1974.
- Asimov, "Introduction to Design", Prentice Hall, 1962.
- Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
- T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008
- Mayall, "Industrial Design", McGraw Hill, 1992.

MT-CSE-18-21: Advance Algorithms

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The student should be able to choose appropriate algorithms and use it for a specific problem.
- To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems.
- Students should be able to understand different classes of problems concerning their computation difficulties.
- To introduce the students to recent developments in the area of algorithmic design.

Learning Outcomes:

At the end of this course students should be able to:

- Analyze the complexity/performance of different algorithms.
- Determine the appropriate data structure for solving a particular set of problems. Categorize the different problems in various classes according to their complexity.
- Students should have an insight of recent activities in the field of the advanced data structure.

Unit 1

Sorting: Review of various sorting algorithms, topological sorting

Graph: Definitions and Elementary Algorithms: Shortest path by BFS, shortest path in edge-weighted case (Dijkasra's), depth-first search and computation of strongly connected components, emphasis on correctness proof of the algorithm and time/space analysis, example of amortized analysis.

Unit 2

Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm.

Graph Matching: Algorithm to compute maximum matching. Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path.

Unit 3

Shortest Path in Graphs: Floyd-Warshall algorithm and introduction to dynamic programming paradigm. More examples of dynamic programming.

Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrix operations, UP-decomposition.

Unit 4

Linear Programming: Geometry of the feasibility region and Simplex algorithm NP-completeness: Examples, proof of NP-hardness and NP-completeness.

Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation.

Extension to polynomials. Application: Interpolation problem.

- Cormen, Leiserson, Rivest, Stein, "Introduction to Algorithms"
- Aho, Hopcroft, Ullman, "The Design and Analysis of Computer Algorithms"
- Kleinberg and Tardos, "Algorithm Design"

MT-CSE-18-22: Soft Computing

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
- To implement soft computing based solutions for real-world problems.
- To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.
- To provide student an hand-on experience on MATLAB to implement various strategies.

Learning Outcomes:

At the end of this course students should be able to:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem.

Unit 1

Introduction to Soft Computing and Neural Networks: Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics

Unit 2

Fuzzy Logic: Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making, Implementation using Python/Matlab

Unit 3

Neural Networks: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks, Implementation using Python/ Matlab

Unit 4

Genetic Algorithms: Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning : Machine Learning Approach to Knowledge Acquisition, Implementation using Python/ Matlab **References**

- Jyh:Shing Roger Jang, Chuen:Tsai Sun, EijiMizutani, "Neuro:Fuzzy and Soft Computing", Prentice:Hall of India, 2003.
- George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic:Theory and Applications", Prentice Hall, 1995.

MT-CSE-18-23(i): Data Preparation and Analysis

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

To prepare the data for analysis and develop meaningful Data Visualizations

Learning Outcomes:

- At the end of this course students should be able to
 - Extract the data for performing the Analysis.

Unit 1

Data Gathering and Preparation: High Cardinality Variable in Descriptive Stats, High Cardinality Variable in Predictive Modeling, Outliers, Type of outliers, Treatment of outliers Data formats, parsing and transformation, Scalability and real-time issues.

Unit 2

Data Cleaning: Consistency checking, Heterogeneous and missing data, Noisy Data, Data Cleaning as Process, Data Integration, Data Transformation and segmentation, Data Reduction, Data Cube Aggregation, Attribute Subset Selection, Concept hierarchy Generation.

Unit 3

Exploratory Analysis: Descriptive and comparative statistics, Clustering, Clustering Hierarchical and Partitioning methods, Constraint-Based Cluster Analysis, Association Mining Apriori Algorithm and Association to Correlations, Hypothesis Generation.

Unit 4

Visualization: Data Visualization techniques (for measurement and categorical data)-Interactive visualization techniques-Common misuses of data visualization- Techniques for Statistical Inference Time series, Geolocated data, Correlations and connections, Hierarchies and networks, interactivity.

- Making sense of Data : A practical Guide to Exploratory Data Analysis and Data Mining, by Glenn J. Myatt
- J Hanes, M. Kamber, "Data Mining Concepts and Techniques", Elsevier India. •
- G.S. Linoff, M.J.A. Berry, "Data Mining Techniques", Wiley India Pvt. Ltd.
- A. Berson, S.J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw-Hill.

MT-CSE-18-23(ii): Computer Vision

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Be familiar with both the theoretical and practical aspects of computing with images.
- Have described the foundation of image formation, measurement, and analysis
- Understand the geometric relationships between 2D images and the 3D world.
- Grasp the principles of state-of-the-art deep neural networks.

Learning Outcomes:

At the end of this course students should be able to:

- Developed the practical skills necessary to build computer vision applications
- To have gained exposure to object and scene recognition and categorization from images.

Unit 1

Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis.

Unit 2

Edge detection, Edge detection performance, Hough transform, corner detection, Segmentation, Morphological filtering, Fourier transform.

Unit 3

Feature extraction, shape, histogram, color, spectral, texture, using CVIPtools, Feature analysis, feature vectors, distance /similarity measures, data pre-processing.

Unit 4

Pattern Analysis; Clustering: K-Means, K-Medoids, Mixture of Gaussians.

Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised.

Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods.

- Richard Szeliski, "Computer Vision: Algorithms and Applications"
- Goodfellow, Bengio, and Courville, "Deep Learning"
- Fisher et al., "Dictionary of Computer Vision and Image Processing"

MT-CSE-18-23(iii): Secure Software Design & Enterprise Computing Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To fix software flaws and bugs in various software and to make students aware of various issues like weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic.
- To understand Methodologies and tools to design and develop secure software containing minimum vulnerabilities and flaws.

Learning Outcomes:

At the end of this course students should be able to:

- Differentiate between various software vulnerabilities.
- Understand software process vulnerabilities for an organization.
- Monitor resources consumption in a software.
- Interrelate security and software development process.

Unit 1

Secure Software Design: Identify software vulnerabilities, Software Design Threats and Mitigations, perform software security analysis, Perform security testing and quality assurance.

Unit 2

Enterprise Application Development: Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system.

Unit 3

Enterprise Systems Administration: Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/Clustering/Web/Email).

Unit 4

Obtain the ability to manage and troubleshoot a network running multiple services. Handle insecure exceptions and command/SQL injection, SQL injection attack, Defend web and mobile applications against attackers.

- Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley.
- Engineering Safe and Secure Software Systems by C.Warren Axelrod
- Enterprise Software Security: A Confluence of Disciplines by Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters and Diana L. Burley

MT-CSE-18-24(i): Advanced Computer Architecture Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The objective of this course is to provide in-depth coverage of current and emerging trends in Advanced Computer Architectures with emphasis on system design and performance.
- It focuses on instruction, data & thread level parallelisms and improvements in performance of memory hierarchy.

Learning Outcomes

At the end of this course students should be able to:

- Know the classes of computers, and new trends and developments in computer architecture
- Understand the various techniques to enhance a processors ability to exploit Instruction-level parallelism (ILP), and its challenges.
- Understand exploiting ILP using dynamic scheduling, multiple issue, and speculation.
- Understand data-level parallelism in vector, SIMD and GPU architectures.
- Understand multithreading by using ILP and supporting thread-level parallelism (TLP).
- Understand warehouse scale computers to exploit request-level & data level parallelism.
- Understand multiprocessor cache coherence using the directory based and snooping class of protocols.
- Understand the several advanced optimizations to achieve cache performance.
- Understand virtual memory and virtual machines.

Unit 1

Instruction Level Parallelism (ILP): Concepts & Challenges, Data Dependences and Hazards, Control Dependences; Basic Compiler Techniques for Exposing ILP – Basic Pipeline Scheduling and Loop Unrolling, Reducing Branch Costs with Advanced Branch Prediction, Overcoming Data Hazardous with Dynamic Scheduling, Tomasulo's Approach, Hardware Based Speculation; Exploiting ILP Using Multiple Issue and Static Scheduling – VLIW & Superscalar Processors, Advanced Techniques For Instruction Delivery and Speculation.

Unit 2

Data Level Parallelism in Vector, SIMD & GPU Architectures: Vector Architecture – Working of Vector Processors, Vector Execution Time, Multiple Lanes, Vector Registers, Memory Banks, Stride, Gather Scatter; SIMD Instruction Set Extensions for Multimedia; Graphics Processing Units, Vector Architecture V/S GPUs, Multimedia SIMD V/S GPUs; Detecting and Enhancing Loop-Level Parallelism – Finding Dependences, Eliminating Dependent Computations.

Thread-Level Parallel Parallelism: Multiprocessor Architecture – Centralized Shared-Memory Architectures, Cache Coherence Problem, Schemes Enforcing Coherence, Snooping Coherence Protocol; Extensions to basic coherence protocol; Distributed Shared-Memory and Directory-Based Coherence

Unit 3

Warehouse-Scale Computers (WSC) to Exploit Request-Level and Data-Level Parallelism: WSC V/S Servers, Programming Models and Workloads for WSC, Architecture of Warehouse-Scale Computers, Physical Infrastructure and Costs of WSC.

Memory Hierarchy: Basics of Memory Hierarchy, Optimization of Cache Performance, Memory Technology & Optimizations, Virtual Memory – Fast Address Translation, Selecting Page Size, Protection of Virtual Memory

Unit 4

MIMD Architectures: Architectural Concepts of Distributed & Shared Memory MIMD Architectures (UMA, NUMA, COMA, CC-NUMA); Interconnection Networks – Direct Interconnection Networks (Linear Array, Ring, Star, 2D Mesh, Hyper Cubes), Switching Techniques; Dynamic Interconnection Networks (Shared Bus, Crossbar, Multistage Networks); Specifications of Top Three Super Computers of Top500 List. **References**

- Hennessy J.D., Patterson D.A., "Computer Architecture: A Quantitative Approach", 5th Ed., MK, 2012.
- Sima D., Fountain T., Kasuk P., "Advanced Computer Architectures A Design Space Approach," Pearson Education, 1997.
- Hesham El-Rewini, Mostafa Abd-El-Barr, "Advanced Computer Architecture and Parallel Processing", Wiley India Pvt. Ltd.
- Kai Hwang, "Advanced computer architecture Parallelism, Scalability, Programmability", Tata McGraw Hill, 2001.
- Rajaraman V. & Murthy C.S.R., "Parallel Computer: Architecture & Programming", PHI Learning.
- David Culler, "Parallel Computer Architecture", 1st Ed., Elsevier India.
- Stallings W., "Computer Organization and Architecture", 10th Ed., Pearson Education.

MT-CSE-18-24(ii): Human and Computer Interaction

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Be aware of mobile Human Computer interaction.
- Learn the guidelines for user interface

Learning Outcomes:

At the end of this course students should be able to:

- Understand the structure of models and theories of human computer interaction and vision.
- Design an interactive web interface on the basis of models studied.

Unit 1

Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

Unit 2

Interactive Design basics – process – scenarios – navigation – screen design –Iteration and prototyping. HCI in software process – software life cycle –usability engineering – Prototyping in practice – design rationale. Design rules– principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

Unit 3

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Unit 4

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I, II & III)
- Brian Fling, "Mobile Design and Development", First Edition, O Reilly Media Inc., 2009
- Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O Reilly, 2009.
MT-CSE-18-24(iii): Digital Forensic

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
- Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
- Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools

Learning Outcomes:

At the end of this course students should be able to

- Understand relevant legislation and codes of ethics.
- Understand Computer forensics and digital detective and various processes, policies and procedures E-discovery, guidelines and standards, E-evidence, tools and environment.

Unit 1

Digital Forensics Science: Forensics science, computer forensics and digital forensics.

Computer Crime: Analysis of cyber-criminalistics area, holistic approach to cyber-forensics

Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications.

Unit 2

Evidence Management & Presentation: Discuss the importance of understanding what court documents would be required for a criminal investigation, Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.

Unit 3

Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, and complete a case, Critique a case,

Network Forensics: open-source security tools for network forensic analysis, Requirements for preservation of network data.

Unit 4

Mobile Forensics: mobile forensics techniques, mobile forensics tools.

Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence.

- John Sammons, The Basics of Digital Forensics, Elsevier
- John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications

MT-CSE-18-31(i): Mobile Applications and Services

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- This course presents the two main mobile platforms and their ecosystems, namely Android and iOS.
- To explore emerging technologies and tools used to design and implement feature-rich mobile applications for smartphones and tablets
- It also take into account both the technical constraints relative to storage capacity, processing capacity, display screen, communication interfaces, and the user interface, context and profile

Learning Outcomes:

At the end of this course students will be able to:

- Identify the target platform and users and be able to define and sketch a mobile application
- Understand the fundamentals, frameworks, and development life cycle of mobile application platforms of Android
- Design and develop a mobile application prototype

Unit 1

Introduction to Mobile Applications, Factors in Developing Mobile Applications, Frameworks and Tools, Introduction to Android Development Environment, Generic UI Development Android User, Basics of Android, Importance and scope, Android Architecture, Android Stack, Android Applications Structure, Android Emulator, Android SDK, Overview of Android Studio, Android and File Structure, Android Virtual Device Manager

Unit 2

More on Uis: Building a User Interface, TextView, EditText, Check Boxes, Radio Buttons, The Spinner, ArrayAdapter, DatePicker, Text-to-Speech Techniques, Fragments and Multi-platform development, Creating Widgets: Layouts, Canvas Drawing, Shadows, Gradients; Handling database in Android, Android Storing and Retrieving Data, Working with a Content Provider

Unit 3

Android Applications: Various life cycles for applications; Location and Mapping: location based services, Mapping, Google Maps activity, Working with MapView and MapActivity; Playing and Recording of Audio and Video in application; Sensors and Near Field Communication; Building client server applications.

Unit 4

Preparing for publishing, Signing and preparing the Application, Publishing to the Android Market Introduction to iPhone OS and iOS, Apple iPhone Platform, UI tool kit interfaces, Event handling and Graphics services, Layer Animation. Overview of Cross-platform application development. **References**

- Wei-Meng Lee, "Beginning AndroidTM 4 Application Development" John Wiley & Sons
- Zigurd Mednieks, Laird Dornin, G,Blake Meike and Masumi Nakamura "Programming Android", O'Reilly Publications.
- Pradeep Kothari, "Android Application Development: Black Book", Wiley India Ltd.
- Wei-Meng Lee, "Beginning iPhone SDK Programming with Objective-C", Wiley India Ltd.
- James C.S. "Android Application development", CENGAGE Learning.

MT-CSE-18-31(ii): Compiler for HPC

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives

- To introduce structure of compilers and high performance compiler design for students.
- To discuss concepts of cache coherence and parallel loops in compilers.

Learning Outcomes:

At the end of this course students will be able to:

- Understand the structure of compiler.
- Understand parallel loops, data dependency and exception handling and debugging in compiler.

Unit 1

High Performance Systems, Structure of a Compiler, Programming Language Features, Languages for High Performance, Data Dependence: Data Dependence in Loops, Data Dependence in Conditionals, Data Dependence in Parallel Loops, Program Dependence Graph.

Unit 2

Scalar Analysis with Factored Use-Def Chains: Constructing Factored UseDef Chains, FUD Chains for Arrays, Induction Variables Using FUD Chains, Constant Propagation with FUD Chains, Data Dependence for Scalars. Data Dependence Analysis for Arrays. Array Region Analysis, Pointer Analysis, I/O Dependence, Procedure Calls, Inter-procedural Analysis.

Unit 3

Loop Restructuring: Simple Transformations, Loop Fusion, Loop Fission, Loop Reversal, Loop Interchanging, Loop Skewing, Linear Loop Transformations, Strip-Mining, Loop Tiling, Other Loop Transformations, and Inter-procedural Transformations. Optimizing for Locality: Single Reference to Each Array, Multiple References, General Tiling, Fission and Fusion for Locality.

Unit 4

Concurrency Analysis: Concurrency from Sequential Loops, Concurrency from Parallel Loops, Nested Loops, Round off Error, Exceptions and Debuggers. Vector Analysis: Vector Code, Vector Code from Sequential Loops, Vector Code from for all Loops, Nested Loops, Round off Error, Exceptions, and Debuggers, Multi-vector Computers.

- Michael Wolfe, High-Performance Compilers for Parallel Computing, Pearson
- John Levesque, Gene Wagenbreth, High Performance Computing: Programming and Applications (Chapman & Hall/CRC Computational Science) 1st Edition

MT-CSE-18-31(iii): Optimization Techniques

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- To provide insight to the mathematical formulation of real world problems.
- To optimize these mathematical problems using nature based algorithms. And the solution is useful especially for NP-Hard problems.

Learning Outcomes:

At the end of this course students will be able to:

- Formulate optimization problems.
- Understand and apply the concept of optimality criteria for various types of optimization problems.
- Solve various constrained and unconstrained problems in Single variable as well as multivariable.
- Apply the methods of optimization in real life situation.

Unit 1

Engineering application of Optimization, Formulation of design problems as mathematical programming problems.

General Structure of Optimization Algorithms, Constraints, The Feasible Region

Unit 2

Branches of Mathematical Programming: Optimization using calculus, Graphical Optimization, Linear Programming, Quadratic Programming, Integer Programming, Semi Definite Programming.

Unit 3

Optimization Algorithms like Genetic Optimization, Particle Swarm Optimization, Ant Colony Optimization etc.

Unit 4

Real life Problems and their mathematical formulation as standard programming problems. Applications of Optimization Algorithms.

- Laurence A. Wolsey (1998). Integer programming. Wiley. ISBN 978-0-471-28366-9.
- Practical Optimization Algorithms and Engineering Applications Andreas Antoniou.
- An Introduction to Optimization Edwin K., P. Chong & Stanislaw h. Zak.
- Dimitris Bertsimas; Robert Weismantel (2005). Optimization over integers. Dynamic Ideas. ISBN 978-0-9759146-2-5.
- John K. Karlof (2006). Integer programming: theory and practice.CRC Press. ISBN 978-0-8493-1914-3.
- H. Paul Williams (2009). Logic and Integer Programming. Springer. ISBN 978-0-387-92279-9.
- Der-San Chen; Robert G. Batson; Yu Dang (2010). Applied Integer Programming: Modeling and Solution. John Wiley and Sons. ISBN 978-0-470-37306-4.
- Michael Jünger; Thomas M. Liebling; Denis Naddef; George Nemhauser; William R. Pulleyblank; Gerhard Reinelt; Giovanni Rinaldi; Laurence A. Wolsey, eds. (2009). 50 Years of Integer Programming 1958-2008: From the Early Years to the State-of-the- Art. Springer. ISBN 978-3-540-68274-5.

KURUKSHETRA UNIVERSITY KURUKSHETRA

SCHEME O	F EXAMINATION FOR M.TECH. (w.e.f. Academic Ses	COM sion 2	PUTE 018-2	ER SC 019	IENC	E & EI	NGIN	EERIN	G)
Paper Code	Nomenclature of Paper	Scheme of Studies Per Week		Credits	External Marks		Internal Marks	Total Marks	
		L	Р	-	Max.	Pass		Max.	Max. Pass
	Semester	r – I							
MT-CSE-18-11	Mathematical foundations of Computer Science	4	0	4	100	40	50	150	60
MT-CSE-18-12	Advanced Data Structures	4	0	4	100	40	50	150	60
MT-CSE-18-13	Elective- I	4	0	4	100	40	50	150	60
MT-CSE-18-14	Elective- II	4	0	4	100	40	50	150	60
MT-CSE-18-15	Research Methodology and IPR	3	0	3	100	40	50	150	60
MT-CSE-18-16	Laboratory- I (Advanced Data Structures)	0	5	2.5	100	40	50	150	60
MT-CSE-18-17	Laboratory- II (Based on Electives)	0	5	2.5	100	40	50	150	60
Total		19	10	24	700	280	350	1050	420
Elective – I		Elective – II							
MT-CSE-18-13(i) MT-CSE-18-13(ii MT-CSE-18-13(ii	 Machine Learning Wireless Sensor Networks Introduction to Intelligent Systems 	MT- MT- MT-	CSE- CSE- CSE-	18-14 18-14 18-14	(i): D (ii): D (iii): M	ata Scio istribut Advan obile N	ence ed Sys ced V Jetwor	tems Wireless ks	s and

Paper Code	Nomenclature of Paper	Scheme of Studies Per Week		Credits	External Marks		Internal Marks	Total Marks		
		L	Р		Max.	Pass	_	Max.	Pass	
Semester – II										
MT-CSE-18-21	Advance Algorithms	4	0	4	100	40	50	150	60	
MT-CSE-18-22	Soft Computing	4	0	4	100	40	50	150	60	
MT-CSE-18-23	Elective- III	4	0	4	100	40	50	150	60	
MT-CSE-18-24	Elective- IV	4	0	4	100	40	50	150	60	
MT-CSE-18-25	Laboratory- I (Advance Algorithms)	0	5	2.5	100	40	50	150	60	
MT-CSE-18-26	Laboratory- II (Based on Electives)	0	5	2.5	100	40	50	150	60	
MT-CSE-18-27	Mini Project with Seminar	2	0	2	100	40	50	150	60	
MT-CSE-18-28	Audit Course	2	0	2	35	14	15	50	20	
Total		20	10	25	735	294	365	1100	440	
Elective III		Elective IV								
MT-CSE-18-23(i): Data Preparation and Analysis MT-CSE-18-23(ii): Computer Vision MT-CSE-18-23(iii):Secure Software Design Enterprise ComputingMT-CSE-18-24(i): Advanced Computer Architectur MT-CSE-18-24(ii): Human and Computer Interactio MT-CSE-18-24(ii): Digital Forensic							chitecture nteraction			
Audit Course: Students of affiliated Institutes/ Colleges are required to select any one paper out of option given below										
I. Eng II. Disa III. Sans IV. Valu V. Con VI. Peda VII. Stre VIII. Perso	lish for Research Paper Writing aster Management skrit for Technical Knowledge ue Education stitution of India agogy Studies ss Management by Yoga onality Development through Life Enli	ghtenn	nent SI	cills.						

Paper Code	Nomenclature of Paper	Sch of St Per V	eme udies Week	Credits	External Marks		Internal Marks	Total Marks		
		L	Р		Max.	Pass		Max.	Pass	
Semester – III										
MT-CSE-18-31	Elective- V	4	0	4	100	40	50	150	60	
MT-CSE-18-32	Dissertation-I / Industrial Project	0	20	10	250	100	100	350	140	
MT-CSE-18-33	Audit Course	2	0	2	35	14	15	50	20	
Total		6	20	16	385	154	165	550	220	
Elective V MT-CSE-18-31(MT-CSE-18-31((i): Mobile Applications and Service(ii): Compiler for HPC	S			1	1	1	1	1	

MT-CSE-18-31(iii): Optimization Techniques

Audit Course: Students of affiliated Institutes/ Colleges are required to select any one paper out of option given below (Excluding the paper already studied in 2nd semester):

- I. English for Research Paper Writing
- II. Disaster Management
- III. Sanskrit for Technical Knowledge
- IV. Value Education
- V. Constitution of India
- VI. Pedagogy Studies
- VII. Stress Management by Yoga
- VIII. Personality Development through Life Enlightenment Skills.

Semester – IV									
MT-CSE-18-41 Diss	ertation – II	0	32	16	350	140	100	450	180
Grand Total of All Semesters		45	72	81	2170	868	980	3150	1260

MT-CSE-18-11: Mathematical foundations of Computer Science

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.
- To study various sampling and classification problems.

Learning Outcomes:

At the end of this course students should be able to:

- To understand the basic notions of discrete and continuous probability.
- To understand the methods of statistical inference, and the role that sampling distributions play in those methods.
- To be able to perform correct and meaningful statistical analyses of simple to moderate complexity.

Unit 1

Probability mass, density, and cumulative distribution functions, parametric families of distributions, Expected value, variance, conditional expectation, Applications of the univariate and multivariate Central Limit Theorem, Probabilistic inequalities, Markov chains

Unit 2

Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood, Recent Trends in various distribution functions in mathematical field of computer science for varying fields

Unit 3

Statistical inference, Introduction to multivariate statistical models: regression and classification problems, principal components analysis, the problem of over fitting model assessment.

Unit 4

Graph Theory: Isomorphism, Planar graphs, graph coloring, Hamilton circuits and Euler cycles.

Permutations and Combinations with and without repetition.

Specialized techniques to solve combinatorial enumeration problems Permutations and Combinations with and without repetition.

- John Vince, Foundation Mathematics for Computer Science, Springer.
- K. Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications. Wiley.
- M. Mitzenmacher and E. Upfal, Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
- Alan Tucker, Applied Combinatorics, Wiley

MT-CSE-18-12: Advanced Data Structures Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The student should be able to choose appropriate data structures, understand the ADT/libraries, and use it to design algorithms for a specific problem.
- Students should be able to understand the necessary mathematical abstraction to solve problems.
- To familiarize students with advanced paradigms and data structure used to solve algorithmic problems.
- Student should be able to come up with analysis of efficiency and proofs of correctness.

Learning Outcomes:

At the end of this course students should be able to:

- Understand the implementation of symbol table using hashing techniques. Develop and analyze algorithms for red-black trees, B-trees and Splay trees. Develop algorithms for text processing applications.
- Identify suitable data structures and develop algorithms for computational geometry problems.

Unit 1

Dictionaries: Definition, Dictionary Abstract Data Type, Implementation of Dictionaries. Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

Unit 2

Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees. Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists

Unit 3

Text Processing: Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

Unit 4

Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, k-D Trees.

Recent Trends in Hashing, Trees.

- Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004
- M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002

MT-CSE-18-13(i): Machine Learning

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To learn the concept of how to learn patterns and concepts from data without being explicitly programmed in various IOT nodes.
- To design and analyse various machine learning algorithms and techniques with a modern outlook focusing on recent advances.
- To explore supervised and unsupervised learning paradigms of machine learning.
- To exploring Deep learning technique and various feature extraction strategies.

Learning Outcomes:

At the end of this course students should be able to:

- Extract features that can be used for machine learning approach in various IOT applications and
- To get an insight of when to apply a particular machine learning approach.
- To mathematically analyze various machine learning approaches and paradigms.

Unit 1

Supervised Learning (Regression/Classification) Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, Naive Bayes, Linear models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Nonlinearity and Kernel Methods.

Unit 2

(Unsupervised Learning) Clustering: K-means/Kernel K-means, Dimensionality Reduction: PCA and kernel PCA, Introduction to ICA, Evaluating Machine Learning algorithms and Model Selection.

Unit 3

Ensemble Methods (Boosting, Bagging and Random Forest), Modeling Sequence Problems, Time-Series Data, Deep Learning and Feature Representation Learning Forests.

Unit 4

An Introduction to some other advanced topics, e.g., Semi-supervised Learning, Active Learning, Reinforcement Learning, Inference in Graphical Models, Bayesian Learning and Inference.

- Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online)
- Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.

MT-CSE-18-13(ii): Wireless Sensor Networks

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To understand Architect sensor networks for various application setups.
- Devise appropriate data dissemination protocols and model links cost.
- Understanding of the fundamental concepts of wireless sensor networks and have a basic knowledge of the various protocols at various layers.
- Evaluate the performance of sensor networks and identify bottlenecks.

Learning Outcomes:

At the end of this course students should be able to:

- Describe and explain radio standards and communication protocols for wireless sensor networks.
- Explain the function of the node architecture and use of sensors for various applications.
- Be familiar with architectures, functions and performance of wireless sensor networks systems and platforms.

Unit 1

Introduction to Wireless Sensor Networks: Introduction, Motivations, Applications, Issues and Challenges in designing sensor networks;

Sensor Network Architecture: Layered architecture, Unified Network Protocol Framework(UNPF), Clustered architecture, Low-Energy Adaptive Clustering Hierarchy (LEACH); Wireless Sensor Node architecture; Cross-layer designs

Unit 2

Medium Access Control Protocol design: Fixed Access, Random Access, WSN MAC protocols: synchronized, duty-cycled; SMACS, EAR; CSMA-Based MAC Protocols

Location Discovery: Indoor Localization, Sensor Network Localization

Unit 3

Security: Possible attacks, countermeasures, SPINS, Static and dynamic key Distribution, LEAP, INSENS Evolving Standards: Energy-Efficient Design, Synchronization, Transport Layer Issues

Unit 4

Routing protocols for WSN: Resource-aware routing, Location- based protocols, Data-centric protocols, Hierarchical protocols, Mobility-based and Heterogeneity based protocols, Geographic Routing, Broadcast, Multicast; Data Dissemination, Data Gathering;

Quality of Sensor Network: Coverage, Exposure

- W. Dargie and C. Poellabauer, "Fundamentals of Wireless Sensor Networks –Theory and Practice", Wiley 2010
- KazemSohraby, Daniel Minoli and TaiebZnati, "wireless sensor networks -Technology, Protocols, and Applications", Wiley Interscience 2007
- Takahiro Hara, Vladimir I. Zadorozhny, and Erik Buchmann, "Wireless Sensor Network Technologies for the Information Explosion Era", springer 2010

MT-CSE-18-13(iii): Introduction to Intelligent Systems Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To introduce to the field of Artificial Intelligence (AI) with emphasis on its use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach.
- To explore the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with uncertainty, learning from experience and following problem solving strategies found in nature.

Learning Outcomes:

At the end of this course students should be able to:

• Demonstrate knowledge of the fundamental principles of intelligent systems and would be able to analyze and compare the relative merits of a variety of AI problem solving techniques.

Unit 1

Biological foundations to intelligent systems: Artificial neural networks, Back-Propagation networks, Radial basis function networks, and recurrent networks.

Fuzzy logic, knowledge Representation and inference mechanism, genetic algorithm, and fuzzy neural networks.

Unit 2

Search Methods Basic concepts of graph and tree search. Three simple search methods: breadth-first search, depth-first search, iterative deepening search. Heuristic search methods: best-first search, admissible evaluation functions, hill-climbing search. Optimization and search such as stochastic annealing and genetic algorithm.

Unit 3

Knowledge representation and logical inference Issues in knowledge representation. Structured representation, such as frames, and scripts, semantic networks and conceptual graphs. Formal logic and logical inference. Knowledge-based systems structures, its basic components. Ideas of Blackboard architectures.

Unit 4

Reasoning under uncertainty and Learning Techniques on uncertainty reasoning such as Bayesian reasoning, Certainty factors and Dempster-Shafer Theory of Evidential reasoning, A study of different learning and evolutionary algorithms, such as statistical learning and induction learning. Recent trends in Fuzzy logic, Knowledge Representation

- Luger G.F. and Stubblefield W.A. (2008). Artificial Intelligence: Structures and strategies for Complex Problem Solving. Addison Wesley, 6th edition.
- Russell S. and Norvig P. (2009). Artificial Intelligence: A Modern Approach. Prentice-Hall, 3rd edition.

MT-CSE-18-14(i): Data Science

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Provide you with the knowledge and expertise to become a proficient data scientist.
- It will demonstrate an understanding of statistics and machine learning concepts that are vital for data science.
- One can critically evaluate data visualizations based on their design and use for communicating stories from data.

Learning Outcomes:

At the end of this course students should be able to:

- Explain how data is collected, managed and stored for data science.
- Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists.

Unit 1

Introduction to Data Science: Big Data and Data Science Hype, Statistical Inference, Exploratory Data Analysis and Data Science Process, Data Science Toolkit, Types of data, Example applications of Data Science.

Unit 2

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data.

Mining Data Stream: The Stream Data Model, Sampling data is a stream, Filtering Streams, Counting distinct elements in a stream.

Unit 3

Page Rank: Definition, Structure of the Web, Avoiding Dead Ends, Spider traps and taxation, Using Page Rank in search engines. Page rank iteration using map reduce.

Introduction to machine learning models, Training sets, Approaches to machine learning. Machine learning architecture.

Unit 4

Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Techniques for Data Visualization. Introduction and implementation to SQL and Python.

- Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly.
- Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.

MT-CSE-18-14(ii): Distributed Systems

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

• To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems.

Learning Outcomes:

At the end of this course students should be able to:

• Design trends in distributed systems. It will help in applying network virtualization, remote method invocation and objects.

Unit 1

Introduction to distributed data processing and distributed database system; Advantages and disadvantages of DDBS; Types of DDBS, Promises and Complications in a distributed DBMS; Distributed DBMS architecture.

Unit 2

Distributed Database Design: Top-down design process, Designing Process and Issues, Fragmentation, Allocation, Database Integration: Schema Matching, schema integration, schema mapping. Data and access control: view management, data security, semantic integrity control.

Unit 3

Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition; Localization of distributed data, Optimization of Distributed Queries: Centralized query optimization; Distributed Query optimization.

Unit 4

Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management, Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery protocols.

Introduction and implementation to SQL and Python.

- Principles of Distributed Database Systems, M.T. Ozsu and P. Valduriez, Prentice-Hall, 1991.
- Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.

MT-CSE-18-14(iii): Advanced Wireless and Mobile Networks

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The students should get familiar with key concepts of wireless networks, standards, technologies, their basic operations and the future needs and challenges.
- To learn how to evaluate MAC and network protocols using network simulation software tools.
- The students should get familiar with the wireless/mobile market and the future needs and challenges.

Learning Outcomes:

At the end of this course students should be able to:

- Demonstrate advanced knowledge of networking and wireless networking and understand various types of wireless networks, standards, operations and use cases.
- Design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performance analysis.

Unit 1

Introduction: Wireless Networking Trends, Key Wireless Physical Layer Concepts, Multiple Access Technologies - CDMA, FDMA, TDMA, Spread Spectrum technologies, Frequency reuse, Radio Propagation and Modeling, Challenges in Mobile Computing: Resource poorness, Bandwidth, energy etc.

Wireless Local Area Networks: IEEE 802.11 Wireless LANs Physical & MAC layer, 802.11 MAC Modes (DCF PCF) IEEE 802.11 standards, Architecture & protocols, Infrastructure vs. Ad-hoc Modes, Hidden Node & Exposed Terminal Problem, Problems, Fading Effects in Indoor and outdoor WLANs, WLAN Deployment issues.

Unit 2

Wireless Cellular Networks: 1G and 2G, 2.5G, 3G, and 4G, Mobile IPv4, Mobile IPv6, TCP over Wireless Networks, Cellular architecture, Frequency reuse, Channel assignment strategies, Handoff strategies, Interference and system capacity, Improving coverage and capacity in cellular systems, Spread spectrum Technologies.

Unit 3

WiMAX (Physical layer, Media access control, Mobility and Networking), IEEE 802.22, Wireless Regional Area Networks, IEEE 802.21 Media Independent Handover Overview

Wireless PANs Bluetooth AND Zigbee, Introduction to Wireless Sensor Networks

Unit 4

Security: Security requirements in wireless Networks, Issues and challenges, Vulnerabilities, Network security attacks, Secure routing in Ad Hoc Wireless Networks, Wi-Fi Security.

Advanced Topics: IEEE 802.11x and IEEE 802.11i standards, Introduction to Vehicular Ad-hoc Networks. **References**

- Schiller J., Mobile Communications, Addison Wesley 2000
- Stallings W., Wireless Communications and Networks, Pearson Education 2005
- Stojmenic Ivan, Handbook of Wireless Networks and Mobile Computing, John Wiley and Sons Inc 2002
- Yi Bing Lin and Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley and Sons Inc 2000
- Pandya Raj, Mobile and Personal Communications Systems and Services, PHI 200
- C.Siva Ram Murthy and B.S.Manoj, Ad Hoc Wireless Networks- Architecture and Protocols, Pearson Education 2004

MT-CSE-18-15: Research Methodology and IPR

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 3

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

Learning Outcomes:

At the end of this course students should be able to:

- Understand research problem formulation.
- Analyze research related information Follow research ethics

Unit 1

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.

Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2

Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 3

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.

International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 4

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Computer Software.

- Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"
- Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- Ranjit Kumar, 2 nd Edition, "Research Methodology: A Step by Step Guide for beginners"
- Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
- Niebel, "Product Design", McGraw Hill, 1974.
- Asimov, "Introduction to Design", Prentice Hall, 1962.
- Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
- T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008
- Mayall, "Industrial Design", McGraw Hill, 1992.

MT-CSE-18-21: Advance Algorithms

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The student should be able to choose appropriate algorithms and use it for a specific problem.
- To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems.
- Students should be able to understand different classes of problems concerning their computation difficulties.
- To introduce the students to recent developments in the area of algorithmic design.

Learning Outcomes:

At the end of this course students should be able to:

- Analyze the complexity/performance of different algorithms.
- Determine the appropriate data structure for solving a particular set of problems. Categorize the different problems in various classes according to their complexity.
- Students should have an insight of recent activities in the field of the advanced data structure.

Unit 1

Sorting: Review of various sorting algorithms, topological sorting

Graph: Definitions and Elementary Algorithms: Shortest path by BFS, shortest path in edge-weighted case (Dijkasra's), depth-first search and computation of strongly connected components, emphasis on correctness proof of the algorithm and time/space analysis, example of amortized analysis.

Unit 2

Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm.

Graph Matching: Algorithm to compute maximum matching. Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path.

Unit 3

Shortest Path in Graphs: Floyd-Warshall algorithm and introduction to dynamic programming paradigm. More examples of dynamic programming.

Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrix operations, UP-decomposition.

Unit 4

Linear Programming: Geometry of the feasibility region and Simplex algorithm NP-completeness: Examples, proof of NP-hardness and NP-completeness.

Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation.

Extension to polynomials. Application: Interpolation problem.

- Cormen, Leiserson, Rivest, Stein, "Introduction to Algorithms"
- Aho, Hopcroft, Ullman, "The Design and Analysis of Computer Algorithms"
- Kleinberg and Tardos, "Algorithm Design"

MT-CSE-18-22: Soft Computing

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
- To implement soft computing based solutions for real-world problems.
- To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.
- To provide student an hand-on experience on MATLAB to implement various strategies.

Learning Outcomes:

At the end of this course students should be able to:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem.

Unit 1

Introduction to Soft Computing and Neural Networks: Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics

Unit 2

Fuzzy Logic: Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making, Implementation using Python/Matlab

Unit 3

Neural Networks: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks, Implementation using Python/ Matlab

Unit 4

Genetic Algorithms: Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning : Machine Learning Approach to Knowledge Acquisition, Implementation using Python/ Matlab **References**

- Jyh:Shing Roger Jang, Chuen:Tsai Sun, EijiMizutani, "Neuro:Fuzzy and Soft Computing", Prentice:Hall of India, 2003.
- George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic:Theory and Applications", Prentice Hall, 1995.

MT-CSE-18-23(i): Data Preparation and Analysis

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

To prepare the data for analysis and develop meaningful Data Visualizations

Learning Outcomes:

- At the end of this course students should be able to
 - Extract the data for performing the Analysis.

Unit 1

Data Gathering and Preparation: High Cardinality Variable in Descriptive Stats, High Cardinality Variable in Predictive Modeling, Outliers, Type of outliers, Treatment of outliers Data formats, parsing and transformation, Scalability and real-time issues.

Unit 2

Data Cleaning: Consistency checking, Heterogeneous and missing data, Noisy Data, Data Cleaning as Process, Data Integration, Data Transformation and segmentation, Data Reduction, Data Cube Aggregation, Attribute Subset Selection, Concept hierarchy Generation.

Unit 3

Exploratory Analysis: Descriptive and comparative statistics, Clustering, Clustering Hierarchical and Partitioning methods, Constraint-Based Cluster Analysis, Association Mining Apriori Algorithm and Association to Correlations, Hypothesis Generation.

Unit 4

Visualization: Data Visualization techniques (for measurement and categorical data)-Interactive visualization techniques-Common misuses of data visualization- Techniques for Statistical Inference Time series, Geolocated data, Correlations and connections, Hierarchies and networks, interactivity.

- Making sense of Data : A practical Guide to Exploratory Data Analysis and Data Mining, by Glenn J. Myatt
- J Hanes, M. Kamber, "Data Mining Concepts and Techniques", Elsevier India. •
- G.S. Linoff, M.J.A. Berry, "Data Mining Techniques", Wiley India Pvt. Ltd.
- A. Berson, S.J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw-Hill.

MT-CSE-18-23(ii): Computer Vision

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Be familiar with both the theoretical and practical aspects of computing with images.
- Have described the foundation of image formation, measurement, and analysis
- Understand the geometric relationships between 2D images and the 3D world.
- Grasp the principles of state-of-the-art deep neural networks.

Learning Outcomes:

At the end of this course students should be able to:

- Developed the practical skills necessary to build computer vision applications
- To have gained exposure to object and scene recognition and categorization from images.

Unit 1

Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis.

Unit 2

Edge detection, Edge detection performance, Hough transform, corner detection, Segmentation, Morphological filtering, Fourier transform.

Unit 3

Feature extraction, shape, histogram, color, spectral, texture, using CVIPtools, Feature analysis, feature vectors, distance /similarity measures, data pre-processing.

Unit 4

Pattern Analysis; Clustering: K-Means, K-Medoids, Mixture of Gaussians.

Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised.

Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods.

- Richard Szeliski, "Computer Vision: Algorithms and Applications"
- Goodfellow, Bengio, and Courville, "Deep Learning"
- Fisher et al., "Dictionary of Computer Vision and Image Processing"

MT-CSE-18-23(iii): Secure Software Design & Enterprise Computing Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- To fix software flaws and bugs in various software and to make students aware of various issues like weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic.
- To understand Methodologies and tools to design and develop secure software containing minimum vulnerabilities and flaws.

Learning Outcomes:

At the end of this course students should be able to:

- Differentiate between various software vulnerabilities.
- Understand software process vulnerabilities for an organization.
- Monitor resources consumption in a software.
- Interrelate security and software development process.

Unit 1

Secure Software Design: Identify software vulnerabilities, Software Design Threats and Mitigations, perform software security analysis, Perform security testing and quality assurance.

Unit 2

Enterprise Application Development: Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system.

Unit 3

Enterprise Systems Administration: Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/Clustering/Web/Email).

Unit 4

Obtain the ability to manage and troubleshoot a network running multiple services. Handle insecure exceptions and command/SQL injection, SQL injection attack, Defend web and mobile applications against attackers.

- Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley.
- Engineering Safe and Secure Software Systems by C.Warren Axelrod
- Enterprise Software Security: A Confluence of Disciplines by Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters and Diana L. Burley

MT-CSE-18-24(i): Advanced Computer Architecture Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- The objective of this course is to provide in-depth coverage of current and emerging trends in Advanced Computer Architectures with emphasis on system design and performance.
- It focuses on instruction, data & thread level parallelisms and improvements in performance of memory hierarchy.

Learning Outcomes

At the end of this course students should be able to:

- Know the classes of computers, and new trends and developments in computer architecture
- Understand the various techniques to enhance a processors ability to exploit Instruction-level parallelism (ILP), and its challenges.
- Understand exploiting ILP using dynamic scheduling, multiple issue, and speculation.
- Understand data-level parallelism in vector, SIMD and GPU architectures.
- Understand multithreading by using ILP and supporting thread-level parallelism (TLP).
- Understand warehouse scale computers to exploit request-level & data level parallelism.
- Understand multiprocessor cache coherence using the directory based and snooping class of protocols.
- Understand the several advanced optimizations to achieve cache performance.
- Understand virtual memory and virtual machines.

Unit 1

Instruction Level Parallelism (ILP): Concepts & Challenges, Data Dependences and Hazards, Control Dependences; Basic Compiler Techniques for Exposing ILP – Basic Pipeline Scheduling and Loop Unrolling, Reducing Branch Costs with Advanced Branch Prediction, Overcoming Data Hazardous with Dynamic Scheduling, Tomasulo's Approach, Hardware Based Speculation; Exploiting ILP Using Multiple Issue and Static Scheduling – VLIW & Superscalar Processors, Advanced Techniques For Instruction Delivery and Speculation.

Unit 2

Data Level Parallelism in Vector, SIMD & GPU Architectures: Vector Architecture – Working of Vector Processors, Vector Execution Time, Multiple Lanes, Vector Registers, Memory Banks, Stride, Gather Scatter; SIMD Instruction Set Extensions for Multimedia; Graphics Processing Units, Vector Architecture V/S GPUs, Multimedia SIMD V/S GPUs; Detecting and Enhancing Loop-Level Parallelism – Finding Dependences, Eliminating Dependent Computations.

Thread-Level Parallel Parallelism: Multiprocessor Architecture – Centralized Shared-Memory Architectures, Cache Coherence Problem, Schemes Enforcing Coherence, Snooping Coherence Protocol; Extensions to basic coherence protocol; Distributed Shared-Memory and Directory-Based Coherence

Unit 3

Warehouse-Scale Computers (WSC) to Exploit Request-Level and Data-Level Parallelism: WSC V/S Servers, Programming Models and Workloads for WSC, Architecture of Warehouse-Scale Computers, Physical Infrastructure and Costs of WSC.

Memory Hierarchy: Basics of Memory Hierarchy, Optimization of Cache Performance, Memory Technology & Optimizations, Virtual Memory – Fast Address Translation, Selecting Page Size, Protection of Virtual Memory

Unit 4

MIMD Architectures: Architectural Concepts of Distributed & Shared Memory MIMD Architectures (UMA, NUMA, COMA, CC-NUMA); Interconnection Networks – Direct Interconnection Networks (Linear Array, Ring, Star, 2D Mesh, Hyper Cubes), Switching Techniques; Dynamic Interconnection Networks (Shared Bus, Crossbar, Multistage Networks); Specifications of Top Three Super Computers of Top500 List. **References**

- Hennessy J.D., Patterson D.A., "Computer Architecture: A Quantitative Approach", 5th Ed., MK, 2012.
- Sima D., Fountain T., Kasuk P., "Advanced Computer Architectures A Design Space Approach," Pearson Education, 1997.
- Hesham El-Rewini, Mostafa Abd-El-Barr, "Advanced Computer Architecture and Parallel Processing", Wiley India Pvt. Ltd.
- Kai Hwang, "Advanced computer architecture Parallelism, Scalability, Programmability", Tata McGraw Hill, 2001.
- Rajaraman V. & Murthy C.S.R., "Parallel Computer: Architecture & Programming", PHI Learning.
- David Culler, "Parallel Computer Architecture", 1st Ed., Elsevier India.
- Stallings W., "Computer Organization and Architecture", 10th Ed., Pearson Education.

MT-CSE-18-24(ii): Human and Computer Interaction

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Be aware of mobile Human Computer interaction.
- Learn the guidelines for user interface

Learning Outcomes:

At the end of this course students should be able to:

- Understand the structure of models and theories of human computer interaction and vision.
- Design an interactive web interface on the basis of models studied.

Unit 1

Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

Unit 2

Interactive Design basics – process – scenarios – navigation – screen design –Iteration and prototyping. HCI in software process – software life cycle –usability engineering – Prototyping in practice – design rationale. Design rules– principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

Unit 3

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Unit 4

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I, II & III)
- Brian Fling, "Mobile Design and Development", First Edition, O Reilly Media Inc., 2009
- Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O Reilly, 2009.

MT-CSE-18-24(iii): Digital Forensic

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

Objectives:

- Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
- Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
- Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools

Learning Outcomes:

At the end of this course students should be able to

- Understand relevant legislation and codes of ethics.
- Understand Computer forensics and digital detective and various processes, policies and procedures E-discovery, guidelines and standards, E-evidence, tools and environment.

Unit 1

Digital Forensics Science: Forensics science, computer forensics and digital forensics.

Computer Crime: Analysis of cyber-criminalistics area, holistic approach to cyber-forensics

Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications.

Unit 2

Evidence Management & Presentation: Discuss the importance of understanding what court documents would be required for a criminal investigation, Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.

Unit 3

Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, and complete a case, Critique a case,

Network Forensics: open-source security tools for network forensic analysis, Requirements for preservation of network data.

Unit 4

Mobile Forensics: mobile forensics techniques, mobile forensics tools.

Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence.

- John Sammons, The Basics of Digital Forensics, Elsevier
- John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications

MT-CSE-18-31(i): Mobile Applications and Services

Maximum marks: 150 (External: 100, Internal: 50) Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- This course presents the two main mobile platforms and their ecosystems, namely Android and iOS.
- To explore emerging technologies and tools used to design and implement feature-rich mobile applications for smartphones and tablets
- It also take into account both the technical constraints relative to storage capacity, processing capacity, display screen, communication interfaces, and the user interface, context and profile

Learning Outcomes:

At the end of this course students will be able to:

- Identify the target platform and users and be able to define and sketch a mobile application
- Understand the fundamentals, frameworks, and development life cycle of mobile application platforms of Android
- Design and develop a mobile application prototype

Unit 1

Introduction to Mobile Applications, Factors in Developing Mobile Applications, Frameworks and Tools, Introduction to Android Development Environment, Generic UI Development Android User, Basics of Android, Importance and scope, Android Architecture, Android Stack, Android Applications Structure, Android Emulator, Android SDK, Overview of Android Studio, Android and File Structure, Android Virtual Device Manager

Unit 2

More on Uis: Building a User Interface, TextView, EditText, Check Boxes, Radio Buttons, The Spinner, ArrayAdapter, DatePicker, Text-to-Speech Techniques, Fragments and Multi-platform development, Creating Widgets: Layouts, Canvas Drawing, Shadows, Gradients; Handling database in Android, Android Storing and Retrieving Data, Working with a Content Provider

Unit 3

Android Applications: Various life cycles for applications; Location and Mapping: location based services, Mapping, Google Maps activity, Working with MapView and MapActivity; Playing and Recording of Audio and Video in application; Sensors and Near Field Communication; Building client server applications.

Unit 4

Preparing for publishing, Signing and preparing the Application, Publishing to the Android Market Introduction to iPhone OS and iOS, Apple iPhone Platform, UI tool kit interfaces, Event handling and Graphics services, Layer Animation. Overview of Cross-platform application development. **References**

- Wei-Meng Lee, "Beginning AndroidTM 4 Application Development" John Wiley & Sons
- Zigurd Mednieks, Laird Dornin, G,Blake Meike and Masumi Nakamura "Programming Android", O'Reilly Publications.
- Pradeep Kothari, "Android Application Development: Black Book", Wiley India Ltd.
- Wei-Meng Lee, "Beginning iPhone SDK Programming with Objective-C", Wiley India Ltd.
- James C.S. "Android Application development", CENGAGE Learning.

MT-CSE-18-31(ii): Compiler for HPC

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives

- To introduce structure of compilers and high performance compiler design for students.
- To discuss concepts of cache coherence and parallel loops in compilers.

Learning Outcomes:

At the end of this course students will be able to:

- Understand the structure of compiler.
- Understand parallel loops, data dependency and exception handling and debugging in compiler.

Unit 1

High Performance Systems, Structure of a Compiler, Programming Language Features, Languages for High Performance, Data Dependence: Data Dependence in Loops, Data Dependence in Conditionals, Data Dependence in Parallel Loops, Program Dependence Graph.

Unit 2

Scalar Analysis with Factored Use-Def Chains: Constructing Factored UseDef Chains, FUD Chains for Arrays, Induction Variables Using FUD Chains, Constant Propagation with FUD Chains, Data Dependence for Scalars. Data Dependence Analysis for Arrays. Array Region Analysis, Pointer Analysis, I/O Dependence, Procedure Calls, Inter-procedural Analysis.

Unit 3

Loop Restructuring: Simple Transformations, Loop Fusion, Loop Fission, Loop Reversal, Loop Interchanging, Loop Skewing, Linear Loop Transformations, Strip-Mining, Loop Tiling, Other Loop Transformations, and Inter-procedural Transformations. Optimizing for Locality: Single Reference to Each Array, Multiple References, General Tiling, Fission and Fusion for Locality.

Unit 4

Concurrency Analysis: Concurrency from Sequential Loops, Concurrency from Parallel Loops, Nested Loops, Round off Error, Exceptions and Debuggers. Vector Analysis: Vector Code, Vector Code from Sequential Loops, Vector Code from for all Loops, Nested Loops, Round off Error, Exceptions, and Debuggers, Multi-vector Computers.

- Michael Wolfe, High-Performance Compilers for Parallel Computing, Pearson
- John Levesque, Gene Wagenbreth, High Performance Computing: Programming and Applications (Chapman & Hall/CRC Computational Science) 1st Edition

MT-CSE-18-31(iii): Optimization Techniques

Maximum marks: 150 (External: 100, Internal: 50)

Time: 3 hours

Credits: 4

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- To provide insight to the mathematical formulation of real world problems.
- To optimize these mathematical problems using nature based algorithms. And the solution is useful especially for NP-Hard problems.

Learning Outcomes:

At the end of this course students will be able to:

- Formulate optimization problems.
- Understand and apply the concept of optimality criteria for various types of optimization problems.
- Solve various constrained and unconstrained problems in Single variable as well as multivariable.
- Apply the methods of optimization in real life situation.

Unit 1

Engineering application of Optimization, Formulation of design problems as mathematical programming problems.

General Structure of Optimization Algorithms, Constraints, The Feasible Region

Unit 2

Branches of Mathematical Programming: Optimization using calculus, Graphical Optimization, Linear Programming, Quadratic Programming, Integer Programming, Semi Definite Programming.

Unit 3

Optimization Algorithms like Genetic Optimization, Particle Swarm Optimization, Ant Colony Optimization etc.

Unit 4

Real life Problems and their mathematical formulation as standard programming problems. Applications of Optimization Algorithms.

- Laurence A. Wolsey (1998). Integer programming. Wiley. ISBN 978-0-471-28366-9.
- Practical Optimization Algorithms and Engineering Applications Andreas Antoniou.
- An Introduction to Optimization Edwin K., P. Chong & Stanislaw h. Zak.
- Dimitris Bertsimas; Robert Weismantel (2005). Optimization over integers. Dynamic Ideas. ISBN 978-0-9759146-2-5.
- John K. Karlof (2006). Integer programming: theory and practice.CRC Press. ISBN 978-0-8493-1914-3.
- H. Paul Williams (2009). Logic and Integer Programming. Springer. ISBN 978-0-387-92279-9.
- Der-San Chen; Robert G. Batson; Yu Dang (2010). Applied Integer Programming: Modeling and Solution. John Wiley and Sons. ISBN 978-0-470-37306-4.
- Michael Jünger; Thomas M. Liebling; Denis Naddef; George Nemhauser; William R. Pulleyblank; Gerhard Reinelt; Giovanni Rinaldi; Laurence A. Wolsey, eds. (2009). 50 Years of Integer Programming 1958-2008: From the Early Years to the State-of-the- Art. Springer. ISBN 978-3-540-68274-5.

AUDIT COURSE: (i) English For Research Paper Writing Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title
- Ensure the good quality of paper at very first-time submission

Learning Outcomes:

At the end of this course students will be able to:

• Write good quality papers.

Unit 1

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

Unit 2

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature, skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions useful phrases, how to ensure paper is as good as it could possibly be the 4 first- time submission.

- Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
- Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
- Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book .
- Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

AUDIT COURSE: (ii) Disaster Management

Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Critically understand the strengths and weaknesses of disaster management approaches.

Learning Outcomes:

At the end of this course students will be able to:

• Handle disaster situation in a better way.

Unit 1

Introduction: Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.

Repercussions Of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

Disaster Prone Areas In India: Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics.

Unit 2

Disaster Preparedness And Management: Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

Risk Assessment: Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co- Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival.

Disaster Mitigation: Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.

- R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "New Royal book Company.
- Sahni, Pardeep Et.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
- Goel S. L., Disaster Administration And Management Text And Case Studies", Deep &Deep Publication Pvt. Ltd., New Delhi.

AUDIT COURSE: (iii) Sanskrit For Technical Knowledge

Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Learning Outcomes:

At the end of this course students will be able to:

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

Unit 1

Alphabets in Sanskrit, Past/Present/Future Tense, Simple Sentences Order, Introduction of roots

Unit 2

Technical information about Sanskrit Literature, Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics.

- "Abhyaspustakam" Dr. Vishwas, Samskrita-Bharti Publication, New Delhi
- "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
- "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

AUDIT COURSE: (iv) Value Education Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Learning Outcomes:

At the end of this course students will be able to:

- Knowledge of self-development
- Learn the importance of Human values
- Developing the overall personality

Unit 1

Values and self-development –Social values and individual, attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgements. Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism.Love for nature ,Discipline.

Unit 2

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation Doing best for saving nature Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence ,Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively.

References:

• Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi

AUDIT COURSE: (v) Constitution Of India

Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Learning Outcomes:

At the end of this course students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. Discuss the passage of the Hindu Code Bill of 1956.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.

Unit 1

History of Making of the Indian Constitution: History, Drafting Committee, (Composition & Working) Philosophy of the Indian Constitution: Preamble, Salient Features

Contours of Constitutional Rights & Duties: Fundamental Rights Right to Equality ,Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit 2

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected, Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy. Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

- The Constitution of India, 1950 (Bare Act), Government Publication.
- Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
- M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
- D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

AUDIT COURSE: (vi) Pedagogy Studies

Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Learning Outcomes:

At the end of this course students will be able to:

- Understand what pedagogical practices are being used by teachers in formal and informal classrooms in developing countries and what is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- Understand how can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Unit 1

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and Terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching. Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education. Evidence on the effectiveness of pedagogical practices Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Unit 2

Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies. Professional development: alignment with classroom practices and follow- up support Peer support Support from the head teacher and the community. Curriculum and assessment Barriers to learning: limited resources and large class sizes

Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

- Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
- Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
- Akyeampong K (2003) Teacher training in Ghana does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
- Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
- Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
- Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
- www.pratham.org/images/resource%20working%20paper%202.pdf.

AUDIT COURSE: (vii) Stress Management By Yoga

Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- To achieve overall health of body and mind
- To overcome stress

Learning Outcomes:

At the end of this course students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

Unit 1

Definitions of Eight parts of yog. (Ashtanga), Yam and Niyam. Do's and Don't's in life. i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

Unit 2

Asan and Pranayam, i) Various yog poses and their benefits for mind & body, ii)Regularization of breathing techniques and its effects-Types of Pranayam

References:

- 'Yogic Asanas for Group Tarining-Part-I'' : Janardan Swami Yogabhyasi Mandal, Nagpur
- "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

Credits: 2

AUDIT COURSE: (viii) Personality Development Through Life Enlightenment Skills Maximum marks: 50 (External: 35, Internal: 15)

Time: 3 hours

Credits: 2

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting four from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting two questions from each Unit. All questions will carry equal marks.

Objectives:

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Learning Outcomes:

At the end of this course students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students.

Unit 1

Neetisatakam-Holistic development of personality Verses- 19,20,21,22 (wisdom), Verses- 29,31,32 (pride & heroism), Verses- 26,28,63,65 (virtue), Verses- 52,53,59 (dont's), Verses- 71,73,75,78 (do's) Approach to day to day work and duties. Shrimad Bhagwad Geeta : Chapter 2-Verses 41, 47,48, Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35, Chapter 18-Verses 45, 46, 48.

Unit 2

Statements of basic knowledge. Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68, Chapter 12 -Verses 13, 14, 15, 16,17, 18 Personality of Role model. Shrimad Bhagwad Geeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42, Chapter 4-Verses 18, 38,39, Chapter18 – Verses 37,38,63.

- "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram Publication Department), Kolkata
- Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath,
- Rashtriya Sanskrit Sansthanam, New Delhi.
KURUKSHETRA UNIVERSITY, KURUKSHETRA (Established by the State Legislature Act XII of 1956) ('A+ Grade, NAAC Accredited)

Annexure-V

Scheme of Examination of B.Sc. Medical

Anthropology

Semester I

Paper –I Introduction to Anthropology	Max Marks 40+10	Time-3hrs	
Paper – II Primatology	Max Marks 40+10	Time-3hrs	
Semo	ester II		
Paper –I Fundamentals of			
Palaeoanthropology	Max Marks 40+10	Time-3hrs	
Paper – II Palaeoanthropology	Max Marks 40+10	Time-3hrs	
Paper – III Practical	Max. Marks – 100	Time 3-hrs	
Seme	ester III		
Paper –I Ethnic Variation	Max Marks 40+10	Time-3hrs	
Paper – II Human Growth	Max Marks 40+10	Time-3hrs	
Sem	ester IV		

Paper – I Social Anthropology	Max Marks 40+10	Time-3hrs
Paper – II Prehistoric Archaeology	Max Marks 40+10	Time-3hrs
Paper- III Practical	Max Marks 100	Time – 3hrs

Semester V

Paper – I Human Genetic	Max Marks 40+10	Time-3hrs
Paper- II Human Genetic	Max Marks 40+10	Time-3hrs

Semester VI

Paper- I Human Ecology and adaptation	Max Marks 40+10	Time-3hrs
Paper- II Application of Anthropology	Max Marks 40+10	Time-3hrs
Paper- III Practical	Max Marks 100	

B.Sc. Semester III

PAPER-I: ETHNIC VARIATION

Max marks = 40+10 Time = 3hrs

Note : Attempt five questions in all.

Question No. 1 is compulsory (Short answer type).

Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Concept of Race in historical & biological perspective: Genetic basis, UNESCO statement on Race-Ethnic group-population, Racial classification of human population.
- 2. Criteria of Human Typology, Morphological traits and Genetical traits.
- 3. Origin of races & their fossil connection. Three Primary Race of the World concepts & classification of race, causes of human variation, Morphological, Serological & Genetic.
- 4. Ethnic & linguistic elements in Indian Populations & their distribution factors influencing its structure & growth
- 5. Racial classification: Deniker's, Hooton's, Coon, Garm & Birdsell's, Racial classification of Indian populations Pislay's, Guha's, Sarkar's.

PAPER II: HUMAN GROWTH

Max marks = 40+10 Time = 3hrs

Note: Attempt five questions in all.

Question No.-1 is compulsory (Short answer type). Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Concept of human growth: differentiate between growth & development. Identify growth, spurt, normal & abnormal growth pattern.
- 2. Development stages of growth Pre-natal, natal, infant, childhood, adolescence, maturity senescence: differences in physique, factors, controlling growth & development on population human growth curves, basic method of study cross sectional, longitudinal, mix-longitudinal.
- 3. Factors affecting growth and development (Genetic, environmental, biochemical nutritional energy value of food, under-nutrition & malnutrition, Nutritional adaptation in Man; cultural and socio economic.)
- 4. Human physique and somatotypes.
- 5. Method of studying Growth & development. Milestones in growth, retarded growth, growth spurt, ageing.

SUGGESTED READINGS:-

- 1. Montagu MFA : Concepts of Race
- 2. Guha BS (1964) Racial Elements in Indian Population.
- 3. Brace C.L & Montagu, A: Man Evolution- An introduction to Physical Anthropology : Macmillan: New York
- 4. Tanner, J.M. (1978): Foetus into Man: Physical Growth from Conception to Maturity.
- 5. Sinclair, D. (1989): Human Growth after Birth. 5th ed. Oxford University Press Oxford.

SEMESTER IV

Paper I: SOCIAL ANTHROPOLOGY

Max marks = 40+10 Time = 3hrs

Note : Attempt five questions in all. Question No.-1 is compulsory (Short answer type). Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Introduction to social anthropology: Concept of Society, Status & role, Pre-requisite of Human Society.
- 2. Basic Concepts:- Group, Community, tribe, caste and class, caste system in India.
- 3. Family: Definition and function of family, types of family, Nuclear, extended, joint. (Structure, Residence). Pattern of authority: Patriarchy, Matriarchy, Nature of kinship, kinship terminology, kingroups- Lineage, Clan, Phratry & Moiety.
- 4. Marriage- forms and types of marriage (Rules : Endogamy, Exogamy, Monogamy, Polygamy, Polygyny, Polygndry, Mate Selection, Levirate, Sororate, Sororal, cross-cousin marriage, dowry.
- 5. Economic Organization: Modes of production, distribution & consumption, concept of value, Political Organization in primitive societies, ownership, production and exchange in primitive societies with reference to Indian tribes.
- 6. Social Structure: Caste System definition & Criteria of caste system, *varna* & caste, dominant caste, caste-mobility fusion, lack of fusion & fission. Backward & Scheduled Cates: Statutory provisions, caste & tribe, caste in democracy.

PAPER II: PREHISTORIC ARCHAEOLOGY

Max marks = 40+10 Time = 3hrs

Note: Attempt five questions in all.

Question No.-1 is compulsory (Short answer type). Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- Introduction of prehistoric Archaeology: Chronology: Relative & Absolute Dating methods – dendrochronology, radio carbon dating, potassium – organ dating, thermo-luminescence dating & archaeo-magnetic dating. Archaeological sites in India
- 2. Principles of prehistoric Archaeology.
- 3. Geochronology of Pleistocene Epoch: Pleistocene glaciations; Evidences and causes, glacial and interglacial, phase.
- 4. Cultural Evolution; Broad outlines of prehistoric culture, Paleolithic, Mesolithic Neolithic, chalcolithic, copper- Bronze age, Iron- Age.

SUGGESTED READINGS :-

- 1. Beals. R. and Hojjer. H. (1979) : An Introduction to Anthropology . New York: Macmillan Publishing Co. Inc.
- 2. Herkovits, M.J.(955) : Cultural Anthropology , Bombay Oxford and IBH Publishing Co. Pvt. Ltd.
- 3. Hoebel , E.A. and Frost E.L.(1979) Cultural and Social Anthropology, New Delhi Tata
- 4. Bhattacharya D.K. (1978) Emergence of Culture in Europe, Delhi B.R. Publication.
- 5. Sankalia H.D. (1964) Stone Age tools, Poona Deccan College.

PAPER III PRACTICALS

- 1. Anthropometry; somatometry and somatoscopy, anthropometric instrument
- 2. Somatoscopic observations (Eye, Nose, Hair, lips).
- 3. Somatometric landmarks (vertex, glabella, opisthocranion, eurion, nasion, sub nasale, pronasale)
- 4. Basic body measurement, weight Status, sitting height, head circumference, head length, head breadth, nose length, nose breadth, upper arm circumference, calf circumference)

B.Sc. SEMESTER V

PAPER I: HUMAN GENETICS

Max marks = 40+10Time = 3hrs

Note: Attempt five questions in all. Question No.-1 is compulsory (Short answer type). Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Human Genetics: Definition and Scope of human genetic and Anthropology, History & Development, Scope & Branches, Cell Structure & division.
- 2. Methods for study of genetic principles in man- family study (Pedigree analysis, twin method, sib pair method, cytogenetic, chromosomal & karyotype, foster child method Biochemical, cytogenetic, immunological recombinant DNA method.
- Cell Biology. Chromosome Structure, identification of human chromosome. Abnormalities of human chromosomes: Numerical Chromosomal Abnormalities -Klinefelter, Turner, Super female, intersex & other syndromic disorders, Structural Abnormalities of the Chromosomes Down, Patau, Edward & cri-du-chat, Somatic allergens, genetic counseling.

Paper II: HUMAN GENETICS

Max marks = 40+10 Time = 3hrs

Note: Attempt five questions in all. Question No.-1 is compulsory (Short answer type). Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Mendelian inheritance in man. Mode of inheritance Atosomal, sex linked, sex influenced, sex limited, lethal, sub-lethal & Polygenic inheritance in man.
- 2. Non Mendelian inheritance in man, Types: Extranuclear, gene conversion, infectious heredity, genomic imprinting, Mosaicism, Trinucleotide repeat disorders.
- 3. Population genetics and the hardy Weinberg law human variation. Causes and changes in the gene frequency mutation, isolation, migration, selection, inbreeding and genetic drift. Consanguineous and non- consanguineous mating genetic load, genetic effect of consanguineous and cousin marriages, genetic adaptation.
- 4. Other complicating factors in human genetics, like age of onset, variable expressivity, penetrance, uniparental disomy, genomic imprinting.

SUGGESTED READINGS:-

- 1. Griffiths AJF, wessler SR. Carroll SB, Doebley J (2011). An Introduction to Genetic Analysis. Macmillan Higher Education.
- 2. Cummings MR (2011). Human Heredity: Principles and Issues. Brooks/Cole, Cengage Learning
- 3. Jobling M. Hurls m and Tyler- Smith C. (2004) Human Evolutionary Genetics: Origins, People & Disease, New York: Garland Science.
- 4. B.R.K Shukla & Sudha Rastogi: Physical Anthropology and Human Genetics.

Semester VI

Paper I: HUMAN ECOLOGY AND ADAPTATIONS

Max marks = 40+10 Time = 3hrs

Note: Attempt five questions in all.

Question No.-1 is compulsory (Short answer type).

Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Concepts and methods of ecological anthropology.
- 2. Bio-cultural adaptation genetic and non genetic factors.
- 3. Man's physiological response to environmental stress. Hot desert, Cold, High altitude climate.
- 4. Epidemiological anthropology: Health and disease infectious and non-infectious disease, nutritionary deficiency related disease.

Paper II: APPLICATION OF ANTHROPOLOGY

Max marks = 40+10 Time = 3hrs

Note: Attempt five questions in all.

Question No.-1 is compulsory (Short answer type).

Nine questions are to be set speared over entire syllabus. All questions carry equal marks.

- 1. Human Genetics Application and the biological future of mankind
 - a) Eugenics
 - b) Genetic Counseling
 - c) Genetic Screening
 - d) Prenatal Diagnosis
 - e) Gene Therapy
 - f) Genetic Engineering
 - g) Human Genetics, Law and Bio-Ethics
 - h) DNA Fingerprinting
- 2. Applications of Physical Anthropology
 - a) Anthropometry and its applications
 - b) Forensic Anthropology
 - c) Physical Anthropology and Sports
 - d) Growth, Development and Nutritional Anthropology
- 3. Methods of studying growth
 - a) Longitudinal method
 - b) Cross Sectional method
 - c) Mixed Longitudinal method
 - d) Growth curves
 - e) Epiphyseal union
 - f) Dentition

SUGGESTED READINGS:-

- 1. Lewis R. (2009) Human Genetics: Concepts and Applications, The MsGraw -Hill Companies. Inc.
- 2. Gaur, R. (1987): Environmental & Ecology of Early man in Northwest India.
- 3. Sukhatme P.V.: Human Adaptation to Environment (1985)

PRACTICAL PAPER III

- Max Marks = 80+20
- 1. Classification and identification of finger prints pattern (15 subjects).
- 2. ABO blood group color blindness test.

KURUKSHETRA UNIVERSITY, KURUKSHETRA

(Established by the State Legislature Act XII of 1956)

('A+ Grade, NAAC Accredited)

Annexure-VIII

Scheme of Examination for M.Sc. Forensic Science (Five years Integrated Course) from Semester VII to X at Dyal Singh College, Karnal w.e.f. the session 2018-2019 onwards

Semester wise distribution of course and credits in Forensic Science

Paper No.	Title of the Paper	Nature of paper	Credits	Contact	Term Exam	Internal Assessmen	Total Marks	Exam Durati
				week	Marks	t Marks	IVIAI KS	on in
				T + S + P				Hours
Semester VII		- <u>I</u>						
FSC 101	General Forensic Science	Core	4	4 + 0 + 0	80	20	100	3
FSC102	Instrumental Analysis I	Core	4	4 + 0 + 0	80	20	100	3
FSC 103	Forensic Biology and Serology	Core	4	4 + 0 + 0	80	20	100	3
FSC 104	Forensic Psychology and Statistics	Core	4	4 + 0 + 0	80	20	100	3
FSC 105	Practical (Based on Papers FSC 101 & FSC 102)	Core	4	0 + 0 + 8	80	20	100	4
FSC 106	Practical (Based on Papers FSC 103 & FSC 104)	Core	4	0 + 0 + 8	80	20	100	4
	Total		24	16 + 0 + 16			600	
Semester VIII								
FSC 201	Forensic Chemistry and Toxicology	Core	4	4 + 0 + 0	80	20	100	3
FSC 202	Instrumental Analysis II	Core	4	4 + 0 + 0	80	20	100	3
FSC 203	Questioned Document Examination	Core	4	4 + 0 + 0	80	20	100	3
FSC 204	Forensic Medicine and Anthropology	Core	4	4 + 0 + 0	80	20	100	3
FSC 205	Seminar	Core	1	0 + 1 + 0		25	25	-
FSC 206	Practical (Based on Papers FSC 201 & FSC 202)	Core	4	0 + 0 + 8	80	20	100	4
FSC 207	Practical (Based on Papers FSC 203 & FSC 204)	Core	4	0 + 0 + 8	80	20	100	4
	Total		25	16 + 1 +			625	
	Total			10				

Summer Training and Project Report (Mandatory) : Minimum Duration 30 days, after examinations of VIII semester in summer vacations during months of May, June and till 15, July or before the final viva-voce of FSC-405.

Semester IX									
FSC 301	Forensic Ballistics Explosives	and	Core	4	4 + 0 + 0	80	20	100	3
FSC 302	Computer Forensics and Recent Advances		Core	4	4 + 0 + 0	80	20	100	3
FSC 303	DNA Profiling	DNA Profiling		4	4 + 0 + 0	80	20	100	3
FSC 304	Advances in Forensic Chemistry- I	Any one from FSC 304	Elective	4	4 + 0 + 0	80+20		100	3
FSC 305	Advances in Forensic Biology –	and I FSC305	Elective	4	4 + 0 + 0				3
FSC 306	Seminar	I	Core	1	0 + 1 + 0	1	25	25	-
FSC 307	Practical (Based or FSC 301, FSC 302	n Papers & FSC 303)	Core	4	0 + 0 + 8	80	80 20		4
FSC 308	Practical (Based or FSC 304/FSC 305	n Papers	Core	4	0 + 0 + 8	80	20	100	4
	Total			27	16 + 1 + 16			625	
Semester X									Τ
FSC 401	Forensic Physics		Core	4	4 + 0 + 0	80	20	100	3
FSC 402	Forensic dactylogr other impressions	Forensic dactylography and other impressions		4	4+ 0+ 0	80	20	100	3
FSC 403	Advances in Forensic Chemistry- II	Any one from FSC 402	Elective	4	4 + 0 + 0	80+20		100	3
FSC 404	Advances in Forensic Biology - II	and FSC 403	Elective	4	4 + 0 + 0				3
FSC 405	Viva of Summer Tr Project Report	aining and	core	4				100	
FSC 406	Practical (Based or FSC 401 & FSC 4(n Papers)2)	Core	4	0 + 0 + 8	80	20	100	4
FSC 407	Practical (Based or FSC 403/FSC 404)	n Papers	Core	4	0 + 0 + 8	80	20	100	4
	Total	Total		24	12+0+16			600	
Grand Total	Sem. VII to Sem. X		•			-	.	2450	

T – Theory; S – Seminar; P – Practical Total Credits: Core 96 + Seminar 2 + Open 4 = 102

PAPER NO. FSC 101 GENERAL FORENSIC SCIENCE CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To give the basic knowledge to students about the concepts in Forensic Science

Outcomes: The students will get to know about the history and background of forensic science. The subject will also discuss the basic laws and principles of forensic science, which will help the students to handle evidences related to crimes and crime scene investigation efficiently.

Note:

1. Nine questions will be set in all.

Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.
As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Forensic Science :** History, Development, and need of Forensic Science, Forensic Science and its International Perspective, Ethics in Forensic Science, Duties of Forensic Scientist, Basic Principles of Forensic Science.
- 2. **Organizational setup of Forensic Science Laboratories:** CFSL, FSL, GEQD, DFSS, Central Detective Training School, NCRB, Mobile Forensic Science Laboratory, Branches of Forensic Science.
- 3. **Crime Scene Investigation:** Introduction, characteristics and types of crime scene, physical evidences, Protection and recording of crime scene, search of physical clues, preservation, chain of custody, packing and forwarding of physical clues, blood pattern analysis.
- 4. **Fingerprints** introduction, types, searching methods, collection and preservation and evaluation.

- 5. **Forensic Photography** Basic principles and techniques of Black & White and colour photography, IR photography, working of digital camera and basics of digital imaging.digital photography, Digital videography. Crime scene and laboratory photography, microphotography.
- 6. **Criminal Justice System** Structure of Police, Prosecution & Judicial Organizations, Inquest, evidence in enquiries and trials, expert witness, admissibility of forensic reports in court, expert testimony.
- 7. **Computers:** Introduction, History of Digital computer, computer organization-hardware, circuits for interfacing computer to instruments, computer scanners, imaging softwares (Photo paint, Photoshop etc.), MS word, Data library.

- 1) B.R. Sharma: Forensic Science in Criminal Investigation and Trials, Universal Law Publishing; Fourth edition 2013.
- 2) David R. Redsicker: The Practical Methodology of Forensic Photography, Second Edition CRC Press, 2001.
- 3) James, S.H and Nordby, J.J.: Forensic Science: An introduction to scientific and investigative techniques 3rd edit. CRC Press, USA.
- 4) Nanda, B.B. and Tewari, R.K.: Forensic Science in India: A vision for the twenty first century Select Publisher, New Delhi (2001)
- 5) Richard Saferstein. Criminalistics: An Introduction to Forensic Science. 10th edit. Prentice-Hall, New Jersey.
- 6) Upshaw Downs, Swienton A. R.: Ethics in Forensic Science, Academic press. 2012.
- 7) H.L. Blitzer and J.Jacobia: Forensic Digital Imaging and Photography, Academic Press (2002).

PAPER NO. FSC 102 INSTRUMENTAL ANALYSIS- I CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To introduce students about the analytical techniques which are being used to analyse the evidences encountered in Forensic investigations.

Outcomes: The students will be introduced about the working of microscopic, chromatographic and spectroscopic techniques which are used to examine different trace evidences in forensics. **Note:**

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Microscopy**: Principles and techniques of Microscopy: Light Microscope, Phase contrast, Fluorescence, stereomicroscope, polarizing, comparison and Electron Microscope (Scanning, Transmission) Forensic application of microscopy. Microspectrophotometry
- 2. **Chromatography:** Introduction Basic principles, types of chromatography, partition and adsorption chromatography techniques.

Thin Layer Chromatography: introduction theory and Instrumentation of TLC, HPTLC, stationary phases, visualization methods, densitometer, applications.

Gas chromatography: introduction, principle and Instrumentation of GC, types of GC (GLC, and GSC) and column types and structure, Detectors for GC -TCD,FID, ECD, NPD etc, and evaluation of chromatogram; Pyrolysis GC, GC-MS; forensic applications. **High Performance liquid chromatography:** introduction, principle and Instrumentation of HPLC, injection system, column structure, detectors for HPLC, advantage and limitations of HPLC; their forensic applications.

3. **Spectroscopy**: Basic principles, property of EMR, interaction of radiation with matters, atomic and molecular spectra; source of radiations, radiations detection devices, wavelength selector, basic components of absorption and emission spectroscopy.

- 4. UV-Visible, IR and Raman spectroscopy: introduction, principles, instrumentation, single beam and double beam spectrophotometer, interpretation of spectra, qualitative and quantitative analysis: advantage and limitations of UV, IR and Raman spectrophotometer, forensic applications.
- 5. Atomic absorption/ emission spectroscopy: introduction, principles, Instrumentation; types of AAS, ICP-AES, quantitative and qualitative analysis, advantage and limitations of AAS and AES, their forensic applications.

- 6. **Mass Spectroscopy:** principle, instrumentation, ion sources, type of mass anlyserquadrupole, time of flight, double focusing, tandem mass spectroscopy, detectors for mass spectroscopy; their forensic applications.
- 7. NMR Spectroscopy, Neutron Activation Analysis: introduction and principle, techniques and forensic application
- 8. **X-rays spectroscopy;** introduction, principles of X ray diffraction and X ray florescence technique, their forensic applications.

- 1. <u>Barbara Wheeler</u> and <u>Lori J. Wilson</u>. Practical Forensic Microscopy: A Laboratory Manual, Wiley
- 2. Keith Wilson & John Walker; Practical Biochemistry- Principles & Techniques, 5th Edition, Cambridge University Press 2000.
- 3. Lee and Caensstem. Advances in Forensic Science, Vol. 2. Instrumental Analysis.
- 4. B. K. Sharma. Instrumental Methods of Chemical Analysis, Goel Publishing House, 26th Edition (2007).
- 5. D. A. Skoog, D. M. West, F. James Holler and S. R. Crouch, Fundamentals of Analytical Chemistry, 8th Edition, Thomson, 2004.
- 6. F. Rouessac and A. Rouessac, Chemical Analysis, 4th Edition, John Wiley & Sons Ltd., 2000.
- 7. G.Chatwal and S. Anand, Instrumental Methods of Chemical Analysis, 7th Edition Himalaya Publishing House.
- 8. Hobart H. Willard, Instrumental Methods of Analysis (Chemistry) Wadsworth Publishing Company.

PAPER NO. FSC 103 FORENSIC BIOLOGY AND SEROLOGY CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80

Internal Assessment: 20

Time: 3 hrs.

Objective: To make students understand the basics of biological material and its properties to aid in forensic investigations.

Outcomes:

- 1. The subject will provide information to students regarding the analysis of various evidences of animal or plant origin.
- 2. It will explicate the insect development and geographical distribution for assistance in estimating the time since death and locating the probable crime scene.
- 3. It will also provide the information about poaching and hunting of protected animal species and trade in international market.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- **1. Forensic Biology:** types of biological evidences, identification, collection, preservation, and significance of biological evidence. Hair and fibers: classification, characteristics, forensic identification and evaluation of hair and fibers evidences.
- 2. Microbial forensics and Entomology: Organisms of Forensic significance, types, isolation and identification. Introduction to forensic Entomology, insects / invertebrates of forensic importance, collection of entomological evidence, their life cycle, the role of aquatic insects in forensics, insects succession on carrion and its relationship to determine time since death.
- **3.** Forensic Botany: Introduction, types, significance, location, collection and Forensic evaluation of botanical evidences such as pollen grains, leaves, seeds etc. Wood-types, soft and hard wood. Identification and comparison. Diatoms: types, morphology, methods of extraction from tissue and bones, their identification and Forensic significance

- **4. Wild life Forensics:** scope, different protected and endangered species of animals. Wild life crime investigation- procedure, tools and techniques. Wild life protection act, animal poaching, animal abuse, wild life trading. Identification of pug marks. Identification of wild life clue materials such as hair, skin, fur, bones, nails, horn, teeth etc by conventional and modern methods. Case studies related to wild life crime.
- **5.** Forensic Serology: Blood groups history, biochemistry and genetics of ABO, Rh, MN and other blood group systems, secretors and non secretors, rare alleles. Blood identification, Methods of ABO blood grouping from dried blood stains and other

body fluids, species identification, Polymorphic Enzymes (PGM, GLO-I, ESD, EAP, AK, ADA etc)- their forensic significance.

6. Body fluids: semen- Introduction, composition, human spermatozoa morphology, Forensic examination and evaluation. Sex determination, X chromosome Inactivation- Barr body.

Other biological fluid clues such as saliva, sweat, urine and milk etc their introduction & collection preservation and examination,

- 1. <u>Richard Li</u>. Forensic Biology: Identification and DNA Analysis of Biological Evidence, CRC Press.
- 2. Alan Gunn: Essential Forensic Biology, 2nd Edition, John Wiley and Sons. 2009
- 3. Eckert, W. G. & James, S.H.: Interpretation of Blood Stain, Evidence, Elsevier, New York (1989).
- 4. Bruce Budowle, et al.: Microbial Forensics 2nd Edition, Academic Press, Wiley-Blackwell, 2012.
- 5. Robertson, J. Forensic Examination of Hair. Taylor and Francis, USA. 1996.
- 6. <u>Heather Miller Coyle</u>, Forensic Botany: Principles and Applications to Criminal Casework. 1st edition, CRC Press; 2004.
- 7. Jane E. Huffman, and John R. Wallace, Wildlife Forensics: Methods and Applications, Wiley Blackwell. 2011
- 8. Chowdhri, S., Forensic Biology B.P.R. &D, Govt. of India

PAPER NO. FSC 104 FORENSIC PSYCHOLOGY AND STATISTICS CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the human behaviour and importance of Psychological analysis in Criminal trials and implementation of Statistics for veritable reporting of findings.

Outcomes:

- 1. The subject will guide students about the role of psychologists with court officials, preparing written psychological reports, interview criminal defendants and make determinations as to whether a criminal can stand trial.
- 2. The subject will also familiarise the students with laws concerning mental health and criminal behaviour and will aid in understanding the basic psychological & scientific principles.
- 3. The study of statistics will aid the students in verifying the laboratory findings, thus establishing the veritability of the outcome of any analysis so conducted in forensic investigations.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Forensic Psychology**: Introduction to Forensic Psychology; scope & ethics; distinction between Forensic and therapeutic evaluation. Genetic basis of Psychology. Legal aspect of forensic psychology practice.
- 2. **Forensic Psychiatry**: introduction, classification of mental disorders, forensic psychiatric examination. Scope of psychiatric examination in criminal and civil cases
- 3. **Crime investigation-** types and classification of crimes and criminals, criminal profiling, and modus operandi. Brain Fingerprinting, Polygraph, Hypnosis, Narco Analysis-Principle, technique and their role in criminal justice system.

PART-B

4. **Measures of central value:** Arithmetic mean, mode and median Definition, calculation and its properties.

Measures of Dispersion:

- a. Range, Interquartile range, Quartile deviation.
- b. Mean deviation and standard deviation.
- 5. **Correlation:** Methods studying correlation Scatter diagram method, Graphic method, Karl Pearson coefficient of correlation, Rank correlation.
- 6. **Regression analysis** (Regression lines and regression equation.)
- 7. **Concept of sampling and sampling methods:** Definition and law of sampling, judgment sampling, Random sampling, stratified sampling, systematic sampling, multi-stages sampling and quota sampling.
- 8. **Test of significance** for large samples and small samples.
- 9. Chi-square analysis

10. Analysis of variance

11. **Probability**: Law of probability, Theoretical probability distribution: Binomial distribution, Poison distribution, Normal distribution.

12. Computer in Biometrics

- a. Components of computers
- b. Statistical softwares

- 1. Bruce A. Arrigo: Introduction to Forensic Psychology, Academic press London.
- 2. CR Kothari: Research methodology, Methods and Techniques, 2nd edt. New age International Publishers.
- 3. Daniel, Wayne W. Bio-statistics: A Foundation for Analysis in the Health Sciences, 7th edition. John Wiley, 2000.
- 4. David L. Shapiro: Forensic Psychology Assessment and Investigative Approach, Allyn and Bacon Publisher.
- 5. Goon, A.M, Gupta, M.K and Dasgupta: B Fundamental of Statistics Vol. I.
- 6. Hess, A. K. and Weiner, I. B.: Handbook of Forensic Psychology, John Wiley & Sons.
- 7. Smoller: Biostatistics and Epidemiology: A Primer for Health and Biomedical Professionals, Sylvia Wassertheil.

PAPER – FSC 105 PRACTICAL (BASED ON PAPERS FSC 101 & FSC 102) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 4 hrs.

- 1. Sketching and photography of mock crime scene.
- 2. Collection, preservation and packing of physical evidences.
- 3. Reconstruction and evaluation of various mock crime scene e g accident, theft etc
- 4. Report Writing in respect of crime scene.
- 5. Searching of evidence by Polylight.
- 6. Evaluation of bloodstain patterns
- 7. Various types of microscopes their components and working.
- 8. To demonstrate polygraph test.
- 9. Electrophoresis techniques Preparations of gels, media, buffers and demonstration of gel electrophoresis.
- 10. Thin layer chromatography- Drugs (2)
- 11. Demonstration of different centrifugation techniques
- 12. Visit to Forensic Science laboratory and preparation of report
- 13. Estimation of macro molecules by spectrophotometry.

PAPER – FSC 106 PRACTICAL (BASED ON PAPERS FSC 103 & FSC 104) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Morphological examination of human and animal hairs
- 2. Preparation of slide for scale pattern study of hairs
- 3. Identification of blood by chemical, micro-chemical test and UV-Visible spectrophotometer.
- 4. Identification of sex from blood samples
- 5. Detection of species of origin by immune double diffusion method.
- 6. ABO typing from dried blood stains.
- 7. Identification of spermatozoa from dried seminal stains
- 8. Microscopic study of fur and feathers of various birds
- 9. Pug marks collection and identification
- 10. Identification of various body fluids e.g. urine, semen, saliva, milk etc
- 11. Microscopic and chemical examination of different plants, animals fibers
- 12. Microscopic examination of soft and hard woods
- 13. Extraction and morphological study of various diatom genera.

SEMESTER-II

PAPER NO. FSC 201 FORENSIC CHEMISTRY AND TOXICOLOGY CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To introduce students about the nature and analysis of evidences related to chemistry and toxicological importance in Forensics.

Outcomes:

- 1. The subject will introduce students about the chemical tests that are being used in Forensic Chemistry.
- 2. It will also provide information about the general chemistry and analysis of legal and illegal alcoholic substances, evidences related to petroleum products and drugs of abuse.
- 3. The students will learn about the medico legal aspects and analysis of different types of toxic substances related to crime like plant poisons, pesticides etc
- 4. The subject will also furnish information about the pharmacokinetics of poison in body and its significance in identification of poisons.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. Forensic Chemistry: Introduction, Colour & Spot test, microcrystal tests, inorganic and organic analysis. Analysis of Beverages: alcoholic and nonalcoholic beverages, illicit liquors, detection and estimation of ethanol. Breathe alcohol analyzer. Analysis of trace evidence cosmetics dyes, pigments, clues of trap cases.
- 2. Analysis of Petroleum Products: Introduction, standard methods of analysis of petroleum product for adulteration as per BIS. Arson Investigation: chemistry of fire, Forensic investigation of arson cases.
- 3. **Drug of Abuse:** introduction, classification, drug of abuse in sports. General chemistry and analysis of narcotic drugs and psychotropic substances as exemplified by cocaine, cannabis, barbiturates, benzodiazepines, amphetamine, opium, hallucinogens, designers drugs. Introduction of NDPS act, drugs and cosmetic act.

PART – B

4. **Forensic Toxicology:** Introduction and scope of forensic toxicology, classification of poisons, legal aspects of poisoning, types of poisoning. Antidotes, factors modifying action of poisons, LD-50, sign and symptoms of common poisons. Collection, preservation of samples; Conventional and recent extraction and isolation methods of poisons.

- **5. Pharmacology:** theory and principles of absorption, distribution, biotransformation and excretion of drugs/poisons, and their forensic aspects.
- 6. General studies and Analysis of vegetable poisons: Opium, Abrus, Dhatura, Marking nuts, Nux-vomica, Oleander and Aconite. alkaloids: classification and charecterisations . Snake venoms and insect poisons, Irrespirable gases, food poisoning
- 7. Insecticides and Metallic Poisons: introduction, types, General methods for their analysis.

- 1. C.K. Parikh. Parikh's test book of medical jurisprudence Forensic medicine and toxicology,
- 2. Dettean J. D. Kirk's Fire Investigation, 5th Ed., Prentice Hall, Eaglewood Cliffs, N.J (2002)
- 3. EGC Clarke, Analysis of drugs and poisons. 3rd edition. Vol. 1 and 2, pharmaceutical press.
- 4. Feigl, Spot Test in Inorganic Analysis, Elsevier Pub. New Delhi (2005).
- 5. Feigl, Spot Test in Organic Analysis, Elsevier Pub., New Delhi (2005).
- 6. Maudham Bassett et al. Vogel's Textbook of Quantitative Chemical Analysis, 6th Ed., Longman Essex (2004).
- 7. Modi: Textbook of Medical jurisprudence & Toxicology, M.M. Tripathi Publication.
- 8. R.T. Morrison, R.N. Boyd; Organic Chemistry, 6th Ed., Prentice Hall, New Delhi (2003)
- 9. S.N. Tiwari: Analytical Toxicology, Govt. of India Publications, New Delhi, 1987.
- 10. Saferstein, R: Forensic Science Hand Book, Vol I, II and III, Pretince Hall, NI, 1982.

PAPER NO. FSC 202 INSTRUMENTAL ANALYSIS- II CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the basics of biochemical techniques related to forensic analysis such as DNA amplification, radio immunological techniques.

Outcomes:

- 1. The subject will introduce the principles of enzymatic and radio chemical techniques.
- 2. The students will also study the factors affecting the DNA amplification (PCR) which may alter the outcome of Forensic DNA profiling.
- 3. The students will get an insight about the different techniques based on Ag- Ab interaction and their assistance in forensic investigations.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Molecular biology techniques**: isolation of DNA, RNA, purification, restriction, PCR DNA amplification, autoradiography, and forensic applications.
- **2.** Cell and tissue culture techniques: pH and buffers, culture media preparations, sterilization techniques and forensic applications.
- 3. Centrifugation Techniques Centrifugation, cold and ultracentrifuges basic principle, instrumentation, G-value & relationship between RPM., applications of analytical centrifugation.
- 4. **Electrophoresis:** Introduction, principles, factors affecting electrophoresis, types of electrophoresis. High and low voltage electrophoresis, capillary electrophoresis. immuno-electrophoresis, SDS-PAGE and iso- electric focusing; their application.

- 5. **Enzyme techniques:** Enzyme kinetics, enzyme assay techniques such as visible UV spectrophotometric methods, Luminescence method, Radioisotope methods and Immuno-chemical methods.
- 6. **Radio chemical techniques:** radioisotope, nature of radioactivity, detection and measurements of radioactivity and forensic applications.
- 7. **Immunochemical Techniques:** Introduction, Antigen -antibody reactions -theory and principles, Production of antibodies. Immunoprecipitation and agglutination based techniques such as immunodiffusion, cross over electrophoresis etc. Labeling of Antibodies and their detection methods: ELISA, RIA- their basic principle, techniques, and their forensic applications.

- **1.** Thomas J. Kindt, et al. Kuby Immunology, 6th edition 2001
- David. L.Nelson & Michael M, Cox Lenninges; Principles of Biochemistry, 4th edition, Freeman Pub. 2005.
- 3. Keith Wilson & John Walker; Practical Biochemistry- Principles & Techniques, 5th Edition, Cambridge University Press 2000.
- 4. Peterson: Clinical and Forensic Application of Capillary Electrophoresis, 2001.

PAPER NO. FSC 203 QUESTIONED DOCUMENT EXAMINATION CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the nature and examination of different documents submitted to the court of Law. **Outcomes:**

- 1. The subject will introduce the students with the types of questioned documents and their handling processes.
- 2. It will also provide information about the fundamentals of handwriting examination.
- 3. The students will be given information on how to detect alterations in document using conventional and modern tools like ESDA, VSC etc

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Document Examination:** introduction and classification of documents, genuine and forged document, and holographic document. Preliminary examination of documents, ways of procurement, handling and marking of document, preservation and reproduction of documents. Basic tools for forensic document examination.
- 2. **Handwriting:** principle, characteristics of handwriting, identification and evaluation of handwriting. Types of forgery, characteristic of genuine and forged signature and their examination. Identification of writer of anonymous letter.
- 3. **Ink and paper examination** their types, composition and forensic examination. Various types of writing instruments, Determination of age of documents.

- 4. Examination of various printing devices and forgeries of printed document. Photostat, scanned and faxed document examination. Examination of typewriters and typed documents, Examination of security documents, fake currency notes, passport, visa, credit cards and ATM. Examination of stamp and seal impressions.
- 5. **Examination of altered documents:** methods and examination of alteration, obliterations, erasures, secret writing, intended and charred document; study of advance techniques for examination of alterations such as Projectina, VSC and ESDA.
- **6. Misllenious:** Photographic techniques to questioned document, Discovery of facts by comparison with known material. Fry test and Daubert standards, Report writing, reasons for opinion, presentation of expert evidence on documents case.

- 1) Ellen, D The scientific examination of Documents, Methods and techniques. 3rd ed., Taylor & Francis Ltd. (2006).
- 2) Hilton, O. The Scientific Examination of Questioned Document, 1982, Elsaevier North Holland Inc. New York.
- 3) Huber, A. R. and Headrick, A.M.: Handwriting identification: facts and fundamental CRC Press, (1999)
- 4) Kelly J.S. and Lindblom B.S. Scientific examination of questioned documents. 2nd edition CRC press.
- 5) Morris R.N. Forensic Handwriting Identification (fundamental concepts and Principals) 1st edition Academic Press Inc. (2000).
- 6) Osborn, A. S. Questioned Documents 1929, Boyd Printing Co. Chicago.
- 7) Wilson R. Harrison; Suspect Documents Their Scientific Examination, Universal Law Pub. Delhi Indian.
- 8) Mehta, M. K. The identification of Handwriting & Cross Examination of Experts, N.M. Tripathi, Allahabad. 1970.

PAPER NO. FSC 204 FORENSIC MEDICINE AND ANTHROPOLOGY CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the application of medical knowledge in criminal investigation, particularly in establishing the causes of injury or death.

Outcomes:

The study of Forensic medicine helps students to know about how a crime was committed including what weapons were used, when the crime happened and where the crime happened.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Forensic Medicine:** Characteristics and cause of death; Aphyxial death-Introduction, characteristics and types of asphyxia death (Hanging, strangulation, drowning etc), thermal death and their medico legal aspects. Estimation of time since death, post mortem examination.
- 2. **Injuries:** classification, types and characteristics of mechanical injuries, antimortem and post mortem injury, artificial injury, grievous injury, and their medicolegal aspects.

Investigation of sexual offences, abortion and infanticides

3. **Forensic Odontology:** Definition, scope, structural variation and types of teeth. Determination of age and sex from teeth, Gustafson's method, dental anomalies and their significance

Bite marks: methods of collection, preservation, recording, comparison and their significance.

PART –B

- 4. **Forensic Anthropology:** Definition, scope and problems, structure of bones, morphological study of human skeleton, comparative study of human and animal skeleton. Age, sex and stature determination from skeleton remains.
- 5. **Osteometry, craniometry:** introduction, methods and their importance in personal identification.
- 6. **Personal Identification Techniques**: portrait parley/ Bertillon system, superimposition techniques- photographic and video superimposition.

Facial reconstruction: introduction, theory and methods, importance of tissue depth to reconstruct various facial futures, genital and congenital anomalies.

- 1. B.C. Smith, et al.: DNA & Forensic Odontology- Manual of Forensic Odontology, Colorado Springs, USA, 1995.
- 2. J. Kasprzak: Possibilities of Cheiloscopy in Forensic Science 1980.
- 3. J. P. Modi: Textbook of Medical jurisprudence & Toxicology, M.M. Tripathi Pub.
- 4. K S Narayan Reddy: The essential of Forensic Medicine and Toxicology.
- 5. K. Parikh: Parikh's test book of medical jurisprudence Forensic medicine and toxicology.
- 6. L.C. Jain: Intelligent Biometric Techniques in Fingerprint and face recognition, CRC Press Ohio, 1999.
- 7. S. Hillison: Dental Anthropology, Cambridge Univ. Press, UK 1996.
- 8. Taylor: Forensic Art and Illustration, CRC Press. 2000
- 9. V. Iannarelli: Ear Identification, Forensic Identification series, Paramount, 1989.

SEMESTER – II

Paper: FSC 205 (Core) Credits: 1 Seminar Total Marks: 25

PAPER – FSC 206 PRACTICAL (BASED ON PAPERS FSC 201 & FSC 202) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Chemical and spectrophotometric analysis of phenolphthalein in trap cases.
- 2. Tests for metallic poisons- Preliminary and Confirmatory
- 3. Estimation of ethanol, and methanol from blood/ urine samples.
- 4. Extraction and identification of drugs from blood and urine sample
- 5. Extraction and identification of insecticides from biological materials.
- 6. Identification of phosphine by colour tests
- 7. Practical demonstration of petroleum analysis by GLC
- 8. Screening of common drugs by UV Vis spectrometry
- 9. Separation and identification of plant poisons and cometics dyes by TLC
- 10. To perform chemical tests for plant poisons
- 11. To perform TLC separation of drugs
- 12. Preparation of media sterilization techniques maintenance of microbial culture and standard plate count.

PAPER – FSC 207 PRACTICAL (BASED ON PAPERS FSC 203 & FSC 204) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Identification of normal/disguised writing- wring movement, ratio of letters etc
- 2. Examination of alteration and obliteration in documents.
- 3. Detection of simulated and traced forgeries.
- 4. Examination of security documents.
- 5. Examination of mechanical and chemical erasure in documents.
- 6. To examine printed document.
- 7. To examine intended writing.
- 8. To examine counterfeit currency.
- 9. Morphological identification of Human and animal bones
- 10. Determination of sex from skull and pelvic girdle.
- 11. Determine of age from bones.
- 12. Estimation of stature from long bones
- 13. To perform craniometric measurements on skull.
- 14. Lifting identification and comparison of bite marks

SEMESTER-III

PAPER NO. FSC 301 FORENSIC BALLISTICS AND EXPLOSIVES CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the nature and scientific examination of evidences concerned with the firearms and ammunition **Outcomes:**

- 1. The subject will introduce students with the classification and characteristics of firearms involved in various crimes.
- 2. It will also provide information about the basics and examination process of various evidences related to firearms for the reconstruction of the crime scene related to shooting incidence.
- 3. Students will get to know the types, chemistry and examination of evidences related to explosive substances.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. History and Background of Firearms, classification and characteristics of firearms, components of firearms, firing mechanism, smooth bore and rifled bore firearms. Country made firearms: introduction, constructional features and identification. Ammunition: classification and composition of cartridges, propellents, cartride case, wads, compositional aspects of various types of bullets and shotgun projectile.
- 2. Forensic Ballistic: Definition and back ground, internal and external ballistics, factors affecting internal and external ballistics such as size, shape and ignition of propellants, barrel length, pressure curve, recoil, ballistics coefficient, air resistance, rifling and bullet stability, measurements of trajectory parameters, ricochet phenomenon.
- **3. Terminal Ballistics:** factors affecting wound ballistics, Bullet penetration phenomena, characteristic of rifled firearm injury and smooth bore firearm injury, Forensic evaluation of firearms injury.

- **4. Firearms and Ammunition Linkage:** principles, comparison of fired cartridge case and bullets. Gunshot residues: introduction, composition and its forensic evaluation, chemical and instrumental methods of GSR analysis.
- **5. Reconstruction of Shooting Incidence:** theory of shooting reconstruction, mathametics of shooting reconstruction, accidental discharge, determination of range and time of fire. Shot pattern testing, laboratory examination of firearms. Law related to examination of firearms in Indian arms act.

6. Explosive: - classification, types, composition and characteristic of low explosives, and high explosive such as black powder, NC, NG, TNT, RDX, PETN, HMX, Dynamite, ANFO etc. Detonators, blasting cap, explosive train, IEDs and pyrotechniques, explosion process and effects, effects of blast wave on structures and human. Specific approach to scene of explosion, reconstruction of sequence of events, post blast residues, collection, analysis of explosion residues.

- 1. B. R. Sharma: Firearms in criminal investigation and trials. Universal Law Publishing; Fourth edition, 2012.
- 2. J. H. Mathews and C. C. Thomas. Firearms Identification. Vol.-I, II & III, Springfield Illinois.
- 3. J. Schwoeble and David L. Exline: Current methods in forensic gunshot residue analysis CRC Press, 2000.
- 4. Karl G. Sellier et al; Wound Ballistics and The Scientific Background, Elsevier Pub. Co.London, 1994.
- 5. Peter F. Mahoney et al., Ballistic Trauma, a Practical Guide. Second Edition, 2005 Springer-Verlag London Limited.
- 6. Yinon Jitrin. Modern Methods & Application in Analysis of Explosives, John Wiley & Sons, England, 1993.
- 7. Exlopsive analysis manual, Directorate of Forensic Science, MHA, Govt. of India
- 8. Hueske E. E., Practical Analysis and Reconstruction of Shooting Incidents, 2006, CRC Press.
- 9. Vincent J. M., Di Maio, Gunshot wounds Practical Aspects of Firearms, Ballistics, and Forensic Techniques Second Edit. 1999, CRC Press.

PAPER NO. FSC 302 COMPUTER FORENSICS AND RECENT ADVANCES CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the various computer and internet related crimes and the laws governing them. **Outcomes:**

- 1. The students are taught numerous methods for revealing the information needed in a case such as the recovery of deleted, encrypted, or damaged files to reveal information stored in a computer.
- 2. Information regarding biometrics, quality management teaches students, the advanced methods of analysis available and being devised in the scientific community.
- 3. The distribution and security of intellectual property enlightens the students about the legal guidelines on access and distribution of information.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Computer Crime:** basics of computers, hardware accessories operating system and software. Types of computer crime, networked computer crime, unauthorized access, program manipulation, software piracy.
- 2. **Cyber Crime:** Introduction, Internet, definition, common principles, classification of cyber crimes. Hacking, virus, obscenity and pornography, encryption and description methods, Investigation of cyber crime: Search and seizure of computer system, computer based evidence and jurisdiction. Tools for analysis
- **3. Fundamental of Computer Security:** risk assessment and mitigation developing secure system, security models, damage control, assessment and auditing, and network security. Recent advances in computer forensics: computer simulation, image processing and pattern recognition, stenography and cryptography, Forensic linguistics, e- documents, digital signature.

- 4. **Quality Management** (ISO/ IEC-17025, NABL): Introduction, general requirement for competence of testing, standardization and calibration of forensic laboratories. Management and technical requirements for quality assurance.
- 5. **Biometrics:** definition, scope, types of biometric tool, fingerprint, face, Iris and retina imaging, ear, speech recognition, pattern comparison, human gait pattern. Professional ethics and conduct of forensic expert, dealing with news media.
- 6. **Intellectual property right**: copyright and patent, IT act 2000- introduction to offences and penalties.

- 1. Tewari, R.K., et al.: Computer Crime & Computer Forensics selects Publisher, New Delhi, 2003.
- 2. John R. Vacca: Biometric technologies and verification system, 2007.
- 3. Anil K. Jain, Rund Bolle, Sharath Rankanli: Biometrics Personal Identification in networked society, 1999.
- 4. Vacca John R: Computer Forensics, Computer Crime Scene Investigation, Firewall Medial, An imprint of Laxmi Pub.
- 5. Casey Eoghan: Handbook of Computer Crime Investigation, Forensic Tools & Technology, Academic Press.
- 6. L C Jain, H Hallic, I Hayaush, S. B Lee & S Tulsui: Intelligent Biometric Techniques in fingerprint and Face Recognition, CRC Press.

PAPER NO. FSC 303 DNA PROFILING CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To introduce students about the basic concepts of DNA fingerprinting and issues related to examination of evidences submitted in criminal cases.

Outcomes:

- 1. Students will study the basic principle of DNA profiling and extraction of DNA by conventional and recent methods.
- 2. The subject will also deal with the study of DNA amplification and various DNA typing methods such as RFLP, STR, and SNPs with their limitations and advantages.
- 3. The various issues related to reporting DNA as evidence to court such as contamination, low copy number, sample degradation will also be discussed.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

- 1. **Introduction of Human Genome:** Human chromosomes and karyotype, human nuclear genome. Mutation-types and cause, gens and alleles, human genetics and heredity. Calculation of allele frequencies. types and properties of DNA, mt DNA, DNA modifying enzymes, restriction enzymes
- 2. Forensic DNA Profiling: History and development of DNA finger printing

Basic Genotyping: VNTR, STR, SNPs polymorphism and other classes of DNA polymorphism. DNA markers

- 3. **Methods of DNA profiling**: Introduction, principle, techniques of RFLP, STRs, SNP profiling, assessment of STR profiling their advantage and limitations. **Gender identification:** Y-STR and mt-DNA profiling.
- 4. **DNA Amplification (PCR)-** principle, method, factors affecting PCR, advantage of PCR based techniques over RFLP.
- 5. Blotting techniques: Southern, Northern, Western, dot-, slot- and vacuum blotting.

- 6. **DNA sample preparation:** sample sources for DNA, collection and preservation of samples for DNA testing, conventional and recent methods of DNA extraction, separation, DNA Quantitation methods, DNA sequencing. DNA data base- CODIS
- 7. **Nucleic acid hybridization:** Preparation of nucleic acid probes for DNA profiling Single locus and multi locus probes, and cDNA probes; Methods of labeling of DNA probes –

Radioactive and non-radioactive labeling; detection methods, DNA Micro array technology.

- 8. **Forensic Issues:** degraded DNA, contamination, mixed samples and low copy number. Result interpretation, Quality assurance in DFP testing. Legal standards for admissibility of DNA profiling
- 9. Forensic Signification of DNA Profiling: personal identification, paternity testing, wild life forensics, veterinary, agriculture and mass disaster. Report writing and presentation of report in case of DNA profiling.

- 1. Daniel L. Hartl & Elizabeth W. Jones; Genetics- Principle & Analysis, 4th Ed., Jones & Bartlet Pub. 1998.
- 2. Jaiprakash G. Shewale, Ray H. Liu Forensic DNA Analysis: Current Practices and Emerging Technologies, CRC Press, 2013
- 3. John M Butler: Forensic DNA Typing. Elsevier Academic Press.
- 4. Keith Immen and Norah Rudus, 1997. An introduction to Forensic DNA Analysis. CRC Press, New York.
- 5. Lee M.C. and Gaenesten, R.E: DNA and other Polymorphism in Forensic Science. Year book Medical Published.

PAPER NO. FSC 304 Advances in Forensic Chemistry- I CREDITS-4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To introduce students about the basics of alcoholic products, adulteration in petroleum etc and detailed analysis of evidences related to Forensic chemistry.

Outcomes:

- 1. The subject will introduce students about the descriptive analysis of different adulterants in liquors which are being used in Forensic Chemistry.
 - 2. The students will learn about the detailed process of extraction and isolation of drugs/ poisons from samples related to forensic toxicology

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

Part A

- **1. Analysis of Beverages**: Alcoholic and non-alcoholic beverages and their composition, Analysis of alcoholic beverages as per BIS and PFA Act,
- **2.** Detection and determination of ethanol, furfural, organic acids, aldehydes, chloral hydrate and, methanol in liquors by color tests, TLC, GC, and GC-MS methods.
- **3. Analysis of petroleum products and residues**: Distillation and fractionation, Standards/methods of commercial analysis of petroleum products as per ASTM and BIS, Analysis of traces of petroleum products in forensic exhibits, Comparison of petroleum products, Adulteration of petroleum products,
- 4. Oils and fats : introduction, analysis and characterization of various oils and fats
- 5. Analysis of gold & other metals in cheating cases

Part B

6. Extraction and isolation of poisons/ drugs from biological samples:

Volatile compounds: Industrial solvent acid and basic Distillation,

Non-volatile organic compounds: Neutral non volatile compounds(pesticides/insecticides- oragnophosphorous compound, chlorinated, compounds, carbamates, and pyrethroids), acidic and basic non volatile compounds -Stas-otto method, Dovbriey Nickolls (Ammonium sulphate) method, acid digest and Valov (Tungstate) methods, Solvent extraction,
Toxic Cations: lead, mercury, arsenic -Dry Ashing and Wet digestion process, **Toxic Anions:** Dialysis method, total alcoholic extraction method.

- **7. Recent methods of sample extraction from body fluid:** Solid phase extraction, Solid phase micro extraction techniques, liquid phase micro extraction methods.
- **8. Examination process of suspected poison sample:** chemical tests, TLC methods, UV Vis methods, IR spectrometry, GC-MS.

References:

- 1. Clarke E.G.C, Clark's Isolation and Identification of Drugs, Publisher Pharmaceutical Press. (1986)
- 2. Kobilinsky Lawrence, Forensic Chemistry Handbook; 1st Edt; John wiley & sons publishing house; Canada
- 3. Suzanne Bell, Forensic chemistry; 2nd Edition; Pearson Higher Education
- 4. Houck Max M, Forensic Chemistry; 1st Edition; Elsevier science publication. (2015) Amsterdam
- 5. Modi: Textbook of Medical jurisprudence & Toxicology, M.M. Tripathi Publication.
- 6. R.T. Morrison, R.N. Boyd; Organic Chemistry, 6th Ed., Prentice Hall, New Delhi (2003)
- 7. S.N. Tiwari: Analytical Toxicology, Govt. of India Publications, New Delhi, 1987
- 8. Forensic Chemistry Manual, Directorate of Forensic science, MHA Government of India
- 9. Sharma B.R. Forensic Science in Criminal Investigation & Trials, Universal Law Publishing Company.
- Johll Mathew E, Investigating Chemistry: A forensic science perspective; 2nd Edition;
 W.H.Freeman and Company; New York, 2009
- 11. Christian Donell R, Khan Javed, Kennedy Thomas, Basic Principles of Forensic Chemistry; 1st Edition, Humana Press, 2011

PAPER NO. FSC 305

ADVANCES IN FORENSIC BIOLOGY- I

CREDITS-4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To make students understand the basics of biological material and its properties to aid in forensic investigations.

Outcome:

- 1. The subject will provide information to students regarding the analysis of various evidences of animal or plant origin.
- 2. It will explicate the insect development and geographical distribution for assistance in estimating the time since death and locating the probable crime scene.
- 3. It will also provide the information about poaching and hunting of protected animal species and trade in international market.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

1. **Hair examination:** Hair structure, growth and replacement of hair. Identification: Species of origin, variation in different major population groups, somatic origin. Individualization: Blood grouping, enzyme typing and DNA typing

Botanical avidences: Introduction types location collection evaluation

2. **Botanical evidences:** Introduction, types, location, collection evaluation and forensic significance.

Wood: Type of wood and their identification and comparison.

Leaves: Identification of various types of leaves and their anatomy, methods of comparison.

Pollens: Structure, function, methods of identification and comparison.

Diatoms: Nature, location, structure, extraction from various body tissues, including bone marrow, preparation of slides, methods of identification and comparison, forensic significance.

3. **Forensic Microbiology:** Types and identification of microbial organisms of forensic significance.

PART- B

4. **Wild Life Forensics:** Introduction, importance, protected and endangered species of Animals and Plants. Identification of wild life materials such as skin, fur, bones, nails, horn, teeth, flowers and plants, by conventional and modern methods, Identification of Pug marks of various animals.

5. **Forensic Entomology:** Introduction, general entomology and arthropod biology, insects of forensic importance, collection of entomological evidence during death investigations, the role of aquatic insects in forensic investigations, Insect succession on carrion and its relationship to determine time since death, its application to Forensic Entomology.

Suggested Readings

- 1. Richard saferstein; Forensic Science Hand book, Vol (I); Prentice Hall, Publications.
- 2. Jason H. Byrd and James L. Castner; Forensic entomology, CRC Press LLC, 2001.
- 3. Robertson (1999) : Forensic examination of Hair. Francis & Taylor, USA.
- 4. Safersstein, R. (1982) Science Handbook; Vol. III, Prentice Hall, New Jersey.
- 5. Curry, A. S. (1965) Methods of Forensic Science, Vol. IV, Interscience, New Youk.
- 6. Chowdhuri, S. (1971) : Forensic Biology, B P R & D Govt. of India.

SEMESTER – III

Paper: FSC 306 (Core) Credits: 1 Seminar Total Marks: 25

PAPER – FSC 307 PRACTICAL (BASED ON PAPERS FSC 301, FSC 302 & FSC 303) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Examination and Comparison of fired bullets
- 2. Examination of characteristics of Firearms Calibre, Choke etc.
- 3. Examination and Comparison of fired Cartridges/cases.
- 4. Determination of shot number from size and weight of shots.
- 5. To perform chemical tests for powder residues and Barrel wash.
- 6. To determine range of firing.
- 7. Examination of Firearms injuries
- 8. Identification of explosives by chemical color test.
- 9. Identification of explosives by TLC methods
- 10. Image processing using tools like photoshop, photopaints etc.
- 11. Email Investigation
- 12. Phishing case report
- 13. Virus attack case report
- 14. Preparation of human karyotype.
- 15. Extraction of DNA from blood etc.
- 16. DNA Quality check: Agarose gel electrophoresis.
- 17. DNA Quantitation by UV Spectrophotometry.

PAPER – FSC 308 PRACTICAL (BASED ON PAPERS FSC 304) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Analysis of alcoholic liquor as per BIS specifications.
- 2. Determination of methanol and ethanol in alcoholic liquors.
- 3. Analysis of gasoline as per BIS specifications.
- 4. Detection of metallic poisons (arsenic and mercury) in viscera and food stuff (simulated samples).
- 5. Systematic extraction and identification of acidic and basic drugs from viscera (simulated sample).
- 6. Qualitative Analysis of explosion residues
- 7. Systematic extraction and identification of organophosphorous, organo- chloro pesticides from food materials and viscera

PAPER – FSC 308 PRACTICAL (BASED ON PAPERS FSC 305) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Determination of age from skull sutures.
- 2. Determination of age from Teeth.
- 3. Determination of sex from skull.
- 4. Determination of sex from Pelvis.
- 5. To Perform osteometric measurements on Long bones.
- 6. To Perform craniometric measurements on skull.
- 7. To perform somatometric measurement on living.
 - (a) Height vertex, (b) Head length
 - (c) Head breadth (d) Foot length
 - (e) Foot breadth (f) Nasal height
 - (g) Nasal breadth (h) External biorbital breadth

Bigonial breadth

- (i) Internal bi-orbital breadth (j)
- (k) Bizygomatic breadth.
- 8 To prepare slides of scale patterns of human hair.
- 9 To examine human hair for cortex and medulla.
- 10 To identify blood stains.
- 11 To identify semen stains.
- 12 To identify saliva stains.
- 13 To identify various type of fibers.
- 14 To determine species of origin from blood.
- 15 To determine blood group from fresh blood and blood stains.

SEMESTER IV PAPER NO. FSC 401 FORENSIC PHYSICS CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the types, nature and examination of physical evidences of Forensic importance **Outcomes:**

1. The subject will introduce students with the composition and examination process of various physical evidences such as glass, soil, building materials, and examination of various tool marks.

2. The students will also read about the classification and composition of the fingerprints and various methods for the development of latent prints.

3. The students will also learn various methods available for retrieving information from available foot/ tyre impression from different surfaces.

PART- A

Forensic Physics: Introduction and scope, tools and techniques, examination of vehicle in case of road traffic accident, skid marks evaluation.

Glass: Types of glass and their composition-soda-lime, boro-silicate, safety glass, laminated, light-sensitive, tampered/ toughened, wire glass, coloured glass. Matching and comparison. Forensic examinations of glass fractures- rib marks, hackle marks, cone fracture, wavy, backward fragmentation, concentric and radial fractures. Colour, fluorescence, physical measurements, refractive index, density gradient, becke-line, specific gravity examination and elemental analysis of glass evidence.

Paint: Types of paint and their composition, macroscopic and microscopic analysis of paint pigments, pigment distribution, micro-chemical analysis- solubility test, pyrolysis gas chromatography, TLC, colorimetric analysis, IR spectroscopy and X-ray diffraction, elemental analysis, mass spectrometer, interpretation of paint evidence.

Fibre: Types of fibres, forensic aspects of fibre examination- fluorescence, optical properties, refractive index, birefringence, dye analysis. Physical fit and chemical testing. TLC, IR-micro spectroscopy, Py-MS. Difference between natural and man-made fibres.

Miscellaneous Evidences: wire, broken bangles, seals, counterfeit coins, ropes/ strings, synthetic fibers etc their introduction & forensic examination.

PART -B

Building Materials: Cement- composition, types, Forensic Analysis- bromoform test, fineness test, ignition-loss test, Identification of adulterated cement. Mortar and concrete analysis.

Soil: Types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, density gradient analysis, ignition-loss test, elemental analysis, interpretation of soil evidence.

Tool Marks: theory, types of tool marks, and their forensic examination, Restoration methods of obliterated marks.

Voice Analysis and Tape Authentication: theory of voice production, theory of voice identification, the sound spectrograph, voice comparison -standards and methods of voice comparison, significance.

Suggested readings:

- 1. B.R. Sharma, Forensic Science in Criminal Investigation and Trials, Universal Law Publishing; Fourth edition 2013.
- David A. Crown, The Forensic Examination of Paints and Pigments, Toylor & amp; Francis, NY, 2001.
- 3. N. Gilbert: Criminal Investigation; Third edition, Macmillan Publishing Company.
- 4. Noon: Forensic Engineering Investigation, 2000.
- 5. Saferstein : Forensic Science Handbook, Vol. I, II & amp; III, Prentice Hall Inc. USA.
- 6. Richard Saferstein. Criminalistics: An Introduction to Forensic Science. 10th edit. Prentice-Hall, New Jersey.

PAPER NO. FSC 402 FORENSIC DACTYLOGRAPHY AND OTHER IMPRESSIONS CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To study the types, nature and examination of physical evidences of Forensic importance **Outcomes:**

1. The subject will introduce students with the composition and examination process of various physical evidences such as glass, soil, building materials, and examination of various tool marks.

2. The students will also read about the classification and composition of the fingerprints and various methods for the development of latent prints.

3. The students will also learn various methods available for retrieving information from available foot/ tyre impression from different surfaces.

PART - A

History and development of finger prints: development and morphology of ridged skin, types,

and variations in finger prints: Causes and genetics, population variations. Finger Prints Bureau.

Sample collection: Basics of taking inked prints, collection of prints samples of living and deads, devices and material for recording prints. Classification of finger Prints, pattern types, pattern area.

Classification systems: Henry system of classification (Primary to tertiary and key classification) extension of Henry system searching of finger prints, , single finger print.

Chance Finger Prints: Latent prints, plastic prints, causes, composition of sweat. Development of latent finger prints: powder methods: such as fluorescent powder, magnetic powder. Fuming methods: Iodine and cynoacrylate methods. Chemical methods: Ninhydrin and its analogue silver nitrate, application of laser technologies, metal deposition method. Biological methods of development of latent prints on skin.

PART-B

Latent print processing Systematic approach to latent print processing, preserving and lifting of finger prints. Photography of Finger Prints, comparison of finger prints: basis of comparison, class characteristics, individual characteristics, various types of ridge characteristics.

Automatic Finger Print Identification system (AFIS) and its variants, digital Image processing of finger prints and their enhancement. Presentation of expert evidence on finger prints in court.

Foot / footwear/ tyre impressions: introduction, class and individual characteristics, types, collection, preservation and forensic examination and evaluation of impressions, Gait pattern.

Lip Prints and Ear Prints – Nature, location, collection, forensic examination, and significance.

Suggested Readings

- B.R. Sharma, Forensic Science in Criminal Investigation and Trials, Universal Law Publishing, 2013.
- 2. Bridges BC: Criminal Investigation, Practical Finger Printing, Thumb Impressions, Hand writing Expert testimony opinion Evidence, University Book Agency, Allahabad.
- 3. Cowger, James F: Friction ridge skin- Comparison and Identification of fingerprints, CRC Press, 1993.
- 4. William J. Bodziak: Footwear Impression Evidence Elsevier Science Publishing Co. New York.
- 5. R. Saferstein: Forensic Science Handbook, Vol.-I, II, Prentice Hall, NJ, 1988.
- 6. C. Champod et al. Ridge skin impression, CRC Press, London, 2004.
- Richard Saferstein. Criminalistics: An Introduction to Forensic Science. 10th edit. Prentice-Hall, New Jersey.

PAPER NO. FSC 403 Advances in Forensic chemistry II Credits-4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To introduce students about the basics and detailed analysis of narcotic and Psychotropic substances and plants alkaloids

Outcomes:

- 1. The subject will introduce students about the descriptive analysis of different adulterants NDPS substances.
- 2. The students will learn about the detailed chemistry and analysis process of plants alkaloids and plant poisons of forensic significances,

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

Part A

Analysis of Narcotic Drugs and Psychotropic Substances: Introduction classification of narcotic substances, natural narcotics, semi synthetic and synthetic narcotic substances.

Opiate: extraction of alkaloids from plant materials, a analysis of opium alkaloids, and derivatives using spot tests, microcrystal tests, TLC, UV- vis spectrometry, IR spectrometry, GC-MS,

Cannabis: introduction, chemistry, analysis by spot tests, TLC, and UV, and IR, spectrometry, GC – MS.

Barbiturates: chemistry, types, extraction and isolation, characterization by spot tests, TLC, and IR spectrometry, HPLC – MS.

Benzodiazepines: Introduction, types and classification, chemistry, characterization by spot tests, TLC, and UV and IR spectrometry, GC – MS etc.

Amphetamines: chemistry, characterization by spot tests, TLC, and UV and IR spectrometry, GC – MS, NMR etc.

Hallucinogens (LSD, psilocybine and mescaline): Introduction, analysis: spot tests, TLC, and IR spectrometry, HPLC – MS, GC- MS.

Part B

Plants poisons: Introduction and classification of plants alkaloids, analysis of different plants poisons of forensic significance using spot tests, microcrystal tests, TLC and other sophisticated techniques. **Poisonous seeds:** Abrus precatorius, Atropa belladonna, Argemone mexicana, Cerbera thevetia, Croton tiglium, Datura fastuosa, Ricinus communis. **Poisonous fruits:**

Semicarpus anacardium, Urginea scilla. **Poisonous roots:** Digitalis, Aconitum napellus, Plumbago rosea. Poisonous Mushrooms

Suggested Readings:

- 1. Modi: Textbook of Medical jurisprudence & Toxicology, M.M. Tripathi Publication.
- 2. S.N. Tiwari: Analytical Toxicology, Govt. of India Publications, New Delhi, 1987
- 3. Clarke E.G.C, Clark's Isolation and Identification of Drugs, Publisher Pharmaceutical Press. 1986
- 4. Kobilinsky Lawrence, Forensic Chemistry Handbook; 1st Edt; John wiley & sons publishing house; Canada
- 5. Suzanne Bell, Forensic chemistry; 2nd Edition; Pearson Higher Education
- 6. Houck Max M, Forensic Chemistry; 1st Edition; Elsevier science publication. 2015 Amsterdam
- 7. Forensic Chemistry Manual, Directorate of Forensic science, MHA Government of India
- 8. Sharma B.R. Forensic Science in Criminal Investigation & Trials, Universal Law Publishing Company.
- Johll Mathew E, Investigating Chemistry: A forensic science perspective; 2nd Edition; W.H.Freeman and Company; New York, 2009
- 10. Christian Donell R, Khan Javed, Kennedy Thomas, Basic Principles of Forensic Chemistry; 1st Edition, Humana Press, 2011

PAPER NO. FSC 404 ADVANCES IN FORENSIC BIOLOGY- II CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

Objective: To make students understand the basics of biological processes and its properties to aid in forensic investigations.

Outcomes:

- 1. The subject will provide information to students regarding the immunological responses of the body and their application in forensic examination.
- 2. It will explicate the students about the details of DNA profiling techniques, its applications, limitations and assistance in criminal cases.

Note:

1. Nine questions will be set in all.

2. Question No. 1, which will be objective/short answer type cover the entire syllabus, will be compulsory. The remaining eight questions will be set section wise selecting four questions from each section (A & B). The candidate will be required to attempt question No. 1 and four more selecting two questions from each section.

3. As far as possible the questions should be divided into sub-parts and marks indicated part wise.

PART- A

1. Immunology: Immune system, immune response, innate and acquired immunity and antigens, haptenes and adjuvants.

Immunoglobulin: Types, physio-chemical properties and function, raising of antisera.

- **2.** Lectins: Forensic significance, buffers and serological reagents, methods of sterilization employed for serological work.
- **3.** Antigen-Antibody Reactions: Precipitation, agglutination, complement, neutralization, immunofluorescence.
- 4. HLA system: Its applications in paternity testing, pitfalls of HLA system.

PART-B

5. Forensic examination of Body fluids:

Blood: Identification (Preliminary and confirmatory tests), species of origin (Immunodiffusion and Immunoelectrophoresis), Individualization: Blood grouping, enzyme typing,

Semen: Composition, functions and morphology of spermatozoa,

Identification (Preliminary and confirmatory tests including Azoospermic semen stains), Individualization (Blood Grouping, seminal fluid isozymes typing, Composition, functions and forensic significance of saliva, sweat, milk, urine, faecal matter, vaginal secretions and tests for their identification including the presence of blood group specific ABH substances.

- 6. Polymorphic enzymes: Forensic significance, identification from fresh blood and stains.
- **7. Paternity disputes:** Causes, Various serological and biochemical methods, calculation of paternity index and probability for paternity and maternity.

Suggested Readings

- 1. Modi, J.K. (1988): Medical Jurisprudence and Toxicology, N.M. Tripathi Pvt. Ltd.
- 2. Boorman, K. E: Blood Group Serology, Churchill, and Lincolin, P. J. (1988)
- 3. Race, R. R. and Sangar, R. (1975): Blood Groups in Man. Blackwell Scientific, Oxford.
- 4. Barris, H. and Hopkinson, D. A. (1976): Handbook of Enzyme, Electrophoresis, Elsevier, North, Holland, New York.
- 5. Gilblet, E. (1969): Marker's in Human Blood, Davis, Pennsylvania.
- 6. Culliford, B. E. (1971), The examination and Typing of Blood Stains, US Deptt. of Justice, Washington.
- 7. Chowdhuri, S. (1971): Forensic Biology, B P R & D, Govt. of India.
- 8. Dunsford, I. and Bowley, C. (1967): Blood Grouping Techniques, Oliver & Boyd, London.
- 9. Eckert, W. G. & James, S.H. (1989): Interpretation of Blood Stain, Evidence, Elsevaier, New York.

SEMESTER – IV

Paper: FSC 405 Credits: 4 Viva of summer training and project report Total Marks: 100

PAPER – FSC 406 PRACTICAL (BASED ON PAPERS FSC 401 & FSC 402) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Physical examination of glass fragments.
- 2. Density measurement of (soil, paints, glass) by density gradients methods
- 3. Comparison of tool marks with comparison microscope.
- 4. Physical and chemical examination of paints.
- 5. Collection of plain and rolled inked fingerprints and to identify patterns and ridge characteristics.
- 6. Analyse the finger prints- 1^{st} , 2^{nd} and 3^{rd} level details.
- 7. Developing and comparison of latent fingerprints with powder, fuming and chemical methods.
- 8. To prepare cast of foot wear/ tyre impression mark and their comparison.
- 9. To record foot marks by tracing method.

PAPER – FSC 407 PRACTICAL (BASED ON PAPERS FSC 403) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. Systematic identification of Narcotic Drugs and Psychotropic substances (opiates, cannabis and barbiturates, benzodiazepines and amphetamines) by spot colour tests.
- 2. Thin layer chromatographic analysis of NDPS substances.
- 3. U.V/Vis spectrophotometric analysis of barbiturates, benzodiazepine and amphetamines.
- 4. IR/FTIR analysis of drug of abuses.
- 5. Identification of vegetable poisons through microscopy.
- 6. Systematic analysis of plant poisons (Datura, abrus, Nicotine, Argemone etc).

PAPER – FSC 407 PRACTICAL (BASED ON PAPERS FSC 404) CREDITS- 4

Total Marks: 100 Theory Exam. Marks: 80 Internal Assessment: 20 Time: 3 hrs.

- 1. To determine titre of antisera.
- 2. To prepare anti-H from seeds of ulex europeous.
- 3. To perform precipitin test for species of origin determination.
- 4. To perform Immunodiffusion test for species of origin.
- 5. To determine blood group from stains of blood and various body fluids with Absorptioninhibition, mixed agglutination and absorption-elution techniques.
- 6. To prepare gel plates for electrophoresis.
- 7. Examination of diatoms.
- 8. Examination of hair of different animals as cat, dog, cow, horse and goat.
- 9. Extraction and isolation of DNA from blood and other body fluids.
- 10. DNA Quality check: Agarose gel electrophoresis.
- 11. DNA Quantitation by UV Spectrophotometry.

DEPARTMENT OF HISTORY KURUKSHETRA UNIVERSITY KURUKSHETRA

B.A. (GENERAL) HISTORY (SEMESTER SYSTEM)

REVISED SCHEME OF EXAMINATION W.E.F. 2018-19 (SYLLABI INTRODUCED IN PHASED MANNER W.E.F. 2016-2017)

Note : There shall be two Optional Papers in each of the Semesters 1st, 2nd, 3rd and 4th. The Candidate shall take any one of the two Optional Papers in each Semester. The Candidate who may select Option-I Paper in the Semester-1st will continue to select the Option-I Paper in the Semesters 2nd, 3rd and 4th. The Candidate who may select Option-II Paper in the Semester-1st will continue to select the Option-II Paper in the Semester-1st will continue to select the Option-II Paper in the Semesters 2nd, 3rd and 4th. The Candidate appears in the Semesters 2nd, 3rd and 4th. There shall be three Optional Papers in the Semesters-5th and 6th. The Candidate opting for a particular number of Optional Paper (i.e. Option-I, II and III) in the Semester-5th shall take the same number of Optional Paper in the Semester-6th.

B.A. (General) History-Part-I, Semester-I

LIST OF PAPERS

Paper	Nomenclature	Internal	Theory	Total	Time
No.		Assessment	Paper	Marks	
			Marks		
Option-i	Ancient India (From Earliest Times	20	80	100	3 Hrs.
_	to Gupta Age)				
Option-ii	History of Haryana (From	20	80	100	3 Hrs.
	Harappan Age to 1526 A.D.)				

Syllabus and Courses of Reading

Option –(i) : Ancient India (From Earliest Times to Gupta Age)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

Meaning and Scope of History Sources of Ancient Indian History Pre-Historic Age: Hunter Gatherers Concept of Neolithic: Origin of the Agriculture System Harappan Civilization: Origins, Extent, Town Planning, Economy, Society, Arts and Political Organization

Unit- II

Vedic Culture: Polity, Society, Religion and Literature Social Institutions: Varna, Caste, Untouchability, and Gender Relations Emergence of State with special reference to the Rise of Magada Empire Religious Movements: Buddhism and Jainism

Unit- III

Mauryan Empire: Polity, Administration; Ashoka's Dhamma- Nature and Propagation Post-Mauryan Empires: Kushanas and Satvahanas Gupta Empire: State, Administration, Society, Economy, Urban Centers, Art and Architecture

Unit-IV

Maps (India):

Important Sites of Harappan Civilization Ports and Urban Centers in Ancient India Ashoka's Empire: Extent, Pillars and Edicts Extent of Kanishka's Empire Extent of Samudragupta's Empire

Suggested Readings:

Allchin, B.and Allchin, F.R.	Rise of Civilization in India and Pakistan (Delhi : Select Book
	Services Syndicate, 1983)
Basham, A.L.	The Wonder That Was India (Mumbai, Rupa, 1971)
Burton, Stein	History of India, Oxford, New Delhi, 1998
Burton, Stein	Vijaya Nagar, Cambridge, 1989
Chakrabarti, D.K.	India : An Archaeological History, Paleolithic beginnings to
	Early Historical Foundation (Delhi OUP, 1999)
Dani, A.H.	Recent Archaeological Discovers in Pakistan (Paris, UNESCO,
	1998)
Harle, J.C.	Art and Architecture of the Indian Subcontinent (Penguin,
	1986)
Jha, D.N. and Shrimali, K.M.	Prachin Bharat Ka Itihas (Delhi, 1990)
Kasambi, D.D.	Prachin Bhartiya Sabhyata Evam Sanskriti (Hindi) (Delhi,
	Rajkamal)
Majumdar, R.C. et al.	History and Culture of the Indian People, Vols. II, III, IV and
	V (Mumbai Bharatiya Vidya Bhavan Series, 1970, 1979, 1980)
Nilkanta Shastri, K.A.	A History of South India From Pre-Historic Times to the Fall of
	Vijaynagar (Chennai, OUP, 1983)
Sharma, R.S.	Aspects of Political Ideas and Institution in Ancient India
	(Delhi, Motilal Banarsidas, 1991)
Thapar, B.K.	Recent Archaeological Discoveries in India (Paris, UNESCO,
	1985)
Thapar, Romila	A History of India, Vol. I, Pelican, 1966
Thapar, Romila	From Lineage to State : Social Formations in the Mid-first
	Millennium BC in the Ganga Valley., Bombay : Oxford, 1984
Thapar, Romila	Aarambhik Bharat Ka Itihas (Delhi, Rajkamal)
	10(1100)

Option –(ii) History of Haryana (From Harappan Age to 1526 A.D.)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

Regional History: Meaning and Scope Sources of History of Haryana Extent of Harappan Civilization in Haryana Expansion of Vedic Culture in Haryana

Unit-II

Haryana between 300 B.C. to 200 A.D. : Polity, Society and Economy Rise of Republies : Yaudheyas, Kunindas and Pushyabhutis Rise of Pratiharas, Tomars and Chauhans

Unit-III

Invasions of Ghaznavi and Ghori : Effects on Haryana Establishment of the Turkish Rule: Resistance and Reconciliation Impact of Islam: Socio -Cultural Transition: Economic Conditions up to 1526

Unit-IV

Maps (Haryana):

Important Excavated and Explored Sites of Harappan Civilization in Haryana Extent of Harsha's Empire Towns in Haryana (300 B. C. to 1000 A.D.) Invasions of Ghaznavi and Ghori in Haryana Towns in Haryana (1000 A.D. to 1526 A.D.)

Suggested Readings:

Buddha Prakash	Glimpses of Haryana, Kurukshetra, 1967.
Buddha Prakash	Haryana Through the Ages, Kurukshetra, 1968

10(1101)

Phadke, H.A.	Haryana : Ancient and Medieval, Delhi, 1986
Phogat,S.R.	Inscriptions of Haryana, Kurukshetra, 1978
Sen, S.P.	Sources of Indian History, Vol. I, Delhi, 1978
Singh Fauja (ed.)	History of Punjab, Vol. I, Patiala, 1975
Verma, D.C.	Haryana, Delhi, 1972
Yadav, K.C.	Haryana Ka Itihas, 3 Vols. Delhi, 1981.
Yadav, K.C.	Haryana: Itihas Evam Sanskriti (Hindi), 2 Vol-I., Delhi, 1992)

B.A. (General) History – Part – I, Semester – II

SCHEME OF EXAMINATION W.E.F. 2016-2017

LIST OF PAPERS

Paper No.	Nomenclature	Internal Assessment	Theory Paper Marks	Total Marks	Time
Option-i	History of India (600-1526 A.D.)	20	80	100	3 Hrs.
Option-ii	History of Haryana (1526-1966	20	80	100	3 Hrs.
	A.D.)				

Syllabus and Courses of Reading

Option – (i): History of India (600-1526 A.D.)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

Post-Gupta Period up to 750 A.D.: Pushyabhutis and Chalukyas Polity and Economy with special reference to Indian Feudalism (750-1206 A.D.) Tri-Parties Struggle among Pratiharas, Palas and Rashtrakutas Polity and Administration of Cholas Socio-Cultural Trends: Society, Culture and Literature during 600-1206 A.D.

Unit-II

Invasions of Mahmud Ghaznavi and Muhammad Ghori - Causes of Success and Effects Emergence of Delhi Sultanate: Iltutmish, Balban, Ala-ud-din Khilji and Muhammad Tughlaq Bahmani and Vijaynagar Kingdoms: Polity, Administration and Economy Fall and Fragmentation of Delhi Sultanate

Unit-III

Delhi Sultanate: Political and Administrative Institutions, Ruling Groups Economic Developments during 1206-1526 A.D.: Agriculture, Industry, Trade and Commerce Art and Architecture during the Sultanate Period Society and Culture: Bhakti and Sufi Movements

Unit-IV

Maps (India): Extent of Harsha's Empire Extent of Ala-ud-din Khiji's Empire

Extent of Muhammad Tughlaq's Empire Extent of Vijaynagar Empire Urban Centers under the Delhi Sultanate

Suggested Readings:

Ashraf, K.M.	Life and Conditions of the People of Hindustan (Delhi, 1965)
Ashraf, K.M.	Hindustan Ke Nivasiyon Ka Jivan Aur Paristhitiyan (Hindi)
Basham, A.L.	The Wonder That Was India (Mumbai, 1971)
Brown, Percy	Indian Architecture Vol. – 1 (Mumbai 1984)
Burton, Stein	History of India (Oxford, 1998)
Burton, Stein	Vijayanagar (Cambridge, 1989)
Gopal, L.	Economic History of Northern India 700-1200 (Delhi, 1989)
Habib, Muhammad and	Comprehensive History of India, Vol. V (Delhi, 1970)
Nizami, K.A.	
Harle J.C.	Art and Architecture of the Indian Subcontinent (Penguin, 1986)
Jackson, Peter	The Delhi Sultanate, (Cambridge, 2001)
Jha, D.N. and Shrimali, K.M.	Prachin Bharat Ka Itihas (Hindi) (Delhi, 1990)
Kulke, H and Rothenmund,	History of India (London, 1998)
D. Majumdan P.C. at al	History and Culture of the Indian Doorle Vola II and V
Majunidar, K.C. et al.	(Mumbai, 1970, 1980)
Panday, A.B.	Early Medieval India, (Allahabad, 1970)
Panday, Vimal Chander	Prachin Bharat Ka Rajnatik Tatha Sanskritik Itihas, Bhag - 2 (Hindi) (Allahabad, 1994)
Rizvi, S.A.A	The Wonder That Was India, Vol. 2, (London 1987)
Satish Chandra	Medieval India from the Sultanate to the Mughals (Delhi, 1997)
Satish Chandra	Madhya Kalin Bharat : Rajniti, Samaj Aur Sanskirti (Hindi) (Delhi, 2007)
Sharma, R.S.	Aspects of Political Ideas and Institutions in Ancient India (Delhi, 1991)
Shastri, K.A. Nilkanta	A History of South India From Pre-Historic Times to the Fall of

Vijaynagar (Chennai, 1983)Shastri, K.A.N.History of South India (Delhi, 1975)Thapar, RomilaA History of India, Vol. I, (1966)Verma, Harish Chandra (ed.)Madhyakalin Bharat, Vol-I, Delhi

Option - (ii): History of Haryana (1526-1966 A. D)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

Mughal Rule in Haryana: Establishment, Administration and Decline Emergence of the Composite Culture Society, Economy, Art and Architecture in Haryana under the Mughals Struggle for Supremacy during the 18th Century: Marathas, Jats and George Thomas Unit-II

The British Rule: Establishment and Administration Uprising of 1857: Nature and Effects Gandhian Movements and Freedom Struggle during 1919-1947 Parjamandal Movement in the Princely States

Unit-III

Growth of Modern Education Economic Effects of the Colonial Rule Social Transition and Reform Movements: Arya Samaj and Sanatan Dharam Sabha Formation of Haryana State

Unit-IV

Maps (Haryana):

Important Urban Centers during the Mughal Period Major Centers of Uprising of 1857 Important Places Connected with the Freedom Struggle Princely States Connected with the Prajamandal Movement Formation of Haryana State: Districts and Important Cities

Suggested Readings:

Buddha Prakash	Glimpses of Haryana, Kurukshetra, 1967.
Buddha Prakash	Haryana Through the Ages, Kurukshetra, 1968.
	10(1104)

Chaudhary, Prem	Panjab Politics : The Role of Sir Chhotu Ram, Delhi 1984
Kakara, Inderjeet	Madhyakalin Haryana- (Hindi), Kurukshetra
Mittal, S.C.	Haryana : A Historical Perspective, Delhi, 1986
Phadke, H.A.	Haryana : Ancient and Medieval, Delhi, 1986
Rai, Gulshan	Formation of Haryana, Delhi, 1981
Sen, S.P.	Sources of Indian History, Vol. I, Delhi, 1978
Singh, Rajpal	Banda Bahadur – His Life and Times, New Delhi, 1998
Talbat, Ian	Punjab and the Raj
Tanwar, R.	The Politics of Sharing Power : The Punjab Unionist
	Party
Verma, D.C.	Haryana, Delhi, 1972
Yadav, K.C.	Haryana Ka Itihas, 3 Vols. Delhi 1981.
Yadav, K.C.	The Revolt of 1857 in Haryana, Delhi 1977
Yadav, K.C. and Rameshwar	Rebels Against the Raj : Who is Who of Freedom Fighters
Dass	in Haryana, 1885-1947, Delhi, 1984

B.A. (GENERAL) HISTORY (SEMESTER SYSTEM)

B.A. (General) History – Part – II, Semester – III

SCHEME OF EXAMINATION W.E.F. 2017-2018

LIST OF PAPERS

Paper	Nomenclature	Internal	Theory	Total	Time
No.		Assessment	Paper	Marks	
			Marks		
Option-i	Political History of India (1526-1857	20	80	100	3 Hrs.
_	A.D.)				
Option-ii	Socio-Economic History of India	20	80	100	3 Hrs.
	(1526-1857 A.D.)				

Syllabus and Courses of Reading

Option - (i) : Political History of India (1526 – 1857 A.D.)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- Note:- 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the

explanatory note will carry full marks.

Unit – I

Establishment of the Mughal Empire: Babur and Humayun Sher Shah Suri and His Administration Akbar: Expansion of Empire and Religious Policy Aurangzeb: Expansion of Empire and Religious Policy

Unit – II

Relations of Mughals with the Rajputs Deccan Policy of the Mughals Mughal Administration: Central and Provincial; Revenue System Institutions: Mansabdari and Jagirdari Decline of the Mughal Empire

Unit- III

Rivalry between the French and the British in India: Battles of Karnataka Founding of the British Empire: Battles of Plessey, Buxer and Mysore Consolidation of the British Empire: Subsidiary Alliance System and Doctrine of Lapse; Annexation of Punjab and Awadh Uprising of 1857: Causes and Consequences

Unit – IV

Maps (India):

Political Conditions of India in 1526 Mughal Empire at the Death of Akbar (1605) Mughal Empire at the Death of Aurangzeb (1707) Expansion of British Empire upto 1856 Major Centres of the Uprising of 1857

Suggested Readings:

Basham, A.L.	The Wonder That Was India, Vol. II
Bayly, C. A.	Indian Society and Making of the British Empire: The New
	Cambridge History of India, Vol. II
Gordon, Stewart	The Marathas 1600-1818 : The New Cambridge History of
	India, Vol. V
Habib, Irfan	Medieval India, 4 Vols.
Hasan, Ibn	Central Structure of the Mughal India
Kulkarni, A. R.	Medieval Maharastra
Kulke, H and D. Rothemund	History of India
Majumdar, Datta and	Advanced History of India
Raychowdhary (eds.)	
Pandey, A. B.	Later Medieval India
Richards, John F.	Mughal Empire: New Cambridge History of India, Vol. V
Satish Chandra	Medieval India: From the Sultanate to the Mughals
Satish Chandra	Madhyakalin Bharat (Hindi)

Satish ChandraMughal Religious PoliciesShukla, R. L. (ed.)Adhunik Bharat Kaltihas (Hindi)Spear, T.G.P.History of India, Vol. IITripathi, R. P.Some Aspects of Muslim AdministrationTripathi, R. P.Rise and Fall of Mughal EmpireVerma, H. C.Madyakalin Bharat, (Hindi) Vol-I & II

Option – (ii) Socio-Economic History of India (1526 – 1857 A.D)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- Note:- 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit – I

Medieval Indian Society: Classes - Ruling Class, Religious Class, Peasants and Artisans; Conditions of the Depressed Classes and Women Bhakti and Sufi Movements; Leading *Panths* and *Silsilahs*

Unit – II

Medieval Economy: Agrarian, Land Revenue and Currency Systems under the Mughals Education and Literature; Art and Architecture Pre-British Economy: Handicraft Industry; Trade and Commerce; Village Community with

Unit- III

The British India: Land Revenue Systems - Permanent Settlement, Ryotwari Settlement and Mahalwari Settlement Decline of Handicraft Industries Introduction of Modern Education and its Impact Development of Railways and its Impact

Unit – IV

Maps (India):

special reference to Jajmani System

Major Centers of Sufi *Silsilahs* and Bhakti Movement Major Urban Centers during the Mughal Period Major Internal Trade Routes under the Mughals Centers of Major Mughal Monuments Jurisdiction of Major Land Revenue Settlements under the British

Suggested Readings:

Banga, Indu and Jaidev (eds.) Cultural Reorientation in Modern India Bayly, C. A. Indian Society and the Making of the British Empire: The New Cambridge History of India, Vols. I & II Colonialism and Nationalism in India Bipan Chandra Indian Architecture : Muslim Period Brawn, Peray Desai, A.R. Social Background of Indian Nationalism Desai, Z. A. Indo-Islamic Architecture Gopal, S. The Permanent Settlement in Bengal Habib, Ifran Cambridge Economic History of India, Vol-I Habib, Irfan Agrarian System in Mughal India Lunia, B.N. Madyakalin Bhartiya Sanskriti (Hindi) Majumdar, Datta and Advanced History of India Raychowdhary Moreland, W.H. India at the Death of Akbar Naqvi, H.K. Urbanization and Urban Centres under the Great Mughals Rai, Satya M. (ed.) Bharat Me Upniveshwad Aur Rashtrawat (Hindi) Rashid, A. Social and Cultural History of Medieval India Richards, John F. Mughal Empire: New Cambridge History of India, Vol. V Rizvi, S.A.A. History of Sufism in India, Vol-II Satish Chandra Medieval India: From Sultanate to the Mughals Satish Chandra Madhyakalin Bharat (Hindi) Agrarian Relations in India 1793-1947 Sen, Sunil, K. Spear, T.G.P. History of India, Vol. II Shukla, R.L.(ed.) Adhunik Bharat Ka Itihas (Hindi) Stein, Burton Peasants, State and Society in Medieval South India Tara Chand Influence of Islam on Indian Culture Tripathi, R.P. Rise and Fall of Mughal Empire Verma, H. C. (ed.) Madyakalin Bharat (Hindi), Vols I & II

B.A. (General) History - Part - II, Semester - IV

SCHEME OF EXAMINATION W.E.F. 2017-2018

LIST OF PAPERS

Paper	Nomenclature	Internal	Theory	Total	Time
No.		Assessment	Paper	Marks	
			Marks		
Option-i	Indian National Movement	20	80	100	3 Hrs.
Option-ii	Modern India (1858-1947 A.D.)	20	80	100	3 Hrs.

Syllabus and Courses of Reading

Option - (i) : Indian National Movement

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- Note:- 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit – I

Origins of the National Consciousness Founding of Indian National Congress Moderates and Extremists: Ideology, Programmes and Politics Home Rule Movement

Unit – II

Role of Mahatma Gandhi in Freedom Movement: Non-Cooperation Movement, Civil Disobedience Movement and Quit India Movement Ideology and Contribution of Revolutionaries with special reference to Bhagat Singh

Unit- III

Political Reforms: Acts of 1909 and 1919 Rise of Communal Politics: Muslim League – Ideology and Politics Conclusion of Poona Pact and the Act of 1935 Subhash Chandra Bose and Indian National Army Partition and Independence of India

Unit – IV

Maps (India):

Places of Important Sessions of Indian National Congress Areas and Centers of Home Rule Movement Areas and Centers of Civil Disobedience Movement Important Centers of Revolutionary Movement Areas and Centers of Quit India Movement

Suggested Readings:

Agrow, D.	Moderates and Extremists in the Indian National Movement		
Bipan Chandra et. al.	Bharat Ka Swatantrata Sangharsh (Hindi)		
Bipan Chandra et. Al.	India's Struggle For Independence		
Brown, Judith	Gandhi's Rise to Power: Indian Politics 1915-1922		
Chahal, S.K.	Dalits Patronized		
Desai, A.R.	Social Background of Indian Nationalism		
Guha, Ranjit (ed.)	Subaltern Studies, Vol. I – XI		
Gupta, M.N.	History of the Revolutionary Movement in India		
Hasan, Mushirul	India's Partition : Process, Strategy and Mobilization		
Hasan, Mushirul	Nationalism and Communal Politics in India 1916-1928		
Majumdar, Datta and Ray	Advanced History of India		
Chowdhary			
Moon, Penderal	Divide and Quit		
Nanda, B.R.	Gandhi : A Biography		
Nanda, B.R.	Jawaharlal Nehru : A Biography		
Omvedt, Gail	Dalits and Democratic Revolution .		
	Dr. Ambedkar and Dalit Movement inColonial India		
Pannikar, K.N.	National and Left Movements in India		
Rai, Satya M.	Bharat Me Upniveshwad Aur Rashtrawad (Hindi)		
Sarkar, Sumit	Modern India		
Sarkar, Sumit	Adhunik Bharat (Hindi)		
Shukla, R. L. (ed.)	Adhunik Bharat Ka Ithas (Hindi)		
Tara Chand	History of the Freedom Movement in India, Vols. I - IV		
Tomlinson, B.R.	Indian National Congress and the Raj, : 1929-1942		
Vajpeyee, J.N.	Adhunik Bharat Ka Ithas (Hindi)		

Option – (ii): Modern India (1858-1947 A. D)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight*

questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.

3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit – I

Drain of Wealth under the Colonial Rule Social Reform Movements: Brahmo Samaj; Arya Samaj; Satyashodhak Samaj; Ramkrishan Mission and Aligarh Movement

Unit – II

Expansion of Railways and its Impact Rise of Modern Industries Press and Literature: Its Role in Indian Renaissance Rise of Middle Classes

Unit - III

Peasant Movements Labour Movements Depressed Class Movement Changing Position of Women Process of Modernization

Unit – IV

Maps (India):

Important Centers of Social Reforms Movements Expansion of Indian Railways: Important Tracks Major Centers of Peasants Movements Major Centers of Modern Industries Major Centers of Labour Movements

Suggested Readings:

Bayly, Susan

Caste Society and Politics in India: The New Cambridge History of India

Chahal, S.K.	Dalits Patronized
Datta, K.K.	Social History of Modern India
Desai, A. R.	Social Background of Indian Nationalism
Desai, A.R.	India's Path of Development
Frykenberg, R.E.	Land Control and Social Structure in India
Krishnamurthi, J.	Women in Colonial India
Kumar, Ravindra	Social History of Modern India
Majumdar, Datta and Ray-	Advanced History of India
Chowdhary (eds.)	
Mishra, B.B.	The Indian Middle Classes : Their Growth in Modern
	Times
Mishra, Girish	Economic History of Modern India
Mishra, Girish	Adhunik Bharat Ka Arthik Itihas (Hindi)
	10(1111)

Mittal, S.C.	Bharat Ka Saamajik aur Aarthik Itihas (1758-1947)
Nanda, B.R.	Jawaharlal Nehru : A Biography
Nurullah, S. & J.P. Naik	History of Education in India
Omvedt, Gail	Dalits and Democratic Revolution : Dr. Ambedkar
	and Dalit Movement in Colonial India
Rai, Satya M.(ed.)	Bharat Mein Upniveshwad Aur Rashtrawad (Hindi)
Raychaudhuri, Tapan and Irfan	The Cambridge Economic History of India, Vol. I
Habib	
Sen, Sunil, K.	Agrarian Relations in India, 1793-1947
Shukla, R.L. (ed.)	Adhunik Bharat Ka Itihas (Hindi)
Spear, T. G. P.	History of India, Vol. II
Srinivas, M.N.	Social Change in Modern India
Stein, Burton	The Making of Agrarian Policy in British India, 1770-1900

Option - (i) : Indian National Movement

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- Note :- 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit – I

Origins of the National Consciousness Founding of Indian National Congress Moderates and Extremists: Ideology, Programmes and Politics Home Rule Movement

Unit – II

Role of Mahatma Gandhi in Freedom Movement: Non-Cooperation Movement, Civil Disobedience Movement and Quit India Movement Ideology and Contribution of Revolutionaries with special reference to Bhagat Singh

Unit- III

Political Reforms: Acts of 1909 and 1919 Rise of Communal Politics: Muslim League – Ideology and Politics Conclusion of Poona Pact and the Act of 1935 Subhash Chandra Bose and Indian National Army Partition and Independence of India

Unit – IV

Maps (India):

Places of Important Sessions of Indian National Congress Areas and Centers of Home Rule Movement Areas and Centers of Civil Disobedience Movement Important Centers of Revolutionary Movement Areas and Centers of Quit India Movement

Suggested Readings:

Moderates and Extremists in the Indian National Movement
Bharat Ka Swatantrata Sangharsh (Hindi)
India's Struggle For Independence
Gandhi's Rise to Power: Indian Politics 1915-1922
Dalits Patronized
Social Background of Indian Nationalism
Subaltern Studies, Vol. I – XI
History of the Revolutionary Movement in India
India's Partition : Process, Strategy and Mobilization
Nationalism and Communal Politics in India 1916-1928
Advanced History of India
Divide and Quit
Gandhi : A Biography
Jawaharlal Nehru : A Biography
Dalits and Democratic Revolution :
Dr. Ambedkar and Dalit Movement inColonial India
National and Left Movements in India
Bharat Me Upniveshwad Aur Rashtrawad (Hindi)
Modern India
Adhunik Bharat (Hindi)
Adhunik Bharat Ka Ithas (Hindi)
History of the Freedom Movement in India, Vols. I - IV
Indian National Congress and the Raj, : 1929-1942
Adhunik Bharat Ka Ithas (Hindi)

B.A. (General) History - Part - III, Semester - V

SCHEME OF EXAMINATION W.E.F. 2018-2019

LIST OF PAPERS

Paper No.	Nomenclature	Internal Assessment	Theory Paper	Total Marks	Time
			Marks		
Option-i	Ancient and Medieval World	20	80	100	3 Hrs.
Option-ii	Rise of Modern World	20	80	100	3 Hrs.
Option-iii	East Asia in Modern Times	20	80	100	3 Hrs.

Syllabus and Courses of Reading

Option - (i) : Ancient and Medieval World

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

Evolution of the Humankind: Paleolithic, Mesolithic and Neolithic Cultures Civilizations of Mesopotamia and Egypt: Polity, Economy, Society, Religion, Arts, Science and Technology

Ancient Greece and Rome: Athenian Democracy, Roman Republic, Society, Economy; Fall of the Roman Empire

Unit- II

Feudal Europe: Manorial System, Organization of Production, Position of Peasants and Artisans

Medieval Church and State

Trade and Commerce and Growth of Port Cities and Towns Decline of Feudalism

Unit- III

Hazrat Muhammad and four Pious Caliphs Evolution of Islamic State under Umayyads and Abbasids Islamic World: Society, Economy, Literature, Art and Architecture Religious Developments: Origins of Sufism

Unit-IV

Maps (World) :

Extent and Important Places of the Civilization of Mesopotamia Extent and Important Places of the Civilization of Egypt Extent and Important Centers of Roman Civilization Major Ports and Urban Centers in Medieval World Extent and Important Places of Arab Empire up to 1258 A.D.

Suggested Readings:

Aleveev, V.L.	The Origins of the Human Race		
Ali, A.	The Spirit of Islam		
Bloch, March	Feudal Society, Vols. I and II		
Bosworth, C.E. and Joseph	The Legacy of Islam		
Schacht			
Burn, A.R.	Pelican History of Greek		
Childe, V. Gordon	What Happened in History		
Clark. G.	World Prehistory : A New Perspective		
Clough, Sheppard B.	The Economic Development of Western Europe		
Daniel, Glyn	First Civilizations		
Densely, Margaret	A History of Early Medieval Europe		
Faruqqi, Amar	Prachin Aur Madhyakalin Samajik Sanrachanayain Au		
	Sanskritiva (Hindi)		
Finley, M.I.	The Ancient Economy		
Gibo, H.A.R.	Mohammedanism: A Historical Survey		
Goval. Shri Ram	Vishaw Ki Sabhvataven(Hindi)		
Heaton. Herbert	Economic History of Europe		
Hitti, P.K.	Hisitory of the Arabs		
Jacquetta, Hawks	First Civilizations		
Jones, A.H.M.	Constantine and Conversion of Europe		
Katz, Solomon	The Social Structure of Islam		
Keen, Maurice	A History of the Medieval Europe		
Kramer ,S.N.	The Sumerians		
Latouche, Robert	The Birth of Western Economy		
Levy, R.	The Social Structure of Islam		
Lewis Bernard	The Arabs in History		
Ralph, Burns	World Civilizations		
Shahu, K.P.	Islam: Udbhav Aur Vikas (Hindi)		
Shaoyi, Baj	An Outline History of China		
Sourdel, Dominique	Medieval Islam		
Stephenson, C.	Medieval Feudalism		
Stephenson, Carl	Medieval History of Europe From 2nd to 16th Century		
Thompson, J.W.	Middle Ages. 2 Vols		
Trigger, B.	Ancient Egypt : A Social History		
Watt, Montgomery	Muhammad in Mecca and Madina		
Wince, R.J.	Patterns in Prehistory		

Option - (ii) : Rise of Modern World

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit – I

Transition from Feudalism to Capitalism in Europe Renaissance: Origins, Emergence and Results Reformation: Origins, Emergence and Results

Unit – II

Shift of Economic Balance from the Mediterranean to Atlantic Region Early Colonial System: Motives, Process and Consequences of Colonization of Americas Mercantile Revolution: Origins and Results

Unit – III

Scientific Revolution: Origins and Impact Glorious Revolution: Origins and Results Industrial Revolution: Origins, Progress and Impact Agricultural Revolution: Origins, Progress and Impact

Unit – IV

Maps (Europe):

Important Centers of Renaissance Important Centers of Reformation Important Mercantile Centers Major Places Connected with Industrial Revolution Capitalist Powers of Europe

Suggested Readings :

Chauhan, D. S.	Europe Ka Itihas (Hindi)
Chauhan, D. S.	Samkalin Europe (Hindi)
Cipolla, Carlo M	Before the Industrial Revolution: European Society and
	Economy1000-1700
Cipolla, Carlo M.	Forntana Economic History of Europe, Vols II and III
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Coleman, D. C. (ed.)	Revisions in Mercantilism
Davis, H. A. (ed.).	Outline History of the World
Davis, Ralph	The Rise of the Atlantic Economics
Dobb, Maurice	Studies in the Developments of Capitalism
Fisher, H.A.L.	A History of Europe
Gupta, Parthasarthi (ed.)	Adhunik Paschim Ka Uday (Hindi)
Gupta, Parthasarthi (ed.)	Europe Ka Itihas (Hindi)
Hall, J.R.	From Galileo to Newton
Henderson, O. P.	The Industrial Revolution on the Continent
Hill, Christopher	From Reformation to Industrial Revolution
Hilton, Rodney	Transition From Feudalism to Capitalism
Hobsbawm, E.J.	The Age of Revolution
Hobsbawn, E.J.	Nation and Nationalism
Keenigsberger, H.G. and G. L.	Europe in the Sixteenth Century
Mosse	
Morgan, K.O.	Oxford Illustrated History of Britain 1789-1983
Parker, G.	Europe in Crisis 1598-1648
Parker, G. and L. M. Smith	General Crises of the Seventeenth Century
Parry, J.P.	The Age of Renaissance
Porter, Andrew	European Imperialism, 1860-1914
Rabb, Theodore K.	The Struggle for Stability in Early Modern Europe
Roberts, J.M.	Europe 1880-1945
Stavrianes, L. S.	The World Since 1500
Stephen, J. Lee.	Aspects of European History 1494-1789
Wood, Anthony	History of Euorpe 1915-1960

Option – (iii) : East Asia in Modern Times

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

The Canton System in China and Opium Wars The Boxer Uprising Revolution of 1911: Causes and Significance Communist Revolution of 1949: Causes and Consequences

Unit- II

The Meiji Restoration in Japan : Causes and Significance Foreign Policy of Japan 1900-1919 Militarism in Japan: Causes and Consequences Japan and World War – II: Involvement and Consequences

Unit- III

Industrial and Agricultural Transformation in Japan after Meiji Restoration Social Change in Japan after Meiji Restoration Land Collectivization and Economic Change in China after 1949 Cultural Revolution in China

Unit- IV

Maps (China and Japan): European Colonial Expansion in China Important Ports Opened for Western Powers in Japan Route of Long March in China Important Industrial Centers of Japan Important Towns and Ports of Japan Affected during World War- II

Suggested Readings:

Allen, George	A Short Economic History of Japan
Beasley, G.	The Modern History of Japan
Chesnoaux, Jean et.al.	China from the 1911 Revolution to Liberation
Chisinau, Jean et al.	China From Opium War to 1911 Revolution
Clyde, P.H.	Far East
Clyde, P.H.	Sudur Purva (Hindi)
Hanne, Mikes	Modern Japan: A Historical Survey
Immanuel, Y. Hus.	The Rise of Modern China
John, Livingstone et.al.	The Japan Reader : Imperial Japan 1800-1945, Vol. I.
Johnson, Chalmers A.	Peasant Nationalism and Communist Power: The Emergence of Red China 1937-1945
K. Fairbank, John et.al	East Asia: Modern Transformation
Norman, F.H.	Japan's Emergence as Modern State
Puffer, Nathaniel	The Far East: A Modern History
Purcell, Victor	The Boxer Uprising: A Background Study
Pyle, Kenneth B.	The Making of Modern Japan
Schumann, Frauz and Orville	China Readings: Imperial China and Republican China, 2
Schell, (ed.)	Vols.
Schwartz, Benjanin I.	Mao and the Rise of Chinese Communism
Shang, Hu	Imperialism and Chinese Politics
Triton Tan, Chuntg and	Studies in the Nineteenth Century China and Imperialism
Dragon	
Tung ,Chow Tse	The May Fourth Movement: Intellectual Revolution in Modern
-	China
Tung Mao Tse	Selected Writings
Vinayake	Poovi Asia Ka Itihas (Hindi)
Wright Mary C.	China in Revolution: The First Phase (1900-1913)
	10(1118)

B.A. (General) History - Part - III, Semester - VI

SCHEME OF EXAMINATION W.E.F. 2018-2019 LIST OF PAPERS

Paper No.	Nomenclature	Internal	Theory	Total	Time
		Assessment	Paper	Marks	
			Marks		
Option-i	Modern World	20	80	100	3 Hrs.
Option-ii	Modern Europe (1789-1945 A.D.)	20	80	100	3 Hrs.
Option-iii	Rise of Indian Republic (1947-1964	20	80	100	3 Hrs.
_	A.D.)				

Syllabus and Courses of Reading

Option – (i) : Modern World

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit - I

Renaissance and Reformation Rise of Capitalism: Early Stages – Mercantile Capital and Free Trade Capital Agricultural Revolution and Industrial Revolution

Unit - II

Growth of Liberalism in England: Development of Parliamentary Form of Government American Revolution: Causes and Impact French Revolution: Nature and Impact Rise of Imperialism: Causes and Consequences

Unit – III

World War – I : Causes and Consequences Paris Peace Settlement and its Consequences Rise of Socialism and Bolshevik Revolution in Russia Rise of Dictatorship: Nazism and Fascism World War - II : Causes and Consequences

Unit - IV

Maps (World/ Europe):

European Countries having been witnessed Industrial Revolution Europe on the Eve of French Revolution Polarization of Countries before World War-I Europe after Paris Peace Settlement Polarization of Countries before World War-II

Suggested Readings:

Anderson, Pery	Lineages of the Absolutist State		
Barrachough, G.	An Introduction to Contemporary History (Penguin, 1968)		
Bronowski, J. and Bruce	The Western Intellectual Tradition (Ayer Co., 1960)		
Mazlish			
Carr, E.H.	The Bolshevik Revolution, 1917-23, 3 Vols. (Macmillan, 1950,		
	1951 and 1953)		
Chauhan, D.S.	Europe Ka Itihas (Hindi)		
Chauhan, D.S.	Samkalin Europe (Hindi)		
Davies, H.A.	Outline History of the World		
Fisher, H.A.L.	A History of Europe (Fontana Library, 1969).		
Gupta, Parthasarthi	Adhunik Paschim Ka Uday (Hindi)		
Gupta, Parthasarthi	Europe Ka Itihas (Hindi)		
Henderson, O.P.	The Industrial Revolution on the Continent.		
Hill, Christopher	From Reformation to Industrial Revolution (Penguin, 1970)		
Hill, Christopher	Lenin and the Russian Revolution, (Penguin, 1978)		
Hinsely, F.H. (ed.)	Modern History: Material Progress and World Wide Problems		
Joll, James	Europe Since 1870: An International History (Harper-Row, 1973)		
Joll, James	1870 Se Europe (Hindi)		
Langer, W.L.	Diplomacy of Imperialism		
Langer, W.L.	European Alliances and Alignments (Greenwood, 1977).		
Lefebvre, Georges	Coming of the French Revolution (Princeton, 1989)		
Palmer, R.A. and Cotton	A History of Modern World (McGraw, 1982)		
Joel			
Parks, H.B.	The United States of America		
Rolls, Eric	History of Economic Thought		
Rude, George	Revolutionary Europe (1984)		
Saboul, A.	The French Revolution.		
Stavrianes, L.S.	The World Since 1500 (1928)		
Taylor, A.J.P.	The Origins of the Second World War		
Taylor A.J.P.	The Struggle for Mastery in Europe (OUP,1954)		
Thompson, David	Europe Since Napoleon (Penguin, 1957,1966)		

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- Note:- 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit- I

French Revolution: Causes and Consequences Napoleon Bonaparte: Rise to Power and Continental System Congress of Vienna: Motives and Significance Concert of Europe and the Metternich System

Unit- II

Nationalism in Europe: Unification of Italy and Germany Formation of Triple Alliance and Triple Entente World War – I : Causes and Consequences Bolshevik Revolution in Russia: Causes and Consequences

Unit- III

Paris Peace Settlement: Treaty of Versailles - Provisions and Effects League of Nations: Working and Causes of Failure Rise of Nazism and Fascism: Nature and Consequences World War - II: Causes and Consequences

Unit- IV

Maps (Europe) :

Europe on the Eve of French Revolution Reconstruction of Europe by the Vienna Congress Europe on the Eve of World War – I Europe after Paris Peace Settlement Europe on the Eve of World War - II

Suggested Readings:

Anderson, Pery	Lineages of the Absolutist State
Barr chough, G.	An Introduction to Contemporary History (Penguin, 1968)
Bronowski, J., and Bruce	The Western Intellectual Tradition (Ayer Co., Publication, 1960)
MacLeish	
Carr, E.H.	The Bolshevik Revolution, 1917-23, 3 Vols. (Macmillan, 1950, 1951
	and 1953)

Davies, H.A.	Outline History of the World
Fisher, H.A.L.	A History of Europe (London, Fontana Library, 1969).
Henderson, O.P.	The Industrial Revolution on the Continent.
Hill, Christopher	From Reformation to Industrial Revolution (Penguin, 1970)
Hill, Christopher	Lenin and the Russian Revolution, (Penguin, 1978)
Hensley, F.H. (ed.)	Modern History: Material Progress and World Wide Problems
Joll, James	Europe Since 1870: An International History (Harper-Row, 1973)
Langer, W.L.,	Diplomacy of Imperialism.
Langer, W.L.,	European Alliances and Alignments (Greenwood, 1977).
Lefebvre, Georges	Coming f the French Revolution (Princeton, 1989)
Palmer, R.A. and Cotton	A History of Modern World (McGraw, 1982)
Joel	
Rolls, Eric	History of Economic Thought
Rude, George	Revolutionary Europe (1984)
Saboul, A.	The French Revolution.
Stavrianes, L.S.	The World Since 1500 (1928)
Taylor, A.J.P.	The Origins of the Second World War.
Taylor A.J.P.	The Struggle for Mastery in Europe (OUP,1954)
Thompson, David	Europe Since Napoleon (Penguin, 1957,1966)

Option – (iii) : Rise of Indian Republic (1947-1964 A. D)

Marks: 80 Internal Assessment: 20 Time Allowed: 3 Hours

- **Note :-** 1. The question paper will consist of *nine* questions. The candidate shall attempt *five* questions in all. The Question No. 1 will be *compulsory*. The Candidate shall attempt *four* more questions selecting at least *one* from each Unit. The paper will carry 100 marks out of which 20 marks will be earmarked for internal assessment. Each question will, therefore, carry 16 marks.
 - 2 The **Compulsory Question No.1** will be multiple choice type containing *eight* questions of equal marks (i.e., 2 marks each) spread over the whole syllabus.
 - 3 The Map Question will be carrying 16 marks (10 for map work and 6 for explanatory note). For visually disabled candidates, the part relating to the explanatory note will carry full marks.

Unit – I

Partition and Independence of India Rehabilitation of Displaced People Integration of Princely States Making of Indian Constitution and the Role of Dr. B.R.Ambedkar Problem of Kashmir

Unit – II

Economic Planning: Agricultural and Industrial Developments Social Justice: Law and Policies for the Upliftment of Weaker Sections and Women India and Non-Aligned Movement Relations with Neighbourers: Pakistan and China

Unit - III

Linguistic Reorganization of States Growth of Democracy: Political Parties at National Level Development of Science, Technology and Modern Education Social Change: Caste, Class and Community

Unit – IV

Maps (India): India and its States after Independence Major Princely States Integrated in India Major Industrial Centers of India Major Scientific Technological and Educational Centers India and its States in 1956

Suggested Readings :

Balbushevik, A. & Dyakov,	A Contemporary History of India	
A.M.		
Basu, D.D.	Shorter Constitution of India	
Bettelheim, Charles	India Independent	
Bipan Chandra et. al.	India's Struggle For Independence	
Bipan Chandra et. al.	Swatantrottra Bharat (Hindi)	
Chahal, S.K.	Dalits Patronized	
Desai, A.R.	Bharat Ka Vikas Marg (Hindi)	
Gaur, Madan	India : 40 Years after Independence	
Guha, Ranjit (ed.)	Subaltern Studies, Vol. I – XI	
Hasan, Mushirul	India's Partition : Process, Strategy and Mobilization	
Jaisingh, Hari	India and Non-Aligned World: Search for A New	
	Order	
Kothari, Rajni	Democratic Policy and Socialist Change in India	
Majumdar, Datta and Ray	Advanced History of India	
Chowdhary		
Moon, Penderal	Divide and Quit	
Nanda, B.R.	Gandhi : A Biography	
Nanda, B.R.	Jawaharlal Nehru : A Biography	
Omvedt, Gail	Dalits and Democratic Revolution :	
	Dr. Ambedkar and Dalit Movement in Colonial India	
Patel, Vallabhbhai	Correspondence, Writings and Speeches	
Rao, U. Bhaskar	The Story of Rehabilitation	
Sarkar, Sumit	Modern India	
Satyamurti, T.V.	India Since Independence	
Shukla, R. L. (ed.)	Adhunik Bharat Ka Itihas (Hindi)	
Srinivas, M.N.	Social Change in Modern India	
Tara Chand	History of the Freedom Movement in India, Vol. IV	
Vajpeyee, J.N.	Adhunik Bharat Ka Ithas (Hindi)	

DEPARTMENT OF ECONOMICS KURUKSHETRA UNIVERSITY KURUKSHETRA ('A+' Grade NAAC Accredited)

M.PHIL. ECONOMICS

Scheme & Syllabus of Examination w.e.f. 2018-19 (under CBS) (Passed in PGBOS meeting held on 13.04.2018)

<u>Scheme of Examination for M.Phil. Economics(Credit Based System)</u>

- 1. The M.Phil Economics Course is an Annual Course spread over 1 year.
- 2. Every Student of M.Phil. Economics Course has to pass 12 Credits (08 Core Courses Credits + 4 Elective Course Credits
- **3.** Every Student of M.Phil Economics has to prepare and submit a Dissertation under the Supervision of an eligible Teacher. After submission of Dissertation Every Candidate shall appear in Viva-Voce Examination on the Dissertation. Grade will be given to the candidate by the examiner.

PAPER CODE	NOMENC	LATURE	EXTERNAL	INTERNAL	CI	REDITS		Time
CORE PA	PERS				L	Т	Р	
M.Phil – 101	Research M Economics	ethodology in	80	20	4	¹ / ₂ Hrs./G	-	3 Hours
M.Phil – 102	Seminars (7	'wo)		100	-	¹ / ₂ Hrs./G	4	
M.Phil - 103	- Dissertation							
ELECTIV	E PAPERS							
	Choose any	one of the followings						
M.Phil –	Option (i)	Recent Developments in Economic Theory-I	80	20	4	¹ / ₂ Hrs./G	-	3 Hours
104	Option (ii)	Recent Developments in Economic Theory-II	80	20	4	¹ / ₂ Hrs./G	-	3 Hours
	Option(iii)	Current Issues in India and the Global Economy	80	20	4	¹ / ₂ Hrs./G	-	3 Hours
Total			30	00		12		

Total Marks: 300

• The Student shall present two seminars before DRAC once in six months to make a presentation of progress of his/her Dissertation work. Prior to the submission of the Dissertation again he/she has to present a pre-submission Seminar. The student shall also present at least one Research Paper in a conference/seminar/workshop.

- At least 75% attendance in each paper is must to appear in major test (end term examination)
- Internal Assessment (Minor Test)
 - (i) Two Class Tests : 50% Marks
 - (ii) Assignment : 25% Marks
 - (iii) Attendance : 25% Marks
- In paper 102, there will be two seminars out of which one will be on the topic approved for the Dissertation.
- The minimum percentage of marks/grade required to pass:
 - (i) 50% marks in each major test.
 - (ii) 50% marks in each seminar
 - (iii) 55% marks in aggregate of minor and major tests for each theory paper.
 - (iv) Grade B+ in Dissertation

Paper: M.Phil-101

Research Methodology in Economics

Total Credits: 4

Time:	3hours
Max. Marks:	100
External:	80
Internal:	20

Note: Two questions will be set from each unit. Candidates are required to attempt four questions selecting one from each unit.

Course Objective: The course introduces the nature and basic theoretical system of economics with an aim that students shall be able to extend the frontiers of knowledge, test old theories and solve basic and applied problems. This course covers the basic steps and process of conducting applied economic research. This includes the selection of topic, literature review and survey, selection of research method and approach, formulation of hypothesis, testing of hypothesis using statistical analysis, and summarizing results.

UNIT-I

Evolution of Scientific Knowledge: Propositions, Syllogism, Hypothesis, Scientific Method; Science as a Theoretical System; Criteria for choice of a Theory; Nature of Social Sciences visà-vis other Sciences; Role of values in Scientific Enquiry; Deductive and Inductive Analysis, Mill's Method of Experimental Enquiry, Fallacies; Theoretical system of Economics and its Methodology. Evolution of Economics in terms of Paradigm Shift and MSRP.

Readings

- 1. Cohen, M.E. and Negel, E. 'Introduction to Logic and Scientific Methods'
- 2. Kuhn, T.S. 'The Structure of Social Sciences'
- 3. Alen Ryan ' The Philosophy of Social Sciences'
- 4. R. Runder 'The Philosophy of Social Sciences'
- 5. Mishra Vikas ' The Study of Product Behaviour'

UNIT II

Research Design: Nature, types and levels of Research; Research Design and Research Process; Model building: Formulation and Its Empirical Verification; Formulation of Research Proposal; Types of Sampling and Sampling Procedures; Basic Experimental Designs.

Measurement and Scaling Techniques: nominal, ordinal, interval and ratio data; Likert's scale, Semantic differential scale, Thrustone scale.

Basic Hypothesis Testing Procedure; Major Parametric and Non Parametric Tests;

- 1. Goode and Hatt 'Methods of Social research'
- 2. Speigal, M. R. 'Theory and Prodblems of Statistics'
- 3. Croxton, F. E., D. Cowden and S. Kliein, Applied General Statistics'
- 4. Gupta S.C. and V.K. Kapoor, 'Fundamentals of Applied Statistics'
- 5. Gupta S. C. 'Fundamentals of statistics'

UNIT-III

Linear Regression Model upto two explanatory variables, OLS Estimates and Their Properties. R2 and adjusted R2, Test, Consequences and remedial steps of problem of Heteroscedasticity, Multicollinearity and Autocorrelation, Factor analysis, Discriminant analysis, Cluster analysis, Conjoint Analysis.

Readings

- 1. Johnson J. 'Econometric Methods'
- 2. Kmenta J. 'Elements of Econometrics'
- 3. Koutsoyiannis, A. 'Theory of Econometrics'
- 4. Maddala G.S.(Ed) 'Econometric Methods and application'
- 5. Paneerselvam- Research Methodology
- 6. Nargundkar Marketing Research

UNIT- IV

Time as a variable, Dummy Variable Technique Use of dummy variables, regression with dummy dependent variables; The LPM, Logit and Probit Models. Time Series; Stationarity, Unit Roots, Co-Integration, Dicky Fuller Test, Engel Granger Test, Forecasting with ARIMA and VAR Models-Box Jenkins Methodology, Vector Auto Regression (VAR). Introduction to Panel Data Methods: Pooled OLS, Random effects and fixed effects models

- 1. Gujarati, D.N. 'Basic Econometrics' (2nd Edition)
- 2. Intrilligator, M.D. 'Econometric Methods, Techniques and Applications'
- 3. Pindyck R.S. and D.L. Rubinfield 'Econometric Models and Economic Forecasts'
- 4. Worldridge Introductory Econometrics.

Paper: M.Phil-104 Option (i)

Recent Developments in Economic Theory-I

Total Credits: 4	Time:	3hours
	Max. Marks	s: 100
	External:	80
	Internal:	20

Note: Two questions will be set from each unit. Candidates are required to attempt four questions selecting one from each unit.

Course Objective: The students going through this Post PG Course are expected to understand the recent developments in micro; macro and applied economic theory at higher abstraction level with more philosophical underpinnings so that they can be prepared to take up the economic research seriously.

UNIT- I

Applied Micro Economics

Individual Choice under Uncertainty; Production under Uncertainty; Insurance; Risk Spreading and Pooling; Agency; Contract Theory and the Firm; Portfolio Theory; Asset Pricing Theories.

Readings:

- 1. Micro Economics- Hugh Gravelle and Ray Rees.
- 2. Economics of Insurance- Borch, Sandmo and Aase
- 3. Agency Theory, Information and Incentives- G.Bambreg. K. Spremann
- 4. The Theory of Incentives 1: The Principal-Agent Model- J.J. Laffont & David Martimort
- 5. Optimisation of Production under Uncertanity- S. Rasmussen
- 6. Investments- Bodie, Kane, Marcus, Mohantu.

$\mathbf{UNIT} - \mathbf{II}$

Applied Macro Economics

Evolution of Monetary Theory; Demand; Velocity and Supply of Money; Money; output and Prices- Causality; Issues and Evidence; Monetary Modeling in India- a Survey; Optimum Quantity of Money; Relevance of Fiscal Policy.

- 1. Handbook of Monetary Economics- Vol.2- B.M. Friedman, F.H. Hahn
- 2. Monetary Policy Rule in Theory and Practice- Nicolas Barbasoux
- 3. Monetary Economics for India- Narender Jadhav
- 4. Money, Credit and the Economy- Richard Coghlan

UNIT – III

Advanced Public and Welfare Economics

Preference Revelation Mechanisms of Public Goods; Democracy and Welfare Economics; Theory of Taxation- Efficiency; Equity and optimality; Sustainability of Public Debt; Budget Deficit-Sustainability; Solvency and optimality; Equity and efficiency aspect of Inter Agency Transfer in a Multi-Government Framework.

Readings:

- 1. Readings in Public Finance- Amaresh Bagchi
- 2. Inter-Governmental Fiscal Transfers- Robin Boadway and Anwar Shah
- 3. Public Choice II- D. Muller
- 4. Democracy and Welfare Economics- Hans Van Den Doel
- 5. The Theory of Taxation and Public Economics- Louis Kaplow
- 6. Modern Public Finance- Raghbender Jha

$\mathbf{UNIT} - \mathbf{IV}$

Behavioral Economics and Economics of Auctions

Behavioral Economics-Nature and Methodology; Values; Preferences and Choices; Beliefs; Heuristics and Biases; Mental Accounting

Auction Theory- Single Object Auctions; Multiple Object Auctions; Double Auctions; Combinatorial Auctions

- 1. Behavioural Foundations of Econ omics J.L. Baxter
- 2. The Behavioural Economics Guide 2016- Alain Samson
- 3. An Introduction to Behavioural Economics- Nick Wilkinson and Matthias Klaes
- 4. Routledge Handbook of Behavioural Economics- Roger Frantz et.al.
- 5. Misbehaving-the Making of Behavioural Economics- Richard H. Thaler
- 6. Understanding Auctions: Asuncion Mochon and Yago Saez.
- 7. Auction Theory- Vijay Krishna.
- 8. Auctions- Theory and Practice- Paul Klemperer.
- 9. An Introduction to Auction Theory- Flavio M. Menezes and Paulo K Monteiro.

Paper: M.Phil-104 Option: (ii)

Recent Developments in Economic Theory-II

Total Credits: 4

Time:	3hours
Max. Marks:	100
External:	80
Internal:	20

Note: Two questions will be set from each unit. Candidates are required to attempt four questions selecting one from each unit.

Course Objective: A lot of new economic literature has emerged in the international trade theory according the changed world economic order. The topics selected in this course will open new areas of research for the aspiring students. Important debates of the contemporary international economic scene related with recent theories, economic integration, WTO, trade, development & environment have been selected in this paper.

UNIT – I

Post H.O. trade Theories: Economies of Scale, Linder's Spillover Theory of Trade, Monopolistic Competition, Product Differentiation, Technological Gap, Product Cycle Theory, Specific Factors Model, Posner and Vermon's Theory

Theories of FDI and FII, Foreign Capital and Welfare-Trade, Growth, Development, Inequelity and Poverty Relationship

- 1. Carbough, R.J. (1999), International Economics, International Thompson Publishing, New York
- 2. Chacholiades, M. (1990), International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
- 3. Dana, M.S. (2000), <u>International Economics: Study, Guide and Work Book</u>, (5th Edition), Routledge Publishers, London.
- 4. Dunn R.M. Jr and Mutti J.H. (2004), <u>International Economics</u>, Routledge, London.
- 5. King, P.G. (1995), <u>International Economics and International Economic Policy: A Reader</u>, McGraw Hill International, Singapore.
- 6. Krugman, P.R. and M. Obstfeld (2013), <u>International Economics: Theory and Policy</u>, Glenview, Foresman.
- 7. Sodersten, Bo. And Reed G. (1994), <u>International Economics</u>, The Macmillan Press Ltd. London.

UNIT – II

International Business Cycles; Dynamics of Exchange rate with Interest rates and money; International Debt and Issues in International Taxation; International Migration; Financial Globalisation and Impossible Trinity; Global Liquidity

Readings:

- 1. Intermediate Public Economics- Hindricks and Myles.
- 2. Belke A. and Polleit T.(2009) Monetary Economics in Globalised Financial Markets, Springer
- 3. Carbough, R.J. (1999), International Economics, International Thompson Publishing, New York
- 4. hacholiades, M. (1990), International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
- 5. Dana, M.S. (2000), <u>International Economics: Study, Guide and Work Book</u>, (5th Edition), Routledge Publishers, London.
- 6. Dunn R.M. Jr and Mutti J.H. (2004), International Economics, Routledge, London.
- 7. King, P.G. (1995), <u>International Economics and International Economic Policy: A Reader</u>, McGraw Hill International, Singapore.
- 8. Jadhav N.(2006), Monetary Policy, Financial Stability and Central Banking in India, MacMillan
- 9. Krugman, P.R. and M. Obstfeld (2013), <u>International Economics: Theory and Policy</u>, Glenview, Foresman.
- 10. Salvatore D.(2006). Introduction to International Economics, Wiley
- 11. Sodersten, Bo. And Reed G. (1994), International Economics, The Macmillan Press Ltd. London.

UNIT – III

The Facts of Economic Growth; Factor Accumulation: Physical Capital (Solow Model and its empirical applications), Human Capital (Alternative Theories of Endogenous Growth), Natural Resources ; Productivity : The Role of Technology and Efficiency ; Growth in the Open Economy.

- 1. Introduction to Economic Growth: Jones and D. Vollarth.
- 2. Economic Growth: David weil
- 3. Economic Growth: Barro, Robert J & Sala-i-Martin.
- 4. Introduction to Modern Economic Growth: Daron Acemoglu
- 5. Globalization, Institutions and Economic Growth: Dani Rodrik
- 6. The Mystery of Economic Growth: E. Helpman Belknap
- 7. Handbook of Economic Growth: P.Aghion & S.N. Duelanf (Eds.)
- 8. How Universities Promote Economic Growth: Shahid Yusf Kaoru
- 9. Understanding Economic Growth: OECD
- 10. Understanding Economic Growth: Modern Theory & Experience: Jati Sangupta
- 11. Is Economic Growth Sustainable: IEA
- 12. The Economies of Growth : Aghion and Howitt

UNIT – IV

The Challenge of Economie Development; Development Perspectives ; Fundamentals of Development: Governance, Property Rights, Access to Finance, Health and Education, Culture ; Beyond GDP : New Measures of Progress and Prosperity.

- 1. Handbook of Development Economics (vol.5): Kennelth J Arrow & M.D. Intriligator (Eds.)
- 2. Economic Growth: David Weil (part IV)
- 3. Development Perspectives: Paul Romer
- 4. The Process of Economic Development: J.M. Cypher & J.L. Dietz
- 5. Economic Development: Biography of a Subject: G M Meier
- 6. The End of Poverty: Jeffery D. Sachs
- 7. The Elusive Quest for Growth: William Easterly
- 8. Development as Freedom: A K Sen
- 9. Poor Economics : A.V. Banerjee & Esther Duflo
- 10. Prosperity without Growth: Tim Jackson
- 11. Leading Issues in Economic Development: Meier & Rauch (Eds.)

Paper: M.Phil-104 Option (iii)

Current Issues in India and the Global Economy

Total Credits: 4

Time:	3hours
Max. Marks:	100
External:	80
Internal:	20

Note: Two questions will be set from each unit. Candidates are required to attempt four questions selecting one from each unit.

Course Objective: The present paper targets the analysis of all Indian economic policies which is the need of the hour. The students should try to understand the policy suggested by theory according to real conditions, practiced policy, gap their of, problems in implementation and interface of the policies with other domains/disciplines. The paper provides a number of options to M.Phil students to choose future policy research area.

UNIT-I

Indian Economy Toady: Overview and Comparative Perspective, Growth and Inflation Outlook, The need for Faster Growth, Priorities for Reviving Growth, NITI Aayog - The Vision, Strategy and Action Agenda.

Long-term challenges and policy measures in Indian Economy including the Global context, Indian Perspectives of Sustainable Development Goals 2030.

- 1. Kapila Uma, Indian Economy, Academic Foundation New Delhi Latest Edition.
- 2. Latest Government of India, Economic Survey, (Annual), Ministry of Finance, New Delhi.
- 3. Mishra S.K.and Puri V.K, Indian Economy Himalya Publication House Latest Edition.
- 4. Dutt and Sundaram, Indian Economy, S. Chand and Company, Latest Edition.
- 5. UN: Sustainable Development Goals 2030.
- 6. _____, Appraisal Document of Twelfth Five year Plan 2012-17, NITI Aayog, 2017.
- 7. _____, Three Year Action Agenda (2017-18 to 2019-20), NITI Aayog, August 1, 2017.

UNIT-II

Growth and Structural Change: Human Development, Performance on Inclusiveness, Sectoral Growth Trends- Cross-Country Evidence, Inter-Regional Disparities in Growth and Development, the Way Ahead.

Infrastructure Development in India: A Macro Perspective, Strategies for Infrastructure Development, FDI into Major Infrastructure, Differences in Infrastructure Building Between India and China, Challenges and Outlook.

Readings

- 1. Kapila Uma, Indian Economy, Academic Foundation New Delhi Latest Edition.
- 2. Latest annual as well as other reports and surveys from Ministry of Finance, Ministry of Industry, Ministry of Agriculture, the RBI, IMF, WB, UN and the WTO.
- 3. Latest Government of India, Economic Survey, (Annual), Ministry of Finance, New Delhi.
- 4. Mishra S.K.and Puri V.K, Indian Economy Himalya Publication House Latest Edition.
- 5. Datt and Sundram Indian Economy, S Chand and Company Latest Edition.
- 6. _____, Appraisal Document of Twelfth Five year Plan 2012-17, NITI Aayog, 2017.
- 7. _____, Indian: Three year Action Agenda (2017-18 to 2019-20), NITI Aayog, August 1, 2017.

UNIT-III

Indian Agriculture: Issues, Policies and Agenda for Reforms, Secondary Agriculture - A Driver for Growth of Primary Agriculture, Emerging Imbalances in Indian Agriculture, National Mission for Sustainable Agriculture, Challenges and Outlook.

Industrial Development and Policies - Profile for Industrial Growth, Shift in favour of Registered Manufacturing, Stagnant share of the Manufacturing Sector in Indian economy.

- 1. Kapila Uma, Indian Economy, Academic Foundation New Delhi Latest Edition.
- 2. Latest Government of India, Economic Survey, (Annual), Ministry of Finance, New Delhi.
- 3. Mishra S.K.and Puri V.K, Indian Economy Himalya Publication House Latest Edition.
- 4. Datt and Sundram Indian Economy, S Chand and Company Latest Edition

- 5. _____, National Mission for Sustainable Agriculture (Strategies for Meeting the Challenges of Climate Change), Department of Agriculture and cooperation, Ministry of Agriculture, New Delhi, August, 2010.
- 6. _____, Appraisal Document of Twelfth Five year Plan 2012-17, NITI Aayog, 2017.
- 7. _____, Indian: Three year Action Agenda (2017-18 to 2019-20), NITI Aayog, August 1, 2017.

UNIT-IV

Impact of the Global Economic Crisis on the Indian Economy: Changing perceptions, Brettonwoods Institutions and the Indian Economy, Current scenario of the WTO vis-à-vis the Indian economy, India and the BRICS countries, External Borrowings and the BOP problem in India -Challenges and Outlook.

- 1. Kapila Uma, Indian Economy, Academic Foundation New Delhi Latest Edition.
- 2. Latest annual as well as other reports and surveys from Ministry of Finance, Ministry of Industry, Ministry of Agriculture, the RBI, IMF, WB, UN and the WTO.
- 3. Latest Government of India, Economic Survey, (Annual), Ministry of Finance, New Delhi.
- 4. Mishra S.K.and Puri V.K, Indian Economy, Himalya Publication House Latest Edition.

University, Kurukshetra

M.P.A. Music

Scheme & Credits According to CBCS in the Course Structure

W.E.F 2018-19

1 credit =25 marks , the value of L+T+P is equal

1lecture = 1credit, 1Tutorial=1 credit, 2practical =1 credit

Environment science

Paper	Title	Code	Time	Credits	External Marks	Internal Marks	Total Marks	L+T+P
EVS	Environment science	EVS 101	3 Hours	2	40	10	50	4+2+0
				2	40	10	50	6

M.P.A. (Five Years Integrated Course)

In M.P.A. (Five year Integrated)course there are four Options/Streams (Vocal / Sitar/ Tabla / kathak) are Available in Department, In Ist, II and IIIrd year Student has to Choose any two options among these four options, Student will carry these options upto (III year)6th semester while two Language paper English and Hindi are compulsory upto III rd year, in 7th to 10th semester (IVth and Vth) year student's Ist option will become his/her main or specialization Subject. Evs paper is also compulsory from the session 2018-19 and carry 2 credits.

Course	Subject	Papers	Papers	Code	Time	Credits	External	Internal	Total	L+T+P
		Category							Marks	
M.P.A.	Compulsory	Core-1	Hindi	MPAH111	3	4	80	20	100	4+0+0
	Compulsory	Core-2	English	MPAE112	3	4	80	20	100	4+0+0
	Compulsory		Environment science	EVS 101	3	2	40	10	50	4+2+0
	Option I vocal	Core-3	Option I Practical	MPAV111		4	80	20	100	0+0+8
		Core-4	Option I Theory	MPAV112	3	4	80	20	100	4+0+0
	Option II Sitar	Core Elective	Option II Practical	MPAS113		4	80	20	100	0+0+8
		Core	Option II Theory	MPAS114	3	4	80	20	100	4+0+0
Total						26	520	130	650	30
	Option III Tabla	Core	Practical	MPAT115	3	4	80	20	100	0+0+8
		Core	Theory	MPAT116	3	4	80	20	100	4+0+0
	Option IV Kathak	Core	Practical	MPAK117	3	4	80	20	100	0+0+8
		Core	Theory	MPAK118	3	4	80	20	100	4+0+0
Total										

M.P.A. Ist SEMESTER

Note – A student can choose any two given options of Music with compulsory subjects Hindi and English in Ist semester and his/her Ist music option will be his/her specialization or main subject in 7th semester which is equivalent to P.G. level.

DEPARTMENT OF MUSIC AND DANCE KURUKSHETRA UNIVERSITY KURUKSHETRA

OUTLINES OF TEST, SYLLABI AND COURSES OF READING FOR THE M.PHIL MUSIC (VOCAL AND INSTRUMENTAL) EXAMINATION (w.e.f. 2018-19) UNDER C. B. S.

1 credit =25 marks, the value of L+T+P is equal

1lecture = 1credit, 1Tutorial=1 credit, 2 practical =1 credit

*Note – In M.Phil. Music course (Vocal & Sitar) Theory paper's are combined and have same syllabus as no changes in paper codes in proposed scheme.

Course	Subject	Papers	papers	Code	Time	Credits	External	Internal	Total	L+T+P
		Category							Marks	
M.Phil	Vocal &	Core-1	Research	MPH 101	3	4	80	20	100	4
•	Instruma		Methodology							
	ntel		and theory of							
			Music.							
		Core-2	Advanced study	MPH 102	30 min	4	80	20	100	8
			of Applied		/student					
			Music(Stage							
			performance/							
			lecture							
			Demonstration)							
			Seminar	MPHP	30 min	2	00	50	50	
			practical		/student					
			Seminar Theory	MPHT	30 min	2	00	50	50	
					/student					
			Dissertation			Grade				
Total						12	160	140	300	12

SYLLABUS AND COURSES OF READING FOR M.PHIL MUSIC VOCAL AND INSTRUMENTAL EXAMINATION (w.e.f. 2018-19) UNDER C.B.S.

Maximum Marks: 100 Theory: 80+20 (Int. Assessment) Credit - 4 Time: 3 Hours

Paper-I Research Methodology and Theory of Music.

Note:- There will be ten questions, two questions from each Unit. The candidates shall be required to attempt five questions in all, selecting one question from each Unit. All question carry equal marks.

UNIT-I

- (A) Origin and Definition of the word 'Research'.
- (B) Types of Research.
- (C) Steps of Research (Synopsis, Bibliography, Questionnaires, Index and Foot-notes)
- (D) Methods of Research.

UNIT-II

- (A) Historical Sources for Research in Indian Music
 - (i) Manuscripts and Books
 - (ii) Inscriptions and Sculptures.
 - (iii) Frescoes and Paintings etc.
- (B) Practical Sources for Research in Indian Music and their importance in Research:
 - (i) Musical Composition
 - (ii) Discs and Tapes
 - (iii) Oral Traditions
 - (iv) Internet
- (C) Importance of Research in Indian Music.

UNIT-III

- (A) Ancient and Modern System of Alapgana
- (B) A Brief Study of Dhruva Gana.
- (C) Classification of Indian Musical Instrumental with special study of Violin, Sitar, Tabla, Pkhawaj, Shahnai, Bansuri.

UNIT-IV

- (A) Importance and Varieties of Laya.
- (B) Origin, Development and Importance of Tala.
- (C) A Brief Study of Margi and Deshi Talas.
- (D) Talas Deshprenas of Sangeet Ratnakar.

UNIT-V

- (A) Importance of Aesthetics in Music.
- (B) Trends and Traditions of Music Educations.
- (C) Relationship of Music with Religion.
- (D) Relationship of Music with Science.
- (E) Inter-relationship between Folk and Classical Music.

PAPER-II Advanced study of Applied Music

Maximum Marks: 100 Theory: 80+20 (Int. Assessment) Credit-4 Time: 3 Hours

OPTION (i)

Stage Performance

Performance of one hours duration planned by the candidate. Choice of Ragas should be confined to the prescribed Ragas.

Names of Ragas: Gujri-Todi, Jhinjhoti, Bhupal-Todi, Jog-Kauns, Bairagee, Sur-Malhar, Bhatiar, Lalit, Shree, Shahana-Kanada.

OPTION (ii)

LECTURE DEMONSTRATION

Topic to be approved by the M.Phil. Committee.

A candidate is required to prepare at least 8 Ragas of the selected topic with detailed study of one Raga out of eight ragas prescribed in the syllabus.

Note:-

VOCAL MUSIC

- 1. Alap and Elaborate treatment of slow and fast Khayalas in any four ragas and brief treatment of rest of the six ragas with one composition in each.
- 2. One Dhrupad or one Dhamar in any one of the above mentioned Ragas.
- 3. One Thumri or one Tappa in any Raga.

INSTRUMENTAL MUSIC

- 1. Alap and Elaborate treatment of slow and fast Gata in any four ragas and brief treatment of fast Gats in rest of the six Ragas.
- 2. Two Gats in any Talas other than teentala such as Ektal, Ada, Chautal, Jhaptal and Rupak.
- 3. Two compositions in Thumri Style.

Kurukshetra University, Kurukshetra M. A. Music Credits According to CBCS in the Course Structure w.e.f 2016-17

1 credit =25 marks, the value of L+T+P is = 1+1+2

1 lecture = 1 credit, 1 Tutorial = 1 Credit, 2 Practical = 1 Credit

M.A. Ist SEMESTER (Vocal)

Course	Subject	Papers Category	papers	Code	Time	Credits	External	Internal	Total Marks	(Hours/Week) L+T+P
M.A.	Vocal	Core-1	General and Applied Music Theory	MMU 411	3 hours	4	80	20	100	4+0+0
		Core-2	History of Indian music	MMU 412	3 hours	4	80	20	100	4+0+0
		Core-3	Stage performance	MMUV 413	35 to 45 min	4	80	20	100	0+0+8
		Core-4	Viva –Voce & Comparative Study of Raga	MMUV 414	35 to 45 min	4	80	20	100	0+0+8
		Core-5 Elective	Lecture Demonstration	MMUV 415	35 to45 min	4	80	20	100	0+0+8
Total						20	400	100	500	32

Course	Subject	Papers Category	papers	Code	Time	Credits	External	Internal	Total Marks	(Hours/Week) L+T+P
M.A.	Sitar	Core-1	General and Applied Music Theory	MMU411	3 hours	4	80	20	100	4+0+0
		Core-2	History of Indian music	MMU412	3 hours	4	80	20	100	4+0+0
		Core-3	Stage performance	MMUS413	35 to 45 min	4	80	20	100	0+0+8
		Core-4	Viva –Voce &	MMUS414	35 to 45 min	4	80	20	100	0+0+8

		Comparative Study of Raga							
	Core-5 Elective	Lecture Demonstration	MMUS415	35 to45 min	4	80	20	100	0+0+8
Total					20	400	100	500	32

M.A. IInd SEMESTER

Course	Subject	Papers	Papers	Code	Time	Credits	External	Internal	Total Marks	L+T+P
		Category								
M.A.	Vocal	Core-1	General and Applied	MMU421	3 hours	4	80	20	100	4+0+0
			Music Theory							
		Core-2	History of Indian music	MMU422	3 hours	4	80	20	100	4+0+0
		Core-3	Stage performance	MMUV423	35 to 45	4	80	20	100	0+0+8
					min					
		Core-4	Viva –Voce &	MMUV424	35 to 45	4	80	20	100	0+0+8
			Comparative Study of		min					
			Raga							
		Core	Lecture Demonstration	MMUV425	35 to45 min	4	80	20	100	0+0+8
		Elective								
		Open	Open elective	OE426	3 hours	2	40	10	50	2+0+0
		Elective								
Total						22	440	110	550	34

Course	Subject	Papers Category	Papers	Code	Time	Credits	External	Internal	Total Marks	L+T+P
		Category								
M.A.	Sitar	Core-1	General and Applied	MMU421	3 hours	4	80	20	100	4+0+0
			Music Theory							
		Core-2	History of Indian	MMU422	3 hours	4	80	20	100	4+0+0
			music							
		Core-3	Stage performance	MMUS423	35 to 45	4	80	20	100	0+0+8
					min					

	Core-4	Viva –Voce &	MMUS424	35 to 45	4	80	20	100	0+0+8
		Comparative Study		min					
		of Raga							
	Core	Lecture	MMUS425	35 to45	4	80	20	100	0+0+8
	Elective	Demonstration		min					
	Open	Open elective	OE 426	3 hours	2	40	10	50	2+0+0
	Elective								
Total					22	440	110	550	34

M.A.IIIrd SEMESTER

Course	Subject	Papers	Papers	Code	Time	Credits	External	Internal	Total Marks	L+T+P
		Category								
M.A.	Vocal	Core-1	Applied Music Theory	MMU531	3 hours	4	80	20	100	4+0+0
			and Musical							
			Composition							
		Core-2	General Study and	MMU532	3 hours	4	80	20	100	4+0+0
			History of (13 th Century							
			to the present day							
		Core-3	Stage performance	MMUV533	35 to 45 min	4	80	20	100	0+0+8
		Core-4	Viva –Voce &	MMUV534	35 to 45 min	4	80	20	100	0+0+8
			Comparative Study of							
			Raga							
		Core	Lecture Demonstration	MMUV535	35 to45 min	4	80	20	100	0+0+8
		Elective								
		Open	Open elective	OE536	3 hours	2	40	10	50	2+0+0
		Elective								
Total						22	440	110	550	34

Course	Subject	Papers	Papers	Code	Time	Credits	External	Internal	Total	L+T+P
		Category							Marks	
M.A.	Sitar	Core-1	Applied Music	MMU531	3 hours	4	80	20	100	4+0+0
			Theory and Musical							
			Composition							

	Core-2	General Study and	MMU532	3 hours	4	80	20	100	4+0+0
		History of (13th							
		Century to the present							
		dayHistory of Indian							
		music							
	Core-3	Stage performance	MMUS533	35 to 45 min	4	80	20	100	0+0+8
	Core-4	Viva –Voce &	MMUS534	35 to 45 min	4	80	20	100	0+0+8
		Comparative Study							
		of Raga							
	Core	Lecture	MMUS535	35 to45 min	4	80	20	100	0+0+8
	Elective	Demonstration							
	Open	Open elective	OE536	3 hours	2	40	10	50	2+0+0
	Elective								
Total					22	440	110	550	34

M.A. IVth SEMESTER

Course	Subject	Papers	Papers	Code	Time	Credits	External	Internal	Total Marks	L+T+P
		Category								
M.A.	Vocal	Core-1	Applied Music Theory and Musical Compositions	MMU541	3 hours	4	80	20	100	4+0+0
		Core-2	History of Indian music(13 th Century to the Modern Period)	MMU542	3 hours	4	80	20	100	4+0+0
		Core-3	Stage performance	MMUV543	35 to 45 min	4	80	20	100	0+0+8
		Core-4	Viva –Voce & Comparative Study of Raga	MMUV544	35 to 45 min	4	80	20	100	0+0+8
		Core-5 Elective	Lecture Demonstration	MMUV545	35 to45 min	4	80	20	100	0+0+8
Total						20	400	100	500	32

Course	Subject	Papers	Papers	Code	Time	Credits	External	Internal	Total	L+T+P
		Category							Marks	
M.A.	Sitar	Core-1	Applied Music	MMU541	3 hours	4	80	20	100	4+0+0
			Theory and Musical							
			Compositions							
		Core-2	History of Indian	MMU542	3 hours	4	80	20	100	4+0+0
			music(13 th Century to							
			the Modern Period)							
		Core-3	Stage performance	MMUS543	35 to 45	4	80	20	100	0+0+8
					min					
		Core-4	Viva –Voce &	MMUS544	35 to 45	4	80	20	100	0+0+8
			Comparative Study		min					
			of Raga							
		Core-5	Lecture	MMUS545	35 to45	4	80	20	100	0+0+8
		Elective	Demonstration		min					
Total						20	400	100	500	32