770
MINOR-PROJECT

Student has to submit a project report on a assigned work by his/her concerned teacher & the report will be evaluate by the examiner appointed by Director/Chairperson

SCHEME OF STUDIES & EXAMINATIONS
8th semester
w.e.f. 2019-20 in phased manner
B. Tech. (Printing, Graphic & Packaging) – 2020-21

Subject Code	Subject area	subject Title	Teaching Schedule				Credits	Allotments of Marks				Duration of Exams(Hrs)
			L	T	P	Hours/Week		Major Test	Minor Test	Practical	Total	
PGP 801	PC	PRINTING MACHINERY MAINTENANCE	4	0		4	4	60	40		100	3
PGP 802	PC	DIGITAL PRINTING	4	0		4	4	60	40		100	3
PGP 803	HS	ENTERPRENURESHIP PROCESS	3	0		3	3	60	40		100	3
PGP 804	PC	BOOK PUBLISHING	4	0		4	4	60	40		100	3
PGP 805	PC	Corrugation Box Packaging	3	0		3	3	60	40		100	3
PGP 806	PC	a.)ADVANCE PRINTING b). ADVANCE GRAPHICS c).ADVANCE PACKAGING	3	0		3	3	60	40		100	3
		LAB										
PGP 811	PC	PRINTING MACHINERY MAINTENANCE LAB			2	2	1		30	45	75	3
PGP 812	PC	DIGITAL PRINTING LAB			2	2	1		30	45	75	3
PGP 813	PC	BOOK PUBLISHING LAB			2	2	1		30	45	75	3
PGP 814	PC	Corrugation Box Packaging-Lab			2	2	1		30	45	75	3
PGP 880	PC	MAJOR PROJECT				2	1				50	3
		Total					26	360	360		950	

801
PRINTING MACHINERY MAINTENANCE

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
Drive and Control Systems

Introduction of Mechanical Actuators, Gear drive, Belt drive, Chain drive, Electrical Actuators- switching devices (Solenoids, Relays, Diodes, Thyristors, Transistors), Drive systems- working principles of Three phase AC induction motor, DC motor, Servo motors (AC and DC) and stepper motor, Control Systems- Hydraulic control systems, Hydraulic control valves, Pneumatic control systems, Pneumatic valves, Introduction to Microcontroller.

UNIT-II
Erecting and Testing

Equipment needed for erection - selection of location and environmental conditions - erection procedure for various prepress printing and finishing equipments and machinery -loading and transport of raw materials and printed product with respect to layout design commissioning.

UNIT-III
Repairs and Reconditioning

Principles of reconditioning -repair methods for various parts - Roller copperising and rerubberising - ebonite covering damping and inking systems - paper transport systems and feeder head.

Cylinders, Bushes and Bearings

Cylinder construction - testing run out and taper - cylinder bearing supports – eccentric bushes - removal and fixing of bushes - changing of oil seals maintenance of bushes and bearings.

UNIT-IV
Maintenance procedures

Need and importance of maintenance - Definition, types of maintenance, Maintenance policies -Maintenance organization, Modern trends- Application of computers in maintenance. Identification & rectification of common faults in a printing machine
Lubricants, their types and Characteristics, types of lubricating systems - Mist, Wet sump and dry sump systems, Greases, oils, Greases oils grades.
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Recommended Books :-

1. Electrical Engg. By B.L. Thareja Part I & II
2. A text book of Mechatronics by R K Rajput, S.Chand Publisher New Delhi
3. A course in workshop technology" Vol-II by B.S. Raghuwanshi, DhanpatRai& Co
4. Internal Combustion Engines by V. Ganesan, Mcgraw- Hill Education

802
DIGITAL PRINTING

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

Digital Documents
Introduction to Digital Printing fundamentals, Pixel image, Digital image, Digitization, Half toning colour reproduction, resolution and its qualities. Scanning of original, Transfer of Digital Photographs. Documentation Image file formats TIFF, EPS JPEG files text files

UNIT-II

Digital Printing Processes
Laser, Inkjet, electrostatic processes . Rendering Type line Art and images.
Color management, Introduction and future, Characterizing input and output device use of **CIELAB.** Introduction, on demand printing. variable data printing. Short run process color printing. On demand printing & Publishing concepts. Future of on-demand printing. Economics of on demand printing - Economics of long run.Efficiencies of Digital on demand work flow.

UNIT-III

Database Marketing's Role:
Customizing traditional print. Customized on-demand print. The future. Other forces of change – Interactivity advantage. Online interactivity advantage. Interactive TV. Demographics. Manufacturing costs-Paper mailing. Alternative media-online. Commercial online services. Just in time. Appropriate applications for on demand & DP. Advertising. Author reprints. On demand products. In-appropriate applications. Marketing and Selling On-Demand Services - TV programming and ATM cards. Value added. Advantages of on demand. Selling factors.

UNIT-IV

Networking&Digital Workflow:
Network concepts and Interfaces.Networks for printing and publishing. Networks for In-house. Ideal Network. Digital Work flow in Prepress.Digital Work flow and Digital Printing (Computer to Press).Digital Work flow –Advantages,Challenges and Possibilities.Production Management /Monitioring System-Purpose and Application

ecommended Books :
Digital Printing -
On Demand Printing - Howard M. Fenten, Frank J. Romano

803
ENTREPRENEURSHIP 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

Entrepreneurship:
A Perspective: Recognition of the need for entrepreneurship and self-employment development, Entrepreneurship spirits, Significance of entrepreneur in Economic Development, Scope and trends of small enterprises, Small business/enterprise-the driving force for national growth, Types of small enterprises, Economic, social and psychological need for entrepreneurship, characterization, qualities and pre-requisites of entrepreneur, Selection of a potential entrepreneur, Identifying & Evaluating Business opportunities.

UNIT-II

Quick Start Method:
Methods and Procedures to start and expand one's own business, life cycle of new business, Franchises, creating your own franchise, Multilevel marketing schemes, Buying an existing business. Business Planning Process: Why is a good business plan required? Business Plan-the major benefits, sub plan, Business plan-blue print to success and financing, Small manufactures business plan, Feasibility Study, Preparation of Feasibility Reports, Project Reports.

UNIT-III

Forms of Ownership:
Different forms of ownership-sole proprietysuip, partnership, joint stock company, Selling, Selling your venture, planning for succession, Valuation of a business, Responsibility of a good employer, Risk management, What risks does your business face?

UNIT-IV

Instructional Models:
Govt. support to new enterprise, incentives, sources of finance. Entrepreneurship Development Centre, Role of Govt. and promotional agencies in entrepreneurship development, Entrepreneurship development programmes, Role of various institutions in developing entrepreneurship in India.
Recommended Books :
Entrepreneurship Development - Colombo Plan Staff College for Technician Education.
Entrepreneurship Development & Management - Jose Paul, N. Ajith Kumar.
Entrepreneurship Development Programmes & Practices - Jasmer Singh Saini.

804
BOOK PUBLISHING

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

Book Publishing
Definition and concept of book publishing, parts of a book, basic steps in book publishing, areas of publishing - general publishing, educational publishing, professional publishing. Reference Publishing House.- role of commissioning editor, the desk editor, the designer, the production manager, the sale/marketing manager, the publicity manager, The Warehouse or distribution department, the accounts department, the management.

UNIT-II

Press Organization
Hierarchy - editorial organization, mechanical aspects of organization - composition, printing , basic operations business aspects of organization, flowcharts of staff in organization, Circulation and Advertisement departments, distribution channels.

Production & Estimating in Book Publishing
First copy cost, manufacturing cost, overheads, Economic Of Publishing - net book, non-net book, variations in price of same size books, published price of book, Technical aspects of production from receipt of manuscript to completion of book, gestation period, calculating break-even point.

UNIT-III

Marketing and Distribution in Book Publishing
Home market, export market, closed market, advertising and publicity, types of distribution, conventional and modern channels of distribution. International book trade and barriers. Import and export of books. Relationship of the Editor with the manuscript. Evaluation procedures. External review and its associated problems.Editorial Organization in Publishing- The editorial functions in newspapers, journals, magazines and books.

UNIT-IV

Legal Aspects in book Publishing
Copyright, types of agreement between author and publishers, the outright sale of the copyright, profit sharing agreement, the royalty system, commission agreements The press and the law-libel, defense against libel, mitigation & damages.Introduction to Booking and Circulation methods used in publishing houses.Subsidy in the Publication of BooksImportance and need of subsidy, advance printing in the publication of books. Salient features of the subsidy scheme. Procedure of getting subsidy.

805
Corrugation Box Packaging

Total Credit: 3 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
Introduction-Introduction to Corrugated Fibre Board Packaging, Components and their Functions
Corrugated Fibre Board Packaging Industry-An Overview
Corrugated Fibre Board Box Packaging- Properties and Applications
Types of Corrugated Fibre Board and Boxes.
Unit-2
Corrugation Box Materials: -Selection of Kraft paper for Corrugated fiber board and box Paper and different types of Papers- Properties and Applications
Selection of Adhesive for Corrugated Fibre Board and Box.Addition of Chemicals.Types of glue,ink and Coating Materials.

Unit-3
Corrugation Box Manufacturing:- Corrugated Board: Corrugated Board construction - Flutes/Single, Double, Triple Wall,Board grades, Manufacture, Adhesive Bond, Specifications, Flat Crush/Edge Crush Tests Box Certificates. Box Layout,Types, Manufacture/Scoring Allowances, Optimization, Economy. Compression Test, McKee Formula/ECT, Inserts/Partitions, Stack Height,Pallet Patterns, Banding/Strapping/Taping, Corrugated Board Pallets, Corrugated Board Cushions.

Unit-4
Layout of Corrugation Box:-Carton Production: 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.Considering the dimension of Product Performance
Layout of various carton styles- Bellows (Gusset) Tuck ,Airplane Style Straight (AST) , Side/End Load,regular-slotted carton,Folding Carton,Corrugated / Folding Carton,

806 (A)

ADVANCE   PRINTING 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
Modern Trend in Printing

1) Digital offset Color Printing
2) Security Printing
3) Laser using in Pre-Press
4) Printing on un-even surfaces.
5) Bar-coding
6) Facsimile printing

UNIT-II
Pre-Press Techniques
1) Image setter Technology-Type, Working, Principal, Advantages, Limitation & applications
2) Scanner-Types, Techniques ,Advantages, Limitation & applications
3) CTP Machines- Type, Working, Principal, Advantages, Limitation & applications.
4) Proofing Techniques and devices

UNIT-III

Print job planning and Stock control
1) Study of job and its work flow.
2) Choosing stable technique/device and material.
3) Maximum utility of equipment and manpower by alternative scheme.
4) Procurement material for printing.
5) Store-keeping, Purchase, Size and variety of stock, stock room conditions
6) Keeping record monitoring stock.

UNIT-IV

Print Industry in India and Abroad
1) Commercial Jobs in Printing:
    Pamphlets, Folders, Danglors, Brochures, Business cards, Prospectus.
2) Use of Computer in Production Planning.

References Books:
1) Operator manual –GATF
2) Colour scanning and imaging systems-Gary field,GATF
3) Production Planning and inventory control-
   SeetharamaL.Narasimhan,DennisW.Mcleavey,PeterJ.Villington
4) Production Planning ,Control and management-K.C.Jain, L.N. Aggarwal

ADVANCE GRAPHICS 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

Overview of : Computer Graphics, Interactive graphics, passive graphics. Advantages of interactive graphics. **Display Devices** : Refresh CRT, Random-Scan and Rester-Scan Monitor, Color CRT Monitors, DVST, Prasma-Penel Displays, LED and LCD monitors. Hard copy devices.
Scan conversion : Scan Converting a point, line, circle, ellipse and arcs.
2-D graphics transformations (Rotations, Scaling, Translations, Reflecting, Shearing) Composition of 2-D transformation, 2-D viewing and clipping, Windowing concepts, clipping algorithms (Line, Area and Text-Sutherland-Cohen, Mid-point subdivision), Window-to-view port transformation, Primitive and attributes. Exterior and Interior clipping.

Unit-II

Document Processing Language
Programming for processing in Post Script LanguageDetail study about vector graphics and Bit Map images, life size and image compression. Linking objects to URL's for internet webpages. Portable document format, print document format, PDF workflow systems, print job ticket format (PJTF). Raster image processing, linking, electronic dot generator.

Unit-III

Graphic text formats: GIF – Graphic Image Format, TIFF – Tagged information file format, JPEG- Joint Photographer Experts Group, BMP – Bitmaps, EPS – Encapsulated Post-script Format, PICT – picture, RTF – Rich Text Format, DOC – Document format, WPG – Word Perfect Graphic, Txt – Text formats, MS Word. OPI servers, file server & networks, digital file export

Unit-IV

Font Management
Interactive graphics: Concept of Positioning and Pointing. Interactive Graphic Devices (Key Boards, Touch Panels, Light Pens, Graphic Tablets, Joysticks, Mouse-Voice System) Interactive Graphical Techniques: Basic Positioning Methods, Constraints, Gride, Gravity field, Rubber-Bank Methods, Sketching, Dragging, Inking and Painting.
Computer Graphic Software : Introduction, GKS (Primitive, attributes and Viewport, Display subroutines)
Introduction to 3-D Graphics
Publishing software: PageMaker, CorelDraw etc.

References:
1. Roy, A. Plastock, Gordon Kalley, "Computer Graphics" (Scham's Series) McGraw Hill.
2. Donald Hearn, M. Pauline Baker, "Computer Graphics", Prentice Hall of India.
3. Foley, VanDam, Fiener, Hughes, "Computer Graphics", Addison Wesley.
4. Harrington, Steven, "Computer Graphics A Programming Approach", McGraw Hill.
5. Dovid F. Rogers; "Procedural Elements for Computer Graphics", McGraw Hill.
6. Newman, W. Sproul, R.F., "Principles of Interactive Computer Graphics", McGraw Hill.
7. PDF : Printing & Workflow, Frank J. Romano, GATF Publication

806(C)
Advanced Packaging 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

Packaging of Food Products
(a) Agriculture produce
(b) Processed and dehydrated food
(c) Milk and Milk Products
(d) Meat and poultry products
(e) Marine products-Shrimps
(f) Spices
(g)

Unit-II

Packaging of other specific items
(a) Pharmaceuticals
(b) Tea
(c) Cosmetics and perfumery
(d) Soaps, detergents and shampoos
(e) Chemicals and fertilizers
(f) Petroleum products
(g) Pesticides
(h) Light engineering goods and domestic appliances
(i) Heavy machinery and equipments
(j) Textiles and garments
(k) handicrafts

Unit-III

Method of storage
(a) Cold storage, and deep freezing method of storage, their design and usage
(b) Irradiation, preservation of perishables and semi perishables

Unit-IV

(a) For packaging material- physical, physico-chemical properties, resistance to light, insect and mould

(b) For packaged goods- Unit package : compatibility studies, shelflife studies-with reference to flexible, rigid packs, different types of seals, closured etc. Bulk packages-Evaluation of transport worthiness of filled packages-physical and climatic hazards.

811
PRINTING MACHINERY MAINTENANCE-LAB

Total Credit: 1 Max.   External: 45
Internal: 30
Time Allowed: 3 Hrs.
Marks: 75

LIST OF EXPERIMENTS

1) Study of AC& DC motors
2) Belt mounting on wheel of driving systems
3) chain mounting on spikes of driving systems
4) gripper setting
5) proper checking of various parts of machines
6) oil seals changing
7) maintenance of bushes & bearing & changing
8) Working of pump &Comressor
9) Study of lubrication flow
10) Lubrication Process to friction paper

812
DIGITAL PRINTING-LAB
Time: 3 Hours   Total Credit: 1 Max.   External: 45
Internal: 30
Time Allowed: 3 Hrs.
Marks: 75

LIST OF EXPERIMENTS

1) Colour Reproduction
2) File format TIFF,EPS,JPEG converting
3) Study of various output printing equipments
4) Page layout
5) Page formation
6) Digital work flow
7) Work flow for on demand printing

BOOK PUBLISHING-LAB

Total Credit: 1 Max.   External: 45
Internal: 30
Time Allowed: 3 Hrs.
Marks: 75

LIST OF EXPERIMENTS

1. Study of Printing Presses for book publishing .
2. Study of pre-make ready &makeready operations.
3.Study of single & multicolour printing jobs.
4. Digital presses for Book Publishing
5. Study of different parts of a book.
6. Study ofthe warehouse in printing press.

814
CORRUGATION BOX PACKAGING

Total Credit :   1
Internal   :30
External   :45
 Total Marks   :75

1. Manufacturing of various types of corrugated boards.
2. Cutting, creasing and building up corrugated boxes.
3. Testing of raw materials like wood, paper, plastic.
4. Test conducted on Cartons, Corrugated packages, wooden packages.
5. Drop test, Vibration test, Inclined impact test, Compression test.
   Rolling test, Drum test.

880

MAJOR-PROJECT

Total Credit: 1 Max.   External: 50
Time Allowed: 3 Hrs.

Student has to submit a project report on a assigned work by his/her concerned teacher & the report will be evaluate by the examiner appointed by Director/Chairperson

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Yoga (M.A - Yoga)

(Applicable only for UTD from Session 2019-2020)

Semester-1st

Total Credits= 21   Total Marks = 600

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	Total
M.A YOGA-101	Fundamentals of Yoga	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-102	Anatomical and Physiological Aspects of Yoga - I	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-103	Pantanjali Yog Sutra	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-104	Research Methodology in Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-105	**Practical -I** i) Demonstrations of Basic Asana ii) Basic Pranayam and Shudhi Kriya	CCC	--	5	5	--	5	5	--	--	100	100
	Total		16	5	21	16	5	21	80	320	100	500

C.C.C = Compulsory Core Course   C.F.C = Compulsory Foundation Course

10(933)

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Yoga (M.A - Yoga)

(Applicable only for UTD from Session 2019-2020)

Semester-2nd

Total Credits= 21 **Total Marks = 600**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	Total
M.A YOGA-201	Fundamentals of Hatha Yoga	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-202	Anatomical and Physiological Aspects of Yoga - II	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-203	Health Aspects of Yoga	OEC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-204	Applied Statistics in Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-205	**Practical - I** i) Demonstrations of Asana, Pranayam and Shudhi Kriya ii) Applied Statistic	CCC	--	5	5	--	5	5	--	--	100	100
	Total		16	5	21	16	5	21	80	320	100	500

C.C.C = Compulsory Core Course C.F.C = Compulsory Foundation Course O.E.C = Open Elective Course

10(934)

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Yoga (M.A - Yoga)
(Applicable only for UTD from Session 2019-2020)
Semester-3rd

Total Credits= 21   Total Marks = 600

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	Total
M.A YOGA-301	Fundamentals of Naturopathy	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-302	Basic Yoga Texts Principle Upanishads & Bhagwat Geeta	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-303	Applications of Yoga	OEC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-304	Applied Psychology in Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-305	(i) Demonstrations of Asana Pranayam and Shudhi Kriya. (ii) Applied Psychology	CCC	--	5	5	--	5	5	--	--	100	100
Total			16	5	21	16	5	21	80	320	100	500

C.C.C = Compulsory Core Course   C.F.C = Compulsory Foundation Course   O.E.C = Open Elective Course

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Yoga (M.A - Yoga)
(Applicable only for UTD from Session 2019-2020)

Semester-4th

Total Credits=21   Total Marks = 600

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Internal Assessment	Examination Scheme		Total
			Theory	Practical	Total	Theory	Practical	Total		Theory	Practical	
M.A YOGA-401	Yoga Therapy	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-402	Options: i) Food & Nutrition ii) Dissertation	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-403	Kinesiological Aspect of yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-404	Teaching Methods of Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA-405	Practical (i) Demonstrations of Assan Pranayam (ii) Teaching Practices Lesson Plan	CCC	--	5	5	--	5	5	--	--	100	100
	Total		16	5	21	16	5	21	80	320	100	500

C.C.C = Compulsory Core Course   C.F.C = Compulsory Foundation Course

M. A. YOGA – 1ST SEMESTER

PAPER – 101: FUNDAMENTALS 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.

Unit-I

1.   INTRODUCTION AND EVOLUTION OF YOGA

1.1   Meaning & Definitions of Yoga according to various schools of thoughts.
1.2   Historical Background and Development of Yoga.
1.3   Importance of Yoga in different fields in modern era.
1.4   Applications and Misconceptions about Yoga in Modern Society.

Unit-II

2.   SCHOOLS OF YOGA

2.1   Hatha Yoga – Aims and Objectives of Hatha Yoga
2.2   Bhakti Yoga – Types of Bhakti, Navdhabhakti
2.3   Meaning and Steps of Gyan Yog.
2.4   Meaning and Types of Mantra Yog.

Unit-III

3.   FAMOUS YOGIES

3.1   Biography of Maharishi Patanjali and his contribution in yoga
3.2   Biography of Hatha Yogi – Guru Gorakshanath and his contribution in yoga
3.3   Biography of Swami Vivekananda and his contribution in yoga
3.4   Biography of Maharishi Aurbindo and his contribution in yoga

Unit-IV

4.   INTRODUCTION OF YOGA INSTITUTES IN INDIA

4.1   Dev Sanskriti Haridwar and its contribution in yoga
4.2   Gurukul Kangri University, Haridwar and its contribution in yoga
4.3   Kaivalyadham Lonavla, Pune and its contribution in yoga
4.4   Bihar Yoga Bharti Yoga Institute Munger, Bihar and its contribution in yoga.

References Books:-

1. "Science of Yoga" - Swami Viganand Saraswati.

2. "Indian Philosophy" - Dr. Ishwar Bhardwaj.

3. "Yog Mahavigyan" - Dr. Kamakhya Kumar.

4. "Bhart ki Mahan Vibutiyan" -

5. "Yoga Sara Samgraha" - Jha Gangadhar

M. A. YOGA – 1ST SEMESTER

PAPER – 102: Anatomical and Physiological Aspects of Yoga - I

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.

Unit-I

1.   GENERAL HUMAN ANATOMY AND PHYSIOLOGY

1.1   Meaning & Importance of Anatomy & Physiology.
1.2   Structure of Cell, Function of Cell and Tissue.
1.3   Skeletal System – Name and structure of all bones and joints of human body.
1.4   Effect of Yogic Practices on Skeletal System.

Unit-II

2.   MUSCULAR SYSTEM

2.1   Types and structure of muscle. Properties of Muscle.
2.2   Elementary knowledge of muscle contraction and muscle tone
2.3   Mechanism of Muscles Fatigue
2.4   Effect of Yogic Practices on Muscular System.

Unit-III

3.   DIGESTIVE SYSTEM

3.1   Structure of digestive tract and organs of digestive tract
3.2   Role of each digestive organ in digestion of food.
3.3   Physiology of food digestion and absorption.
3.3   Effect of Yogic Practices on Digestive System.

Unit-IV

4.   RESPIRATORY SYSTEM

4.1   Structure and functions of respiratory organs.
4.2   Physiology of external and internal respiration.
4.3   Elementary knowledge of various respiratory volumes & capacities.
4.4   Effect of yogic practices on respiratory system.

References Books:-

1. "Anatomy of Hath Yoga" - Coutter, H. D.

2. "Human Anatomy" Vol.-1, Fourth Edition – Chaurasia, B. D.

3. "Anatomy and Physiology" – Shiva, V. K.

4. "Essential Encyclopedia of Human Anatomy and Physinology" – Sharma J. P.

5. "Anatomy and Exercise Physiology" – Kumar R.

PAPER – 103 PATANJALI YOG SUTRA

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.

Unit – I

1. INTRODUCTION OF PATANJALI YOGA SUTRAS

1.1 Historical Background of Patanjali Yoga Sutra.
1.2 Importance of Patanjali Yoga Sutras in Modern Age.
1.3 Patanjali Yoga as a Science.
1.4 Physical Mental and Social Excellence in Yoga Sutra.

Unit – II

2. SAMADHI PADA

2.1 Meaning and Definition of Yoga Concept of Chitta, Chit Vritti and Chitta Bhumi
2.2 Abhyas Varagya, Yog Antraya, Ishwar Swaroop and Vivek Khyati.
2.3 Chitta Vikshep and Chitt Prasadhan.
2.4 Samadhi- Sampragyat Samadhi and Ritambhara Prayga. Concept of Sabeej and Nirbeej.

Unit – III

3. SADHAN AND VIBHUTI PADA

3.1 Kriya Yoga and Panch Klesha : Avidhya, Asmita, Raag, Devasha and Abhinivesha
3.2 Ashtang Yoga (Bahirang Sadhana) – Yama, Niyam, Asana, Pranayam and Pratyahar
3.3 Ashtang Yoga (Antrang Sadhana) – Dharana, Dhyana and Samadhi
3.4 Samyama, Yoga Vibhootis and Ashtsiddhis

Unit – IV

4. KAIVALYA PADA

4.1 Types of Sidhis.
4.2 Concept of Dharmamegh Samadhi
4.3 Brief introduction of Karma, Types of Karma and Karmaphal Siddhanta
4.4 Concept of Kaivalya

References Books:-

1. "Yog Darshan" - Pt. Shri Ram Sharma Acharya.

2. "Patanjal Yog Pradipika" – Swami Omananda Tirth.

3. "Yog Darshan" – Rajveer Shashtri.

4. "Four Step of Freedom" – Swami Shivananda Sarswati.

5. "Yoga Sutra (Tatva Vaishardi) – Mishra, Vachaspati

6. "Light on the Yoga Sutras of Patanjali" – Iyengar, B. K. S.

PAPER – 104 - Research Methodology in Yoga

Maximum Marks: 100 (Theory: 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.

Unit – I: Introduction

1.1 Meaning and Definition of Research. Need of Research in Yoga
1.2 Types of Research: Analytical, Descriptive, Experimental, Qualitative and Meta Analysis.
1.3 Research Problem: Meaning of Research Problem, location of research problem, criteria for Selection of Research Problem.
1.4 Delimitation and limitations of research problem

UNIT II – Concept of Sampling and Hypothesis

2.1 Meaning and Definition of Sample and Population.
2.2 Types of sampling methods: Probability Sampling Methods and Non – Probability Sampling Methods.
2.3 Meaning and definition of Hypothesis, Importance Hypothesis in research,
2.4 Types of Hypothesis, Type 1 and Type 2 errors in Hypothesis testing.

UNIT-III Review of related literature

3.1 Meaning and need for survey of related literature, Literature Sources – Primary and Secondary sources, Steps in Literature Search. Method for writing of Literature review.
3.2 Variables: Meaning and Definition of Variables, types of variables: Dependent, Independent, Control, Extraneous, Moderator and Predictor.
3.3 Research Proposal: Meaning and Significance of Research Proposal, Steps of preparing Research proposal/synopsis,
3.4 Format of a synopsis

Unit – IV Research Report

4.1 Research Report: Details of Chapterization of Thesis/ Dissertation,
4.2 Method of writing abstract, method of writing full paper for presenting in a conference and to publish in journals.
4.3 Technicalities of writing: Footnote and Bibliography.
4.4   Ethical Issues in Research: Areas of Dishonesty in research

Suggested Readings:

Best J. W (1971) Research in Education, New Jersey; Prentice Hall, Inc

Clarke David. H & Clarke H, Harrison (1984) Research processes in Physical Education, New Jersey; Prentice Hall Inc.

Craig Williams and Chris Wragg (2006) Data Analysis and Research for Sport and Exercise Science, Londonl Routledge Press

Jerry R Thomas & Jack K Nelson (2000) Research Methods in Physical Activities; Illonosis; Human Kinetics;

Kamlesh, M. L. (1999) Reserach Methodology in Physical Education and Sports, New Delhi Moses, A. K. (1995) Thesis Writing Format, Chennai; Poompugar Pathippagam

PAPER – 105 PRACTICAL SYLLABUS (PART-A)

(PART-A)   **Maximum Marks: 50**

A   SYLLABUS FOR YOGA PRACTICALS (BEGINNERS)

A-I   PRAYER, SANKALPMANTRA

1.   SURYA NAMASKARA-12 ROUNDS

2.   PAWANMUKTASANA SERIES-I

3.   SUKSHAMA VYAYAMA

4.   MEDITATIVE ASANAS:

         Padmasan, Siddhasan, Vajarasana

5.   RELAXATIVE ASANAS:

         Shavasan, Makarasan

6.   SUPINE LYING ASANAS:

         Naukasan, Setubandhasan, Pavanmuktasan, Vipareetkaraniasan, Ardhhalasana,

         Simplematsyasana

7.   PRONE LYING ASANAS:

         Bhujangasan, Ardhshalabhasan, Niralambasan

8.   SITTING ASANAS:

         Janushirasan, Vakrasan, Mandukasan, Yog Mudra Shashankasan

         Ardhaushtrasana, Uttan Mandukasan, Parvatasana

9.   STANDING ASANAS:

         Tadasan, Natarajasan, Garudasan, Katichakrasan

10.   STREATCHING PRACTICES

M. A. YOGA – 1ˢᵀ SEMESTER

PAPER – 105 PRACTICAL SYLLABUS (PART-B)

Maximum Marks: 50

(PART-B)

1. **Concept of various practices and their applications.**

2. **PRANAYAM:**

   Nadi Shodhan Pranayam, Surya Bhed Pranayam, Chandra bhed pranayam

3. **BANDH:**

   Jalandhar Bandh

4. **MUDRA:**

   Gyan Mudra Pranayamic Mudra

5. **SHATKARM:**

   a. NETI   : Two types (Jal Neti and Rubber Neti)

   b. DHAUTI   : Two Types (Kunjal Kriya and Agnisar Kriya)

6. **MEDITATION – Om recitation**

7. **RELAXATION TECHNIQUES –** Shavasana, Yog Nidra

PAPER – 201 FUNDAMENTALS OF HATHA 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.

Unit – I

1.   INTRODUCTION OF HATHAPRADIPIKA

1.1   Definitions of Hatha Yoga – Time and Place, Dress Code & Environment for Hatha Yoga practice
1.2   Concept of Mitahara, Pathya and Apathya
1.3   Introduction of Asanas, Mudra, Bandh & Concept of Nadis
1.4   Asana and Shatkarmas – Meaning, Definitions, Principles, Types, Technique, Precautions and Benefits.

Unit – II

2.   KUMBHAKA, MUDRAS, BANDHAS, NADANUSANDHANA

2.1   Kumbhaka – Meaning, Definition, Types of Kumbhaka, Technique, Precautions & Benefits
2.2   Mudras and Bandhas – Meaning, Definition, Technique, Precautions and Benefits
2.3   Chakras, Kundalini and Nadis
2.4   Nadanusandhana and Various types of Samadhis.

Unit – III

3.   INTRODUCTION OF GHERANDA SAMHITA

3.1   Introduction and History of Gheranda Samhita.
3.2   Concept of Ghatasth Yoga. Saptasadhana:- Shatkarma, Asanas, Pranyama, Pratyahara, Mudra, Dhyana, Smadhi
3.3   Shatkarma – Meaning Types (Dhauti, Basti, Neti, Trataka, Nauli and Kapalabhati), Technique, Precautions and Benefits.
3.4   Asanas and Mudras – Meaning, Definition, Types, Technique, Precautions and Benefits.

Unit – IV

4.   PRATYAHARA AND PRANAYAMAS

4.1   Pratyahara – Meaning, Types, Technique, Precautions and Benefits
4.2   Pranayamas – Meaning and Definition, Types, Technique, Precautions and Benefits.
4.3   Dhayana – Meaning, Types, Technique, Precautions and Benefits.
4.4   Samadhi – Meaning, Types, Technique, Precautions and Benefits.

References Books:-

1. "Sadhan Paddhation Ka Gyan or Vigyan" – Pt Shri Ram Sharma.

2. "Hatha Yog Pradipika" – Kaivalayadham Lonavala.

3. "Hatha Yog Pradipika" – Swatmaram Krit Swami Digamberji.

4. "Ghorak Samhita" – Ghoraknath Mandir, Gorakpur.

5. "Gherand Samhita" - Kaivalayadham Lonavala.

6. "Text Book of Yoga" – Yogeshwar.

7. "Mysterious Kundalini" – Dr. Vasant Rule.

8. "Asan Pranayam Mudra, Bandh" – Swami Satyanand Saraswati.

9. "Prana and Pranayama" – Swami Niranjanananda Saraswati.

M. A. YOGA - SEMESTER – II

PAPER – 202 ANATOMICAL AND PHYSIOLOGICAL ASPECTS OF YOGA - II

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.

Unit-I

1.   Cardio-Vascular System:

1.1   Structure & Functions of Heart.
1.2   Blood and its composition, functions of blood.
1.3   Types of Blood circulations: Systemic and Pulmonary
1.4   Effect of Yogic Practice on Cardio-Vascular System.

Unit-II

2.   Nervous System:

2.1   Introduction of Nervous System Organs.
2.2   Types of Nervous Systems: Central, Peripheral & Autonomic nervous system.
2.3   Effect of Yogic Practice on Nervous System.
2.4   Structure & functions of nose, ears and eyes. Effect of Yoga on nose, ears and eyes

Unit-III

3.   Excretory System

3.1   Organs of excretory system.
3.2   Structure of Kidney and Skin
3.3   Structure of nephron and physiology of the formation of urine.
3.4   Effect of Yogic Practices on Kidney and Skin

Unit-IV

4.   Endocrine System:

4.1   Meaning of Endocrine glands, Name and location of endocrine glands.
4.2   Hormones secretions from pituitary, thyroid, parathyroid, pancreas and adrenal gland
          and their functions in body.
4.3   Meaning of Hormone and enzyme and their differentiation.
4.4   Effect of yogic practices on Endocrine glands and their secretions.

References Books:-

1. "Anatomy of Hatha Yoga" – Coutter, H. D.

2. "Anatomy and Exercise Physiology" – Kumar, R.

3. "Human Anatomy, Vol.-I, Fourth Addition – Chaurasia B. D.

4. "Anatomy & Physiology" – Shiva V. K.

M. A. YOGA SEMESTER – II

PAPER – 203 HEALTH ASPECTS 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.

Unit-I

1.   Introduction of Yoga & Health

1.1   Meaning, Definition according to WHO & Importance of Health.
1.2   Dimensions of Health Physical, Mental, Social and Spiritual.
1.3   Concept of Health & Diseases in Indian Systems of Ayurveda.
1.4   Health Services and Guidance Instruction in Personal Hygiene.

Unit-II

2.   Role of Yoga in Health Care

2.1   Role of Yoga in Preventing Health Care.
2.2   Asana & Health, Pranayam & Health.
2.3   Shatkarmas & Health, Mudra/Bandh & Health.
2.4   Concept of Trigunas, Panch-mahabhutas, Panch- pran & Role in Health and Healing

Unit-III

3.   Yoga & Mental Health

3.1   Meaning of Styana, Samshaya, Pramada, Avirati, Bhranti Darsana, Alabdha – Bhumikatva, Anavasthitatva, Dukha and Daurmanasy.
3.2   Meaning of Mental Health and Positive Mental Health.
3.3   Causes and Consequences of Conflict and Frustration.
3.4   Healing through Yoga : Mental Disorders, Depressive Disorders, Anxiety Disorders and Serious Mental Disorders.

Unit-IV

4.   Yoga & Diet

4.1   Diet: Before and after yogic practices.
4.2   Concept and contents of Balance Diet, Yogic Diet and Moderation of Diet.
4.3   Concept of Vegetarian Diet, Useful Effect of Vegetarian Diet.
4.4   Harmful Effects of Non-Vegetarian Diet.

References Books:-

1. "Yog & Mansic Swasthya" – Dr. Suresh Varnval.

2. "Abnormal Psychology" – Dr. A. K. Singh.

3. "Yog Sutra" - Raj Martind Bhojraj.

4. "Yog Darsan" – Rajveer Shashtri.

M. A. YOGA – 2nd SEMESTER

PAPER – 204 – APPLIED STATISTICS 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.

Unit – I: Introduction to Statistics and Measures of Central Tendency

1.1   Meaning of Statistics. Need and importance of statistics in Yoga
1.2   Meaning of Data, Methods of organizing Data through Frequency Distribution.
1.3   Meaning of the Measures of Central Tendency, Computation Mean, Median and Mode.
1.4   Merits and limitations of Mean, Median and Mode

Unit-II: Introduction of Variability

2.1 Meaning of measures of variability: Range, Quartile Deviation, Average Deviation and Standard Deviation.
2.2   Computation of Range, Quartile Deviation, Average Deviation and Standard Deviation.
2.3 Meaning of term Percentile and Quartiles Deviation. Computation of Percentile and   Quartiles Deviation
2.4   Meaning of term Percentile Rank and Computation of Percentile Rank.

Unit – III: Introduction to Normal Probability Curve and Correlation

3.1   Meaning of Normal Probability Curve and Properties of Normal Curve.
3.2   Meaning and types of Skewness and kurtosis. Sigma Scores and T – Scores.
3.3   Meaning and Types of Linear Correlation.
3.4 Computation of Correlation Coefficient with Product Movement and Rank Difference Method.

Unit – IV: Graphical representation of data and testing of Hypothesis

4.1   Meaning and advantage of Graphical Representation of Data.
4.2   Types of Bar Diagrams, Method of preparing Histogram, Frequency Polygon, Cumulative- Frequency Graph, Bar-Diagram and Pie Diagram.
4.3   Meaning of two – tailed and one tailed test of significance,
4.4   Computing significance of difference between two means with t – Test (independent samples) and One way ANOVA Test.

REFERENCES:

Clarke.HH.The Application of Measurement in Health and Physical Education,1992.

Clarke,David H.and Clake H.Hares N. Research Process in Health Education Physical Education and Recreation . Englewood Cliffs, New Jersey, Prentice Hall, Inc.1986.

Shaw. Dhananjoy. Fundamental statistics in Physical Education & Sports sciences, sports publication,2007.

Margaret J. Safrit : Introduction to Measurement in Physical Education and Exercise Science, Time Mirror/ Mosy, College Publishing St. Louis. Toronte Bosion (2Nd. Edition-1998.

Morey E. Garrett : Statistics in Psychology and Educated, David Meka Company Inc.

Devinder K. Kansal : Test and Measurement in Sports and Physical Education, D.V.S.Publications, Kalkaji, New Delhi –110019.

PAPER – 205 PRACTICAL SYLLABUS

(i) Demonstrations of Asana, Pranayam and Shudhi Kriya   **Maximum Marks: 70**

1.   **SURYA NAMASKARA - 12 ROUNDS**

2.   **SUKSHAMA VYAYAMA**

3.   **MEDITATIVE ASANAS:** Padmasan, Siddhasan, Vajarasana

4.   **RELAXATIVE ASANAS:** Shavasan, Makarasan

5.   **SUPINE LYING ASANAS:** Sarvangasan, Halasan, Chakrasan, Uttanpadanasan

6.   **PRONE LYING ASANAS:** Bhujangasan, Ardhshalabhasan, Niralambasan

7.   **SITTING ASANAS:** Paschimottanasan, Matsyanderasan, Shashankasan, Ushtrasana, Suptavajarasan

8.   **STANDING ASANAS:** Tadasan, Vrikshasan, Konasan, Padhastasan

9.   **PRANAYAM:** Nadi Shodhan Pranayam, Seetkari Pranayam, Bhastrika Pranayam, Bhramari

10.   **BANDH:** Jalandhar Bandh, Udyan Bandh, Mool Bandh

11.   **MUDRA:** Gyan Mudra Pranayamic Mudra, Vipritkarni Mudra

12.   **SHATKARM:**

      a) NETI   :   Two types (Jal Neti and Rubber Neti)

      b) DHAUTI   :   Two Types (Kunjal Kriya and Agnisar Kriya)

      c) KAPALBHATI   :   Vaatkarma, Sheetkarma

      d) TRATAK

13.   **MEDITATION – Om recitation**

14.   **RELAXATION TECHNIQUES –** Shavasana, Yog Nidra,

15.   **PRACTICAL NOTE BOOK**

PAPER – 205 PRACTICAL SYLLABUS

ii) APPLIED STATISTICS: Maximum Marks: 30

Following statistical techniques with Excel & SPSS

i)   Calculation of Mean, Median & Standard Deviation   (Marks = 10)

ii)   t - test, ANOVA & Correlation   (Marks = 10)

iii) Plotting different types of graphs   (Marks = 10)

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.

Unit-I

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.

Unit-II

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.

Unit-III

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.

Unit-IV

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.

3. 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

4. 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

5. 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.

Unit-I

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.

Unit-II
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

Unit-IV
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).

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.

7. 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.

Unit-I

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.

Unit-II

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.

Unit-III

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.

Unit-IV

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.

Unit-I

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.

Unit-II

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.

Unit-III

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.

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.

7. 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.

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   (Marks = 10)

     Mrs. Shubhra Mangal.

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.*

Unit-I

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.

Unit-II

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).

Unit-III

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.

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.

Unit-I

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.

Unit-II

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.

Unit-III

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.

Unit-IV

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.

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.

Unit-I

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.

Unit-II

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.

Unit-III

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.

Unit-IV

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.

UNIT –I

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 Competi

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
PRACTICAL – (405)

(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.

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Physical Education (M.P.ED)

(Changes will be implement from Session 2019-2020)

Semester-1st

Total Credits= 26   Total Marks = 800

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd-101	Research Process in Physical Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd-102	Principles of Sports Training	CFC	04	--	04	04	--	04	20	80	--	100
MPEd-103	Kinesiology	CFC	04	--	04	04	--	04	20	80	--	100
MPEd-104	Health Education and Sports Nutrition	CCC	04	--	04	04	--	04	20	80	--	100
MPEd-105	Information & Communication Technology(ICT) in Physical Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd-106	Practicum: Athletics- (Track Events & Jumps)	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd-107	Game	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd-108	Health Education	CCC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd-109	Information & Communication Technology(ICT) in Physical Education	CCC	--	01	01	--	0.5	0.5	--	--	50	50
	Total		20	12	32	20	06	26	100	400	300	800

C.C.C = Compulsory Core Course   C.F.C = Compulsory Foundation Course

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Physical Education (M.P.ED)

(Changes will be implement from Session 2019-2020)

Semester-2nd

Total Credits= 26   Total Marks = 800

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd -201	Research Process in Physical Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 202	Physiology of Exercise	CFC	04	--	04	04	--	04	20	80	--	100
MPEd - 203	Applied Statistics in Physical Education and Sports	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -204	Physical Fitness and Wellness	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 205	Yogic Science	OEC	04	--	04	04	--	04	20	80	--	100
MPEd - 206	Practicum: Athletics (Throws & Conduct of Athletic Meet)	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd - 207	Game	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd -208	Yoga	OEC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd -209	Applied Statistic and ICT	CCC	--	01	01	--	0.5	0.5	--	--	50	50
	Total		20	12	32	20	06	26	100	400	300	800

C.C.C = Compulsory Core Course   C.F.C = Compulsory Foundation Course   O.E.C = Open Elective Course

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Physical Education (M.P.ED)

(Changes will be implement from Session 2020-2021)

Semester-3rd

Total Credits= 26   Total Marks = 800

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	Total
MPEd -301	Sports Psychology	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 302	Sports Medicine	CFC	04	--	04	04	--	04	20	80	--	100
MPEd - 303	Tests, Measurement and Evaluation in Physical Education	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -304	Athletic Care and Rehabilitation	CCC	04	--	04	04	--	04	20	80	--	100
MPEd -305	Value and Environmental Education	OEC	04	--	04	04	--	04	20	80	--	100
MPEd - 306	Practicum: Game – I	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd - 307	Game - II	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd -308	Sports Psychology	CCC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd -309	Tests, Measurement and Evaluation in Physical Education	CCC	--	01	01	--	0.5	0.5	--	--	50	50
	Total		20	12	32	20	06	26	100	400	300	800

C.C.C = Compulsory Core Course   C.F.C = Compulsory Foundation Course   O.E.C = Open Elective Course

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Physical Education (M.P.ED)

(Changes will be implement from Session 2020-2021)

Semester-4th

Total Credits= 26

Total Marks = 800

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd -401	Sports Journalism and Mass Media	CCC	04	--	04	04	--	04	20	80	--	100
MPEd -402	Education Technology in Physical Education	CFC	04	--	04	04	--	04	20	80	--	100
MPEd - 403	Sports Bio Mechanics	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -404	Sports Technology	CCC	04	--	04	04	--	04	20	80	--	100
MPEd -405	Options: i) – Dissertation ii) – Sports Management	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 406	Practicum: Game –I	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd - 407	Game - II	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd -408	Class Room Teaching	CCC	--	02	02	--	01	1.0	--	--	100	100
	Total		20	12	32	20	06	26	100	400	300	800

C.C.C = Compulsory Core Course

C.F.C = Compulsory Foundation Coure

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M. P. Ed. –Syllabus
(From session 2019-2020)
<u>Semester – 1st</u>
Part – A (Theory Courses)
M.P.Ed. - 101: Research Process in Physical Education
Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Time: Three Hours   **Total Credits: 4**

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.

Unit – I: Introduction
Meaning and Definition of Research, Need and importance of Research in Physical Education and Sports, Characteristics of Research in Physical Education & Sports.
Types of Research: Analytical, Descriptive, Experimental, Qualitative and Meta Analysis.
Research Problem: Meaning of the term Research Problem, location and criteria of Selection of Problem, Formulation of a Research Problem, Limitations and Delimitations.

UNIT II – Concept of Sampling and Hypothesis
Meaning and Definition of Sample and Population.
Types of Sampling: Probability Methods- Systematic Sampling, Cluster sampling, Stratified Sampling.
Area Sampling, Multistage Sampling.
Non- Probability Methods: Convenience Sample, Judgement Sampling, Quota Sampling.
Meaning and definition of Hypothesis, Importance Hypothesis in research, Types of Hypothesis, Type 1 and Type 2 errors in Hypothesis testing.

UNIT-III Review of related literature
Survey of Related Literature: Need for surveying related literature, Kinds of Related Literature, Literature Sources – Primary and Secondary, Steps in Literature Search. Writing of Literature review.
Variables: Meaning and Definition of Variables, types of variables: Dependent, Independent, Control, Extraneous, Moderator and Predictor, Source of variables.

Unit – IV Ethical Issues and tools in Research
Ethical Issues in Research: Areas of Scientific Dishonesty, Ethical Issues regarding Copyright, Responsibilities of Researchers, Working Ethics with Faculty, Protecting Human Participants.
Tools of Research: Observation, Interviews, questionnaires, opinion or attitude scales, Psychological Tests and Personality Inventories.

Suggested Readings:
Best J. W (1971) Research in Education, New Jersey; Prentice Hall, Inc
Clarke David. H & Clarke H, Harrison (1984) Research processes in Physical Education, New Jersey; Prentice Hall Inc.
Craig Williams and Chris Wragg (2006) Data Analysis and Research for Sport and Exercise Science, Londonl Routledge Press
Jerry R Thomas & Jack K Nelson (2000) Research Methods in Physical Activities; Illonosis; Human Kinetics;
Kamlesh, M. L. (1999) Reserach Methodology in Physical Education and Sports, New Delhi Moses, A. K. (1995) Thesis Writing Format, Chennai; Poompugar Pathippagam
Rothstain, A (1985) Research Design and Statistics for Physical Education, Englewood Cliffs: Prentice Hall, Inc
Subramanian, R, Thirumalai Kumar S & Arumugam C (2010) Research Methods in Health, Physical Education and Sports, New Delhi; Friends Publication
Moorthy A. M. Research Processes in Physical Education (2010); Friend Publication, New Delhi

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 1st

M.P.Ed.- 102: Principles of Sports Training
Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Time: Three Hours   Total Credits: 4

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.

Unit-I: Training load, adaptation and recovery:
   (i) Training of Load: Meaning and Charactertics of training load
   (ii) Adaptation - Meaning, conditions for adaptation of training load.
   (iii) Over load - Meaning and causes, Symptoms of overload, tackling overload.
   (iv) Recovery - Meaning and phases of recovery, Methods of recovery.

UNIT –II: Development of various motor components:
   (i) Strength: Meaning, Different types of Strength, Methods of improving different forms of Strength (Maximum Strength, Explosive Strength and Strength Endurance).
   (ii) Speed: Different types of Speeds, Methods of improving different types of Speed abilities.
   (iii) Endurance: Different types of Endurance, Methods of improving different types of Endurance abilities.
   (iv) Flexibility: Different types of Flexibility, Methods of improving different types of Flexibility abilities.
   (v) Co-ordinative Abilities: - Methods of improving different forms of co-ordinative abilities.

UNIT – III: Technique and Tactical Training:
   (i) Meaning and definition of technique, skill, and style.
   (ii) Aim of technique and tactical training in different sports.
   (iii) Different phases of technique training.
   (iv) Charactertics and implications of different phases of technique training.
   (v) Methods of technique and tactical training.

UNIT – IV: Training Plans, Periodisation and Competition
   (i) Meaning of Training Plan and cyclecity of training: - Macro Cycle, Meso Cycle and Micro Cycle
                                                . Training session plan.
   (ii) Periodisation: Meaning, Aim, Contents/Parts of Periodisation, Type of Periodisation.
   (**iii) Competition:** Importance and Preparation (Direct and Psychological preparations)

Suggested Readings:

Beotra Alka, (2000), Drug Education Handbook on Drug Abuse in Sports. Delhi: Sports Authority of India
Bunn, J.N. (1998) Scientific Principles of Coaching, New Jersey Engle Wood Cliffs, Prentice Hall Inc.
Cart, E. Klafs & Daniel, D. Arnheim (1999) Modern Principles of Athletic Training St. Louis C.V. Mosphy Company
Daniel, D. Arnheim (1991) Principles of Athletic Training, St. Luis, Mosby Year Book
David R. Mottram (1996) Drugs in Sport, School of Pharmacy, Liverpool: John Moore University
Gray, T. Moran (1997) – Cross Training for Sports, Canada: Human Kinetics
Hardayal Singh (1991) Science of Sports Training, New Delhi, DVS Publications
Jensen, C.R. & Fisher A.G. (2000) Scientific Basic of Athletic Conditioning, Philadelphia
Ronald, P. Pfeiffer (1998) Concepts of Athletics Training 2nd Edition, London: Jones and Bartlett Publications
Yograj Thani (2003), Sports Training, Delhi: Sports Publications

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 1st
M.P.Ed- 103: Kinesiology

Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Time: Three Hours   **Total Credits: 4**

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.

Unit – I: Introduction
 (i) Meaning, importance and scope of Kinesiology in Physical Education.
(ii) Meaning of axis and planes.
(iii) Types of axis and planes.
(iv) Medical Terminology of Body Position
(v) Terminologies of different Body movements

Unit – II: Muscles of various regions
(i)   Functional classification of Skelton Muscles
(ii) Origin, Insertion and Actions of Muscles present on back and abdominal region:
     Latissimus Dorsi, Trapezius, Rhomboid Major, Rhomboid Minor and Rectus Abdominal
(iii) Origin, Insertion and Actions of Muscles of Hip region
      Gluteus maximus, Gluteus medius and Gluteus minimus Muscles
(iv) Origin, Insertion and Action of Muscles present on Neck region
      Sternocleidomastoid muscle

Unit - III: Joints of Upper Extremity
 (i) Shoulder joint – Structure, Ligaments, Muscle reinforcement and Movements.
 (ii) Elbow joint - Structure, Ligaments, Muscle reinforcement and Movements.
(iii) Origin, Insertion and Actions of Muscles present on upper extremity:
      Deltoid, Biceps, Triceps and Pactroralis Major.

Unit - IV: Joints of Lower extremity
 (i)   Hip Joint - Structure, Ligaments, Muscle reinforcement and Movements.
 (ii) Knee joint – Structure, Ligaments, Muscle reinforcement and Movements.
 (iii) Origin, Insertion and Action of Muscles present on lower extremity:
       Hamstrings group of Muscles, Quadriceps group of Muscles, Sartorius Muscle,
       Gastrocnemius Muscle

Suggested Readings:

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. P. Ed. –Syllabus
(From session 2019-2020)
<u>Semester – 1st</u>
M.P.Ed. - 104: Health Education and Sports Nutrition

Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Time: Three Hours   **Total Credits: 4**

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.

Unit – I: Health Education
Definition of Health, Dimensions and Determinants of Health, Health Education, Health Instruction, Health Supervision Aim, objective and Principles of Health Education, Health Service and guidance instruction in personal hygiene, Care of skin, Nails, Eye health service, Nutritional service, Health appraisal, Health record, Healthful school environment, first- aid and emergency care in different conditions.

Unit – II: Health Problems in India
Effect of Alcohol on Health, Effect of Tobacco on Health, Effect of different types of drugs on Health, Meaning of Hypertension, Causes of Hypertension, Management of Hypertension, Meaning of Diabetics, Types of Diabetics, Causes of Diabetics, Management of Diabetics, Meaning of Stress, Causes of stress, management of Stress, Objective of school/college health service, Role of health education in school/college.

Unit – III- Introduction to Sports Nutrition
Meaning and Definition of Sports Nutrition, Role of nutrition in sports, Basic Nutrition guidelines, Nutrients: Ingestion to energy metabolism (Carbohydrate, Protein and Fat), Role of carbohydrates, Fat and protein during exercise. Calories in different food stuffs. Preparation of diet chart for Sports personal, normal male and female, children and elderly persons.

Unit – IV Nutrition and Weight Management
Concept of BMI (Body mass index), Meaning of Obesity, Causes of Obesity, Management of Obesity, Obesity and its hazard, Dieting versus exercise for weight control, maintaining a Healthy Lifestyle, Weight management program for children, adolescence, adulthood and elderly. Role of diet and exercise in weight management, Design diet plan and exercise schedule for weight gain and loss.

Suggested Readings:
Bucher, Charles A. "Administration of Health and Physical Education Programme". Delbert, Oberteuffer, et. al." The School Health Education".
Ghosh, B.N. "Treaties of Hygiene and Public Health".
Hanlon, John J. "Principles of Public Health Administration" 2003. Turner, C.E. "The School Health and Health Education".
Moss and et. At. "Health Education" (National Education Association of U.T.A.) Nemir A. 'The School Health Education" (Harber and Brothers, New York). Nutrition Encyclopedia, edited by Delores C.S. James, The Gale Group, Inc.
Boyd-Eaton S. et al (1989) The Stone Age Health Programme: Diet and Exercise as Nature Intended. Angus and Robertson.
Terras S. (1994) Stress, How Your Diet can Help: The Practical Guide to Positive Health Using Diet, Vitamins, Minerals, Herbs and Amino Acids, Thorons.

M. P. Ed. –Syllabus
(From session 2019-2020)
<u>Semester – 1st</u>

M.P.Ed.- 105: INFORMATION & COMMUNICATION TECHNOLOGY (ICT) IN PHYSICAL EDUCATION

Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)

Time: Three Hours   **Total Credits: 4**

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.

Unit - I Information & Communication Technology in Physical Education
(i) Meaning & Nature of Information & Communication Technology
(ii) Scope of ICT in Physical Education
   a) Teaching Learning Process b) Publication   c) Evaluation   d) Research
   e) Administration   f) Organisation of sports tournaments
(iii) Challenges in integrating Information & Communication Technology in Physical Education.
(iv) Visual Classroom: Meaning of visual class room, Audio-visual aid and equipments   of class room.

Unit - II Introduction to Computer and Internet
 (i) Computer - Definition & structure
      Hardware - i) Input devices - Key Board, Mouse, Scanner, Microphone, Digital camera.
              ii) Output devices - Monitor, Printer, Speaker, Screen image projector
              ii) Storage devices - Hard Disk, CD & DVD, Mass Storage, Device (Pen drive)
     Software - i) Operating System - Concept and function.
              ii) Application Software (It uses in Physical Education)
                1) Word Processors 2) Presentation 3) Spread sheet, 4) Database Management
    ii) Internet: Facilities available for Communication - E-mail, chat, online
               Conferencing, e- Library, websites, Blog etc.
               Search Engines - Concept and uses.

Unit III – MS Office Applications
    MS Excel: Main Features & its Applications in Physical Education
    MS Access: Main features and its Uses in Physical Education
    MS Power Point: Preparation of Slides with Multimedia Effects
    MS Publisher: Newsletter & Brochure

Unit- IV ICT supported teaching / learning strategies and E – Learning
    Computer Assisted Learning, Project Based Learning, Collaborative Learning, Technology Aided Learning E - Learning - Concept & Nature, Web Based Learning, Role of EDUSAT, Viruses & its Management

Suggested Readings:

B. Ram, New Age International Publication, Computer Fundamental, Third Edition-2006 Brain under IDG Book. India (p) Ltd Teach Yourself Office 2000, Fourth Edition- 2001

Douglas E. Comer, The Internet Book, Purdue University, West Lafayette in 2005.

Irtegov, D. (2004). Operating system fundamentals. Firewall Media.

Marilyn, M.& Roberta, B.(n.d.).Computers in your future. 2nd edition, India: Prentice Hall. Milke, M.(2007). Absolute beginner's guide to computer basics. Pearson Education Asia. Sinha, P. K. & Sinha, P. (n.d.).Computer fundamentals. 4th edition, BPB Publication.

Heidi Steel Low price Edition, Microsoft Office Word 2003- 2004

ITL Education Solution Ltd. Introduction to information Technology, Research and Development Wing-2006

Pradeep K. Sinha & Priti; Sinha, Foundations computing BPB Publications -2006. Rebecca Bridges Altman Peach pit Press, Power point for window, 1999

Sanjay Saxena, Vikas Publication House, Pvt. Ltd. Microsoft Office for ever one, Second Edition-2006

Part – B
Practical Courses
Semester – I

M.P.Ed. – 106: Athletics (Track Events and Jumps)   **Marks - 100**

Track Events
(i) Teaching ability of different types of Starts (with & without starting blocks)   (Marks –20)
(ii) Teaching ability of Long Jump (hang Style), Triple Jump and   (Marks – 20)
    High Jump
(iii) Interpretation of rules related to jumps   (Marks – 20)
(iv) Marking of Track 400m and 200m.   (Marks – 20)
(v) Closing, opening and medal ceremony of Athletic Meet   (Marks – 20)

Note: Candidate have to take at least 5 teaching lessons on various techniques.

MPEd – 107: Game – (Handball and Cricket)   **Marks – 100**

i) Handball   **Marks – 50**

(i) Marking of Handball Court   (Marks – 10)
(ii) Teaching ability of various Basic skills of Handball   (Marks – 10)
(iii) Interpretation of Various rules of Handball   (Marks – 10)
(iv) Filling the score sheet of Handball   (Marks – 10)
(v) Officiating Symbols   (Marks – 10)

ii) Cricket   **Marks – 50**

(i) Marking of Cricket Court   (Marks – 10)
(ii) Teaching Ability of various Basic skills of Cricket   (Marks – 10)
(iii) Interpretation of Various rules of Cricket   (Marks – 10)
(iv) Filling the score sheet of Cricket   (Marks – 10)
(v) Officiating Symbols   (Marks – 10)
Note: Candidate have to take at least 5 teaching lessons of each game.

M.P.Ed. – 108 - Health Education   **Marks - 50**

(i)   Method of keeping health record
(ii)   First Aid for various conditions and articles of first aid box
(iii) Identification of various forms of postural deformities and their remedial exercises

M.P.Ed. – 109 – Information & Communication Technology (ICT) in Physical Education   Marks - 50

(i) Writing different types of Notices for Sports Activities in MS Ward
(ii) Writing different types of letters for Purchase, Sports Activities, Annual Athletic Meet etc. in MS Ward
(iii) Preparation of score sheets for Different Games and Athletic Events in MS Ward

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 2nd
Part – A (Theory Courses)
M.P.Ed. - 201: Research Process in Physical Education

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.

Unit – I: Historical and Philosophical Research
Historical Research: Meaning and definition of Historical Research, Sources of Historical Research: Primary Data and Secondary Data, Historical Criticism: Internal Criticism and External Criticism.
Philosophical Research: Meaning of Philosophical Research, Tool of Philosophical Research, Steps in Critical Thinking.

UNIT-II: Survey Research
Survey Studies: Meaning of Survey, Tools of Survey Research: Questionnaire and Interview, Meaning of Questionnaire and Interview, Construction, Appearance and Development of Questionnaire, Procedure of Conducting interview, Suggestions to enhance response.
Normative Survey: Meaning of Normative Survey, Factors affecting Normative Survey.
Case Studies: Meaning of Case Studies, steps of case studies.

UNIT-III Experimental and Research Proposal
Experimental Research – Meaning, Nature and Importance, Experimental Design - Single Group Design, Reverse Group Design, Repeated Measure Design, Static Group Comparison Design, Equated Group Design and Factorial Design.
Research Proposal: Meaning and Significance of Research Proposal, Steps of
preparing Research proposal/synopsis, Format of a synopsis.

Unit – IV Research Report
Research Report: Meaning of Research Report, Chapterization of Thesis/ Dissertation, Title page, Preliminary documents, Text (introductions and chapters), Back matter (notes, bibliography or references, appendices, glossary.
Method of writing abstract , method of writing full paper for presenting in a conference and to publish in journals ,technicalities of writing: Footnote and Bibliography.

Suggested Readings:
Best J.W.Research in Education, Prentice Hall Inc. : Delhi-1982
Clarke, H.David., Research Processes in Physical Education , Recreation & Health Prentice
Hall Inc.1985.
Thomas Jerry R. and Nelson Jack K., Research Methods, Physical Activity. Human Kinetics
Champaign, 1996.
Weimer, Jon, Research Techniques in Human Engineering. Prentice Hall: New Jersy.1994.
C.V.Good : Methods of Research , Appleton Century Crofts Inc., New York,1954.
W.R.Mouly : Educational Research Introduction, David Making CO. Inc. Yew York, 1975.
J.W.Best : Research in Education, Prentice Hall, 1980.
D.H. Clarke: Research Processes in Physical Education, Recreation and Health , Premice
Hall, 1970

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 2nd
M.P.Ed. - 202: Physiology of Exercise

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.

UNIT – I: Skeletal Muscles and Exercise:
Macro & Micro Structure of the Skeletal Muscle, Chemical Composition of Skeletal Muscle, Sliding Filament Theory of Muscular Contraction, Composition of slow and fast twitch muscle fibers, Muscle Tone, Short and long term Effects of exercises and training on the muscular system

UNIT – II: Cardiovascular System and Exercise
Conduction system of the Heart, Blood Circulation and its classification, Cardiac Cycle – Stroke Volume, Cardiac Output, Heart rate, Effect of different types of training on the Cardio-vascular system, E**lectrocardiogram (ECG),** Method of reading ECG

UNIT – III: Respiratory System and Exercise
Mechanism of Breathing, Respiratory Muscles, Mechanism of Exchange of Gases in the Lungs and Tissues, Ventilation at rest and during exercise, Oxygen debt, Effect of Exercise on Respiratory System, Aerobic and Anaerobic metabolism

UNIT – IV: Body Composition and Sports
Body Build, Body Size, Body Composition, Techniques of Assessing Body Composition (Skin Fold Fat Thickness and Bioelectric impedance), Sports performance in hot climate, Cool Climate and high altitude.

Suggested Readings:
Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: Poompugar Pathipagam.
Beotra Alka, (2000) Drug Education Handbook on Drug Abuse in Sports: Sports Authority of India Delhi.
Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs.
David, L Costill. (2004). Physiology of Sports and Exercise. Human Kinetics.
Fox, E.L., and Mathews, D.K. (1981). The Physiological Basis of Physical Education and Athletics.
     Philadelphia: Sanders College Publishing.
Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sanders co. Richard, W. Bowers.
(1989). Sports Physiology. WMC: Brown Publishers.
Sandhya Tiwaji. (1999). Exercise Physiology. Sports Publishers.
Shaver, L. (1981). Essentials of Exercise Physiology. New Delhi: Subject Publications. Vincent, T. Murche.
(2007). Elementary Physiology. Hyderabad: Sports Publication. William, D. Mc Aradle. (1996). Exercise
Physiology, Energy, Nutrition and Human Performance. Philadelphia: Lippincott Williams and Wilkins
Company.

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 2nd
M.P.Ed. - 203: Applied Statistics in Physical Education and sports

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.

Unit – I: Introduction to Statistics and Measures of Central Tendency
Meaning of Statistics. Need and importance of statistics in Physical Education,
Meaning of Data, Methods of organizing Data through Frequency Distribution.
Meaning of the Measures of Central Tendency, Computation of Measures of Central Tendency i.e. Mean, Median and Mode.
Merits and limitations of Mean, Median and Mode

Unit-II: Introduction of Variability
Meaning of Variability, Meaning of Measures of variability: Range, Quartile Deviation,   Average Deviation and Standard Deviation.
Computation of Range, Quartile Deviation, Average Deviation and Standard Deviation.
Meaning of term Percentile, Computation of Percentile & Quartiles.
Meaning of Percentile Rank, Computation of Percentile Rank.

Unit – III: Introduction to Normal Probability Curve and Correlation
Meaning of Normal Probability Curve, Properties of Normal Curve.
Meaning and types of Skewness and kurtosis, Sigma Scores, Z- Scores, Hull Scores
Calculation of probability for various combinations of Heads and Tails.
Meaning and Types of Linear Correlation. Computation of Correlation Coefficient with
Product Movement Method and Rank Difference Method.

Unit – IV: Graphical representation of data and testing of Hypothesis
Meaning and advantage of Graphical Representation of Data, Principle of Graphical Representation of Data. Types of Bar Diagrams, Method of preparing Histogram, Frequency Polygon, Cumulative-Frequency Graph, Bar-Diagram and Pie Diagram.
Meaning of two – tailed and one tailed test of significance, computing significance of difference between two means with t – Test (independent samples), One way ANOVA Test.

Suggested Readings:
Clarke.HH.The Application of Measurement in Health and Physical Education,1992.
Clarke,David H.and Clake H.Hares N. Research Process in Health Education Physical Education and Recreation . Englewood Cliffs, New Jersey, Prentice Hall, Inc.1986.
Shaw. Dhananjoy. Fundamental statistics in Physical Education & Sports sciences, sports   publication,2007.
Margaret J. Safrit : Introduction to Measurement in Physical Education and Exercise Science, Time Mirror/ Mosy, College Publishing St. Louis. Toronte Bosion (2Nd. Edition-1998.
Morey E. Garrett : Statistics in Psychology and Educated, David Meka Company Inc.
Devinder K. Kansal : Test and Measurement in Sports and Physical Education, D.V.S.Publications, Kalkaji, New Delhi – 110019.

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 2nd
M.P.Ed. - 204: Physical Fitness and Wellness

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.

Unit I – Introduction of Physical Fitness and Wellness
Meaning and Definition of Physical Fitness and Wellness, Dimensions of Wellness, Principles of physical fitness and wellness, Primary and Secondary components of fitness, Assessment of wellness, Meaning of recreation, Types of recreation activities, Principles of recreation and Leisure time physical activity.

Unit II – Sports Nutrition
Categorisation of sports according to energy requirements, Body Weight and Energy Expenditure for different categories of sports, Pre event Meal (3-4 hrs. , 1-2 hrs and less than 1 hr), Diet plan for sports requiring 7000 k.cal., 6000 k.cal., 5200k. Cal., 4500 k.cal. and 3600 k. Cal.
Role of Fluid and electrolytes balance in sports performance, Symptoms and Results of Dehydration, Fluid Replacement Guidelines: before, during and after exercise.

Unit III – Aerobic and Anaerobic Exercise
Difference between aerobic and anaerobic fitness, aerobic and anaerobic metabolic threshold, Health benefits of aerobic and anaerobic exercise, calculation to aerobic and anaerobic training zone, Monitoring of heart rates during activity. Assessment of aerobic and anaerobic fitness, aerobic and anaerobic training methods, goal setting to maintain or improve aerobic and anaerobic fitness levels.

Unit IV – Ergogenic Aids and doping
Meaning of Ergogenic Aids, Ergogenic Aids: Mechanical Aids, Pharmacological Aids, Physiological Aids, Nutritional Aids and Psychological Aids.
World and National Anti Doping Agency, Anti doping rules of WADA, Category of Banned substances and methods. Side effects of doping on health.

Suggested Readings:
David K. Miller & T. Earl Allen, Fitness, A life time commitment, Surjeet Publication Delhi 1989.
Dificore Judy, the complete guide to the postnatal fitness, A & C Black Publishers Ltd. 35 Bedford row, London 1998
Dr. A.K. Uppal, Physical Fitness, Friends Publications (India), 1992. Warner W.K. Oeger & Sharon A. Hoeger, Fitness and Wellness, Morton Publishing Company, 1990.
Elizabeth & Ken day, Sports fitness for women, B.T. Batsford Ltd, London, 1986.
Emily R. Foster, Karyn Hartiger & Katherine A. Smith, Fitness Fun, Human Kinetics Publishers 2002.
Lawrence, Debbie, Exercise to Music. A & C Black Publishers Ltd. 37, Sohe Square, London 1999
Robert Malt. 90 day fitness plan, D.K. publishing, Inc. 95, Madison Avenue, New York 2001

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 2nd
M.P.Ed. - 205: Yogic Science

Time: Three 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.

Unit- I Philosophy and types of Yoga
Philosophy of Yoga

Types of Yoga – Ashtang Yoga, Raj Yoga, Karma Yoga, Bhakti, Yoga, Hath Yoga, Kriya Yoga, Gyan Yoga and Mantra Yoga.

Yogic Practice: Place, Time, Clothes, Bathing, Diet before and after.

Unit- II
Spiritual development through Yogic Practices.

Naturopathy: Meaning, concept and philosophy, brief history of naturopathy, basic principles of nature cure. Various methods of Naturopathy

Chakras: Major Chakaras- Benefits of clearing and balancing Chakras

Unit III – Kriyas, Bandhas and Mudras
Shat Kriyas: Meaning of Kriya, Techniques and Benefits of Neti, Dhati, Kapalapathi, Trataka, Nauli, Basti.

Bandhas: Meaning, Techniques and Benefits of Jalendra Bandha, Jihva Bandha, Uddiyana Bandha, Mula Bandha.

Mudras: Meaning, Techniques and Benefits of Hasta Mudras, Asamyukta hastam, Samyukta hastam , Mana Mudra, Kaya Mudra, Banda Mudra, Adhara Mudra.

Unit IV – Psychological, Physiological and Meditative effects of yoga
Role of Yoga in Psychological Preparation of athlete: Mental Wellbeing, Anxiety, Depression Concentration, Self Actualization.

Effect of Yoga on Physiological System: Circulatory, Skeletal, Digestive, Nervous, Respiratory, Excretory System.

Meditation: Meaning, Techniques and Benefits of Meditation – Passive and active.

Suggested Readings:
George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.

Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004), The Yoga Adventure for Children. Netherlands: A Hunter House book.

Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.

Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal

Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.

Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.

Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.

Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.

Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.

Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.

Swami Sivananda, (1971), The Science of Pranayama. Chennai: A Divine Life Society Publication.

Thirumalai Kumar. S and Indira. S (2011) Yoga in Your Life, Chennai: The Parkar Publication.

Tiwari O.P. (1998), Asanas-Why and How. Lonavala: Kaivalyadham.

M. P. Ed. –Syllabus
(From session 2019-2020)
Part – B
Practical Courses
Semester – 2nd

Paper – M.P.Ed.–206: Athletics (Throws & Conduct of Athletic Meet)   **Marks - 100**

Track Events
i.	Marking of Short Put, Discus and Javelin throw Sector	(Marks – 20)
ii.	Teaching ability of Short Put Techniques (Standing and Parry O'brien Technique)	(Marks – 20)
iii.	Teaching ability of Discus Throw Technique	(Marks - 20)
iv.	Teaching ability of Javelin Throw Technique	(Marks - 20)
v.	Interpretation of various rules of Throwing Events (Preparation of result sheet of Short Put, Discus and Javelin throw)	(Marks - 10)
vi	Baton exchange of relay races	(Marks - 10)

Note: Candidate have to take at least 5 teaching lessons of Throwing Events.

Paper – M.P.Ed.–207: Game (Volleyball, Wrestling & Boxing)   **Marks - 100**

i) Volleyball   **Marks – 50**

1. Marking of Volleyball Court	(Marks – 10)
2. Teaching ability of various basic skills of Volleyball	(Marks – 10)
3. Interpretation of Various rules of Volleyball	(Marks – 10)
4. Filling the score sheet of Volleyball	(Marks – 10)
5. Officiating Symbols	(Marks – 10)

ii) Wrestling & Boxing   **Marks – 50**

1. Teaching ability of various basic skills of Wrestling & Boxing	(Marks – 20)
3. Interpretation of Various rules of Wrestling & Boxing	(Marks – 10)
4. Filling the score sheet of Wrestling & Boxing	(Marks – 10)
5. Officiating Symbols of Wrestling & Boxing	(Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

Paper – M.P.Ed. – 208: Yoga   **(Marks – 50)**

LIST OF YOGIC PRACTICES

ASANA   **PRANAYAMA**
1. Shirsh Asana   1. Anulome-vilome
2. Vipratakarani   2. Ujjai
3. Hal Asana   3. Bhastrika
4. Bhujang Asana   4. Shitali
5. Ardh-Shalbh Asana   5. Kapalbhati
6. Vakra Asana   6. Suryabhedan
7. Ardha Matasyaendrasana   7. Bhramri
8. Paschimottan Asana
9. Vajra Asana
10. Supta Vajra Asana
11. Yoga Mudra
12. Nauka Asana
13. Bak Asana
14. Mayur Asana
15. Ustra Asana
16. Vriksh Asana
17. Padma Asana
18. Trikon Asana
19. Sarvang Asana
20. Manduk Asana
21. Pavan Muket
22. Chakra Asana
23. Pad-hast Asana
24. Katichakra Asana
25. Surya Namaskar

Note: Students are required to do any 10 asana form above mentioned Asanas and three Pranayama

Paper – M.P.ED. – 209 : Applied Statistics and ICT   **Marks – 50**

   Following statistical techniques with Excel & SPSS
i)   Calculation of Mean, Median & Standard Deviation   (Marks - 10)
ii)   t - test, ANOVA & Correlation   (Marks - 20)
iii) Plotting different types of graphs   (Marks - 20)

(From session 2020-2021)

Paper 301: Sport Psychology

Time: 3 hours   **Total Marks: 100 (Theory Marks: 80 + Int. 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.

UNIT- I Introduction of Sports Psychology & Learning
1. Introduction to Sports and Exercise Psychology?
2. Multidimensional components of the field of Sports Psychology.
3. Thorndike's theory (Connectionism or Trial and Error Learning)
4. Pavlov's Theory of Classical Conditioning
5. Kohler's Insight Learning
6. Bandura's Social Learning Theory

UNIT- II Psychological Skills Training and Goal Setting
1. Introduction to Psychological Skills Training (PST) and Types
2. Advantages of PST in Sports
3. Phases of Psychological Skills Training Programmes in games and sports
4. Define Goal Setting and Types of Goals
5. Principles of Goal Setting

UNIT- III Motivation and Stress
1. Meaning of Motivation, Basic Motivational concepts Interactional model of Motivation.
2. Strategies for Motivating Athletes and Teams.
3. Theories of achievements Motivation (Atkinson's theory and Attribution theory)
4. Maslow's need-hierarchy theory
5. Meaning and Definition of Stress, Causes, Symptom
6. Effective Strategies of Stress, through Yoga & Meditation

UNIT- IV Personality and Its Theories
1. Meaning and Structure of Personality
2. Sigmund Freud: Psychoanalytic Theory of Personality
3. Types theories of Personality (Hippocrate's classification, Kretschmer's classification, Sheldon's and Jung)
4. Trait theories of Personality (Allport, Cattell, & Eysenck Personality)

REFERENCE:

1. Bhatia, Hans Raj, Test Book of Education Psychology, Delhi: Macmillan, 2003
2. Roben. B. Frost: Psychological concepts applied to Physical Education and Coaching,   Edition, Wesley Publishing Co. London.
3. Dridge & Hung: Psychological foundation of Education. Harper and Row Publishers.
4. Jain, D., Introduction to Psychology, New Delhi: K.S.K, 2003.
5. Kamlesh, M.L. Education Sports Psychology, New Delhi, Friends Pub., 2006

6. Kamlesh, M.L., Key Ideas in Sport Psychology, New Delhi, Friends Pub., 2007 Kutty, S.K. Foundations of Sports & Exercise Psychology, New Delhi: Sports, 2004
7. Robert. S. Weinberg – Foundations of Sports and Exercise Psychology (Third Edition Daniel Gould
8. Jack H.Liewellyn – Psychology of Coaching: Theory and Application (Surjeet Publisher New Judy A. Blucker Delhi)
9. Jashwant Kaur Virk – Psychology of Training and Learning (Twenty First Century Publication Pardeep Kumar Sahu Patiala, 2008.
10. Dr. Arun Kumar Singh – Advanced General Psychology, Moti Lal Banarasi Das Bunglow Road Jawahar Nagar Delhi.

(From session 2020-2021)

M.P.Ed – 302: SPORTS MEDICINE

Time: Three 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.

UNIT- I: Introduction to Sports Medicine

i   Meaning, Definition and Importance of Sports Medicine in field of Sports.

ii   Principle, purposes and concept of Sports Medicine.

iii   Different aspects of Sports Medicine.

iv   Career opportunities in Sports Medicine.

v   Role of Athletic Trainer in Sports Medicine.

UNIT- II: Sports Injuries.

i   Sports Injuries: Meaning and their different classifications.

ii   Sprain & Strain: Meaning, Pathological Symptoms and their treatment.

iii   Dislocation & Fracture:, Meaning, Pathological Symptoms and their treatment.

iv   Strapping and Aiding Equipments for Sprain, Strain, Dislocation and Fracture.

UNIT- III: Physiotherapeutic Modalities.

 i   PRICE treatment: Its advantages and Physiological Effects.

ii   TENS treatment: Its advantages and Physiological Effects.

iii   Hydrotherapy: Its advantages and Physiological Effects.

iv   Cryotherapy: Indications, Contra Indications and Precautions, its benefits and Physiological Effects.

v   Manual Therapy: Its benefits, Techniques and Physiological Effects.

UNIT- IV: Exercise Therapy

i   Meaning, definition and importance of exercise therapy

ii.   Strengthening Exercises and their benefits in rehabilitation from injuries.

iii   Flexibility Exercises and their benefits in rehabilitation.

iv   Aquatic Therapy and its benefits in rehabilitation.

v   Balance Exercises and their benefits in rehabilitation.

REFERENCE:

1. Christopher M. Norris. (1993). Sports Injures Diagnosis and Management for Physiotherapists. East Kilbride: Thomson Litho Ltd.

2. James, A. Gould & George J. Davies. (1985). Physical Therapy. Toronto: C.V. Mosby Company.

3. Morris B. Million (1984) Sports Injuries and Athletic Problem. New Delhi: Surjeet Publication.

4. Pande. (1988). Sports Medicine. New Delhi: Khel Shitya Kendra.

5. The Encyclopedia of Sports Medicine. (1998). The Olympic Books of Sports Medicine, Australia: Tittel Blackwell Scientific Publications.

6. Mellion (1995) Office of Sports Medicine II Edition Publisher Hanley & Belfus Inc. Philadelphia.

7. Steven J Karageanes: (2005) Principles of Manual Sports Medicine Lippincott Williums and Wilkins A Wolter Kluwer Company.

(From session 2020-2021)

M.P.Ed – 303: TEST, MEASUREMENT AND EVALUATION IN PHYSICAL EDUCATION

Time: Three 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.

Unit -1: Introduction of Test, Measurement and Evaluation

Meaning and definition of Test, Evaluation and Measurement. Need and Importance of measurement and evaluation in Physical Education and Sports. Criteria for test selection: a) Technical Standards – i) Validity ii) Reliability iii) Objectivity and iv) Norms, b) Practical Standards for administration of Test – i) Advance Preparations ii) Duties During Testing iii) Duties after testing.

Unit – 2: Motor Ability and Fitness Tests

Meaning of Motor Ability, Test of Motor Ability – a) Barrow Motor Ability test b) Scott Motor Ability Test. Test of Fitness and Endurance – a) AAHPER Youth Fitness Test b) Harvard Step Test c) Copper 12 Min run test. Muscular Fitness – Kraus Weber Minimum Muscular Fitness Test. LUS Agility Obstacle test, Nelson - Hand Reaction test , Foot Reaction test and Speed of the movement test

Unit – 3: Skill test

Test of specific sports skill - Badminton - French Short Serve, Scott Long Serve and French Clear Test. Basket Ball – Johnson Basketball Test, AAHPER Basketball Test, Hockey – Schmithals-French Test in Field Hockey& Harbans Hockey Test. Mor-Christian General Soccer Ability Skill Test Battery.

Unit – 4 : Anthropometric and Sports skill test

Method of Measuring Skin folds of different regions, Measurement of Body fat percentage with skinfold measurement in men and women with skin fold measurement. Meredith Physical Growth Records and Iowa Posture Test. Broer – Miller Forehand and Backhand Drive test for Tennis skills. Modified Brady Volleyball Test. Cricket- Sutcliff cricket test.

REFERENCES:

Authors Guide (2013) ACSM's Health Related Physical Fitness Assessment Manual, USA: ACSM Publications

Collins, R.D., & Hodges P.B. (2001) A Comprehensive Guide to Sports Skills Tests and Measurement (2nd edition) Lanham: Scarecrow Press

Cureton T.K. (1947) Physical Fitness Appraisal and Guidance, St. Louis: The C. Mosby Company

Getchell B (1979) Physical Fitness A Way of Life, 2nd Edition New York, John Wiley and Sons, Inc

Jenson, Clayne R and Cynt ha, C. Hirst (1980) Measurement in Physical Education and Athletics, New York, Macmillan Publising Co. Inc

Kansal D.K. (1996), "Test and Measurement in Sports and Physical Education, New Delhi: DVS Publications

Krishnamurthy (2007) Evaluation in Physical Education and Sports, New Delhi; Ajay Verma Publication

Vivian H. Heyward (2005) Advance Fitness Assessment and Exercise Prescription, 3rd Edition, Dallas TX: The Cooper Institute for Aerobics Research

Wilmore JH and Costill DL. (2005) Physiology of Sport and Exercise: 3rd Edition. Champaigm IL: Human Kinetics

Yobu, A (2010), Test, Measurement and Evaluation in Physical Education in Physical Education and Sports. New Delhi; Friends Publications

(From session 2020-2021)

M.P.Ed-304 : ATHLETIC CARE AND REHABILITATION

Time: Three 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.

UNIT I – Mechanics of Tissue Injury and Healing

Force and its effects in injury, torque and its effect in injury, Tissue response to injury in synovial membrane, synovial fluid, soft tissue and bone. Healing of soft tissue, bone tissue healing, nerve healing, Neurological basis of pain, referred pain and radiating pain, pain pathway and pain relief mechanism.

UNIT II – Identification of injury and treatment plan

Inspection of injury site: palpation- component of palpation, Special test for identifying nature of injury.

Short term goals and long term goals in the treatment of musculoskeletal problems, Development of treatment plan: Phase one, Phase two, Phase three and Phase four.

UNIT III – Therapeutic Modalities

Proprioceptive Neuromuscular Facilitation (PNF): Meaning, benefits, pattern and technique.

Pathology of Rehabilitation in injuries with Short wave Diathermy, Micro wave Diathermy, Ultra Sound Therapy, Electric Wave Stimulation, Infra Red Rays and Ultra Violet Rays

UNIT IV – Specific Sports Injuries

Symptoms and treatment of Muscle Soreness, Tennis/Golfer Elbow, Shin Splint, Rotaters Cuff injury, Spondylolysis, Hoffar's syndrome, Charley House, ITFB Syndromes, Jumper's Knee, Tennis Leg, Achilles tendonitis, Abdominal wall Contusion and Abdominal muscle strain.

REFERENCES:

Christopher M. Norris. (1993). Sports Injures Diagnosis and Management for Physiotherapists. East Kilbride: Thomson Litho Ltd.
James, A. Gould & George J. Davies. (1985). Physical Physical Therapy. Toronto: C.V. Mosby Company.
Morris B. Million (1984) Sports Injuries and Athletic Problem. New Delhi: Surjeet Publication.
Pande. (1998). Sports Medicine. New delhi: Khel Shitya Kendra
The Encyclopedia of Sports Medicine. (1998). The Olympic Book of Sports Medicine, Australia: Tittel Blackwell Scientific publications.
Practical: Anthropometric Measurements.

M.P.Ed. 3rd Semester
(From session 2020-2021)

M.P.Ed – 305: Value and Environmental Education

Time: Three 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.*

UNIT I – Introduction to Value Education
Values: Meaning, Definition and Concepts of Values.
Value Education: Importance and Objectives of Value Education.
Moral Values: Need and Theories of Values.
Classification of Values: Basic Values of Religion and Classification of Values.
Factors effecting Values

UNIT II – Ethics System
Meaning and Definition of Ethics in Sports, Need of ethics in Sports,
Types of ethics, Mainstream Ethical Theories in Sports.
Ethics for a coach, a physical education teacher and a player.
WADA Ethical Panel: Guiding Values in Sport and Anti-Doping

Unit- III – Environmental Education
Definition, Scope and Need of environmental studies, Historical background of environmental education. Air Pollution: Parameters of outdoor and indoor air pollution, smog pollution, greenhouse effects, global warming, ozone depletion, Renewable and renewable mineral resources, Bio – degradable and non bio – degradable products.

Unit - V Natural Resources and related environmental issues
Water Pollution: Parameters of water quality, Prevention and controlling groundwater and surface water pollution, water harvesting techniques
Soil contamination by salinisation and pesticides, Desertification by human impact, Preventing and controlling soil pollution
Hazardous waste: types and production, dealing with hazardous waste

REFERENCE:
Miller T.G. Jr., Environmental Science (Wadsworth Publishing Co.) Odum, E.P. Fundamentals of Ecology (U.S.A.: W.B. Saunders Co.) 1971.
Rao, M.N. & Datta, A.K. Waste Water Treatment (Oxford & IBH Publication Co. Pvt. Ltd.) 1987
Townsend C. and others, Essentials of Ecology (Black well Science)
Heywood, V.H. and Watson V.M., Global biodiversity Assessment (U.K.: Cambridge University Press), 1995.
Jadhav, H. and Bhosale, V.M. Environmental Protection and Laws (Delhi: Himalaya Pub. House), 1995.
Mc Kinney, M.L. and Schoel, R.M. Environmental Science System and Solution (Web enhanced Ed.) 1996.
Miller T.G. Jr., Environmental Science (Wadsworth Publishing Co.)

(From session 2020-2021)
Practicals

M.P.Ed – 306: Game – I (Hockey & Basketball)   **Marks - 100**

 i) Hockey   **Marks – 50**
1. Marking of Hockey Court   (Marks – 10)
2. Teaching ability of various basic skills of Hockey   (Marks – 10)
3. Interpretation of Various rules of Hockey   (Marks – 10)
4. Filling the score sheet of Hockey   (Marks – 10)
5. Officiating Symbols   (Marks – 10)

 ii) Basketball   **Marks – 50**
1. Marking of Basketball Court   (Marks – 10)
2. Teaching ability of various basic skills of Basketball   (Marks – 10)
3. Interpretation of Various rules of Basketball   (Marks – 10)
4. Filling the score sheet of Basketball   (Marks – 10)
5. Officiating Symbols of Basketball   (Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.
M.P.Ed – 307: Game – II (Kabaddi & Kho - Kho)   **Marks - 100**

 i) Kabaddi   **Marks – 50**
1. Marking of Kabaddi Court   (Marks – 10)
2. Teaching ability of various basic skills of Kabaddi   (Marks – 10)
3. Interpretation of Various rules of Kabaddi   (Marks – 10)
4. Filling the score sheet of Kabaddi   (Marks – 10)
5. Officiating Symbols   (Marks – 10)

 ii) Kho – Kho   **Marks – 50**
1. Marking of Kho -Kho Court   (Marks – 10)
2. Teaching ability of various basic skills of Kho -Kho   (Marks – 10)
3. Interpretation of Various rules of Kho -Kho   (Marks – 10)
4. Filling the score sheet of Kho -Kho   (Marks – 10)
5. Officiating Symbols of Kho -Kho   (Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.
M.P.Ed – 308: Sports Psychology   **Marks – 50**

Note: **Candidate has to evaluate any of the following three questionnaires**   **Marks - 30**
1. Co-operation and competition test Research Series of –APRC, Agra, 1997
2. Sport Aggression Inventory – Prof. Anand Kumar Srivastava.
3. Self concept questionnaire- Dr. Raj Kumar Saraswat.
4. ASAAP (A Socio- Metric measure- Dr. S.L. Chopra, Lucknow.
5. Leader Behaviour Scale – Dr. Asha Hingar, Jaipur.
 Viva – Voce related to these questionnaires   **Marks – 20**

M.P.Ed – 309: Tests, Measurement and Evaluation in Physical Education   Marks – 50

1. Measuring of Body Fat with Skinfold Caliper   = 10 Marks
2. Method of measuring Circumference: Arm, Waist, Hip and Thigh = 10 Marks
3. Calculating Physical Fitness Index with Harvard Step test   = 10 Marks
4. Analysis of poster with Iowa posture test   = 10 Marks
5. Method of Measuring the Standing Height and Sitting Height.   = 10 Marks

M.P.ED - 4th Semester

(From session 2020-2021)

M.P.Ed – 401: Sports Journalism and Mass Media

Time: Three 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.

UNIT- I: Sports Journalism

1. Meaning, Definition and Elements of Journalism
2. Ethical Standards of Professional in Journalism
3. Sports as a Pondra of Jobs and Courses:- Sports Schemes and Incentives
4. Sports Journalists and Sports Writers Commentators, Broadcaster.
5. Sports News Agencies & Sports Broadcasting Channels.

UNIT- II: Mass Media and Functions of Mass Media in Sports

1. Mass Media in Journalism and Types of Mass Media (Print media, Electronic media and Folk media)
2. Sports coverage in different types of media
3. Advantage to a sports person from sports coverage
4. Role of media in making and breaking images in sport.
5. Impact of Commercialization and Privatization change in sport media.

UNIT- III: Sports Sociology

1. Meaning, Definition and Importance of Sports Sociology in Sports
2. Meaning, Definition, Structure and Relationship of Sports with Culture.
3. Meaning, Types and Processes of social interaction through sports.
4. Relationship of Sports with Social Institution.
5. Role of Physical Education in context of social problems.

UNIT- IV: Group Cohesion in Sports

1. Nature and Group Dynamics in Sports
2. Group Cohesion in Sports
3. Group Interactions and Morale in Sports
4. Meaning and Types of Sports Society
5. Meaning of Counselling & its Need in sports, fundamental of counseling Skills in sports

REFERENCE:

Ahiya B.N. (1988) Theory and Practice of Journalism: Set to Indian context Ed3.
            Delhi: Surjeet Publications

Ahiya B.N. Chobra S.S.A. (1990) Concise Course in Reporting. New Delhi: Surjeet
            Publication

Bhatt S.C. (9193) Broadcast Journalism Basic Principles. New Delhi. Haranand Publication Dhananjay Joshi
(2010) Value Education in Global Perspective. New
            Delhi: Lotus Press.

Kannan K (200() Soft Skills, Madurai: Madurai: Yadava College Publication

Mohit Chakrabarti (2008): Value Education: Changing Prespective, New Delhi:
            Kanishka Publication.

Padmanabhan. A & Perumal A (2009), Science and Art of Living, Madurai:
            Pakavathi Publication

Shiv Khera (2002), You Can Win, New Delhi: Macmillan India Limited.

Varma A.K. (1993) Journalism in India from Earliest Times to the Present Period.
            Sterling publication Pvt. Ltd.

Bhusan, V.and Sachdeva, An introduction to Sociology, Delhi: Kitab, 2003.

Jain, Rachna, Sport Sociology, New Delhi: KSK, 2005

Kanwaljeet, S., Sport Sociology, ND: Friends Pub. 2000.

Yadvinder Singh, Sociology in Sport, Sports Publication, 7/26 Ansari road, Darya
            Ganj New Delhi- 110 002.

Sharma, R.N. Urban Sociology, ND: Surjeet Pub., 1993.

Singh, Bhupinder, Sports Sociology, New Delhi: Friends, 2004.

IGNOU, The Study of Society – Understanding Sociology, Delhi- IGNOU, 2007.

Turner, B., Cambridge Dictionary of Sociology, U.K., Cambridge, U.N. Press, 2006.

Prof. A Yobu, Sociology of Sports, Friends Publications (India) 1014787/23, Ansri
            road, Darya Ganj, New Delhi- 110 002.

Dr. Arun Kumar Singh – Advanced General Psychology, Moti Lal Banarasi Das
            Bunglow Road Jawahar Nagar Delhi.

M.P.ED - 4th Semester

(From session 2020-2021)

M.P.Ed – 402: EDUCATION TECHNOLOGY IN PHYSICAL EDUCATION

Time: Three 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.*

Unit I – Introduction to Educational technology and Communication

Educational technology: meaning, characteristics and Scope. Types of educational technology: teaching technology, instructional technology, and behavior technology.

Communication: meaning, main features and need. Process of communication, barriers in effective communication and principles of communication.

Unit II – Concept of teaching in Physical Education

Meaning of Teaching, Difference between Teaching and training, difference between teaching and instructions, teaching as science, Nature and characteristics of teaching.

Phases of teaching: Pre – active phase, Inter – active phase and Post active phase. General principles of teaching in physical education.

Unit III – Lesson Planning

Meaning of lesion Plan, Need of lesson plan, essentials of a good lesson plan. Different Types of lesson plans, Pre- requisites of a lesson plan.

Structure of a lesson plan: Herbart's approach - Outline of lesson plan. Recent trends of Research in Educational Technology and its future with reference to physical education.

Unit IV – Audio Visual Media in Physical Education

Meaning of Audio-visual media Aids, Classification of Audio-visual media Aids. Characteristics of Audio-visual media Aids.

Procedure and organization of Teleconferencing/Interactive video-experiences in schools and colleges. Audio Conferencing and Interactive Radio Conference, its strengths and Limitations. Video/Educational Television: Telecast and Video recordings, its Strengths and limitations.

REFERENCE:

Amita Bhardwaj, New Media of Educational Planning".Sarup of Sons, New Delhi-2003

Bhatia and Bhatia. The Principles and Methods of Teaching (New Delhi : Doaba House), 1959.

Education and Communication for development, O. P. Dahama, O. P. Bhatnagar, Oxford Page 68 of 71 IBH Publishing company, New Delhi

Essentials of Educational Technology, Madan Lal, Anmol Publications

K. Sampath, A. Pannirselvam and S. Santhanam. Introduction to Educational Technology (New Delhi: Sterling Publishers Pvt. Ltd.) : 1981.

Kochar, S.K. Methods and Techniques of Teaching (New Delhi, Jalandhar, Sterling Publishers Pvt. Ltd.), 1982

Kozman, Cassidy and kJackson. Methods in Physical Education (W.B. Saunders Company,Philadelphia and London), 1952.

M.P.ED - 4th Semester

(From session 2020-2021)

M.P.Ed – 403: Sports Bio-mechanics

Time: Three 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.

Unit- I

Meaning and Scope of Biomechanics in Physical Education
Basic concepts of kinematics and kinetics
Definition of terms: Distance, Displacement, Speed, Velocity, Acceleration, Mass and Weight.
Meaning of Motion and types of Motion

Unit- II

Newton's Laws of Motion and their application in sports.
Lever: (a) Classification of Levers and Lever Arms
　　　　(b) Concept of Mechanical advantage
　　　　(c) Human body levers.
Force: (a) Definition and Effects of Forces.
　　　　(b) Properties of Force
　　　　(c) Internal and External Forces
　　　　(d) Centripetal and Centrifugal Forces
　　　　(e) Friction: Meaning, Coefficient of friction, factors effecting friction

Unit – III

Meaning of Center of Gravity and Line of Center of Gravity
Meaning Equilibrium, types of equilibrium & principles of stability
Meaning of Projectile, Characteristics of Projectile, Range of Projectile, Height of Projectile and Time of Projectile
Buoyancy Force and Principle of Flotation

Unit – IV

Meaning of Spin, Types of Spin, Effect of Spin on angle of rebound and velocity
Magnus Effect
Meaning of Work, Power and Energy
Mechanical Analysis of Gait Cycle Walking and Running
Mechanical Analysis of Long Jump (Takeoff and landing)
Mechanical Analysis Shot Put (Power Position and Delivery Phase)

REFERENCES

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 Bases 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.

7. Grabiner. M.D. Current Issue is Biomechanics, New Delhi, 1993.

8. Mood, S.D., Beyond Biomechanics, New York: Taylor, 1996.9. Shaw, D. Mechanical Bases of Biomechanics, Delhi: Sport Pub. 2000

9. Shaw, D. Mechanical Bases of Biomechanics, London- A & C, 2003

M.P.ED - 4th Semester
(From session 2020-2021)
M.P.Ed – 404: Sports Technology

Time: Three 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.

Unit I – Sports Technology
Meaning and definition of sports technology.
Significance of technology in sports
General Principles of instrumentation in sports.
Meaning of Foams, Types of foams (Polyurethane, Polystyrene, Styrofoam, closed-cell, open- cell foams and Neoprene) and there uses in different sports.

Unit II – Nanotechnology in Sports Materials
Meaning and definition of Nanotechnology
Meaning of nano glue and nano moulding technology.
Uses and benefits of Nanotechnology in sports uniforms, and safety equipments
Uses and benefits of Nanotechnology in sports equipments and playing surfaces

Unit III – Surfaces of Playfields and Measuring Gadgets
Method of construction and installation for Synthetic and Cinder tracks.

Method of construction for Cricket pitches: Turf and Cemented.

Meaning and types of flooring materials for different sports: synthetic (polyurethane and poly grass) and wooden.

Modern Measuring Equipments used in Running, Throwing and Jumping Events.

Unit IV – Modern Stadiums and Training Machines
Cricket: Bowling Machine, Mechanism and Advantages,
Tennis: Serving Machine, Mechanism and Advantages,
Dimensions of Sports Infrastructure - Gymnasium, Pavilion, Swimming Pool, Indoor Stadium and Out-door Stadium.

Lighting Facilities: Method of erecting and luminous in indoor and outdoor stadiums. Methods of measuring luminous.

REFERENCE:
Charles J.A. Crane, F.A.A. and Furness, J.A.G. (1987) "Selection of Engineering Materials"
UK: Butterworth Heiremann.
Finn, R.A. and Trojan P.K. (1999) "Engineering Materials and their Applications" UK: Jaico
Publisher.
John Mongilo, (2001), "Nano Technology 101 "New York: Green wood publishing group. Walia,
J.S. Principles and Methods of Education (Paul Publishers, Jullandhar), 1999.
Kochar, S.K. Methods and Techniques of Teaching (New Delhi, Jullandhar, Sterling
Publishers Pvt. Ltd.), 1982
Kozman, Cassidy and Jackson. Methods in Physical Education (W.B. Saunders Company, Philadelphia
and London), 1952.

M.P.ED - 4th Semester

(From session 2020-2021)

M.P.Ed – 405: Option – (i) - Dissertation

Evaluation Marks =80 + Int. Assessment = 20 : Total Marks: 100

Note: Students must submit their Dissertation in the office of the Department before the Start of 4th semester theory exams.

M.P.ED - 4th Semester

(From session 2020-2021)

M.P.Ed – 405 Option – (ii): Sports Management

Time: Three Hours   **(Theory Marks: 80 + Internal Assessment: 20)**   **:**   **Total Marks: 100**

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.*

UNIT- I: Introduction to Sports Management
i   Meaning, Definition and need of Sports Management.
ii   Scope of Sports Management.
iii   Career Opportunities in Sports Management.
iv   Functional Elements of Sport Management.
v   Different Processes of Sport Management.

UNIT- II: Leadership & Communication in Sports Management.
i   Meaning of Leadership, Leader Skills and Features of Sports Leader.
ii   Various Approaches of Leadership in Sport Management.
iii   Meaning, Purpose & Importance of Communication.
iv   Principles of Effective Communications.
v   Major Problems in Communication and Information System.

UNIT- III: Planning and Public Relation in Sports Management.
i   Meaning, Definitions and Importance of Planning.
ii   Steps and Principles of Planning.
iii   Developing Planning Premises & Categories of Plans.
iv   Meaning and Importance of Public Relation in Sports Management.
v   Guidelines for Sound Public Relation and Essential of Public Relation Programme.

UNIT- IV: Human Recourse in Sport Management.
i   Staff Recruitment and Selection.
ii   Guidelines for Staff Recruitment and Selection.
iii   General Qualifications of Staff in Sport Management.
iv   Responsibilities of Staff Members
v   Supervisory Working Relationship with Staff.

REFERENCE:
1. Bonnie, L. (1991) The Management of Sports. St. Louis: Mosby Publishing Company
2. Bucher A. Charles, (1993) Management of Physical Education And Sports. St. Louis: Mosby Publishing Company
3. Chelladurai, P.(1999), Human Resources Management in Sports and Recreation. Human Kinetic.
4. Lisa Pike Masteralexis, Carol A. Barr.(2005) Principles and Practice of Sport Management (Second Edition) Jones and Barlett Publishers.
5. Harold Koontze, Cyril O' Donnel Management – A system and contingency Analysis of Managerial Function VI Edition.
6. Koontze & O Donnel – Essentials of Management. Mc graw Hill, Kogakusha Ltd.

M.P.ED – 4ᵗʰ Semester

(From session 2020-2021)

Practicals

M.P.Ed – 406: Game – I (Baseball, Softball & Lawn tennis)   Marks - 100

 i) Baseball &Softball   Marks – 50
1. Marking of baseball& Softball court   (Marks – 10)
2. Teaching ability of various basic skills of baseball& Softball   (Marks – 10)
3. Interpretation of Various rules of baseball& Softball   (Marks – 10)
4. Filling the score sheet of baseball& Softball   (Marks – 10)
5. Officiating Symbols   (Marks – 10)

 ii) Lawn Tennis/Table tennis   Marks – 50
1. Marking of Lawn Tennis Court/T.T. table   (Marks – 10)
2. Teaching ability of various basic skills of Lawn Tennis/T.T   (Marks – 10)
3. Interpretation of Various rules of Lawn Tennis/T.T   (Marks – 10)
4. Filling the score sheet of Lawn Tennis/T.T   (Marks – 10)
5. Officiating Symbols of Lawn Tennis/T.T   (Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

MPEd – 407: Game – II (Football & Badminton)   Marks - 100

 i) Football   Marks – 50
1. Marking of Football Court   (Marks – 10)
2. Teaching ability of various basic skills of Football   (Marks – 10)
3. Interpretation of Various rules of Football   (Marks – 10)
4. Filling the score sheet of Football   (Marks – 10)
5. Officiating Symbols   (Marks – 10)

 ii) Badminton   Marks – 50
1. Marking of Badminton Court   (Marks – 10)
2. Teaching ability of various basic skills of Badminton   (Marks – 10)
3. Interpretation of Various rules of Badminton   (Marks – 10)
4. Filling the score sheet of Badminton   (Marks – 10)
5. Officiating Symbols of Badminton   (Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

M.P.Ed – 408: III Classroom Teaching   Marks – 100

Note: Candidate have to take total 5 classroom teaching lessons on different topics related to physical education.

(i)   Candidate has to preparation five lessons delivered in the class during teaching practice
      in the notebook.

(ii) Assessment will be made by the external and internal examiners on the basis on performance,
confidence level, body language in teaching and use of audio visual aids related to subject matter.

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2019-2020 (in a phased manner)
Semester-1

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam(hours)
BTI-101	Introduction to Biotechnology	Core	4	4	10	65	75	Three
BTI-102	Biomolecules	Core	4	4	10	65	75	Three
BTI-103	Cell Biology	Core	4	4	10	65	75	Three
BTI-104	Genetics	Core	4	4	10	65	75	Three
BTI-105	Inorganic Chemistry	Core			4	33	37	Three
BTI-106	Physical Chemistry	Core	4	4	4	33	37	Three
BTI-107	Organic Chemistry	Core			3	33	36	Three
BTI-108	Lab. Course -1 based on Paper- BTI-101 &102	Core	4	4	10	40	50	Three
BTI-109	Lab. Course – II based on Paper- BTI-103 & 104	Core	4	4	10	40	50	Three
			Total credits - 28			Total Marks - 510		

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)

w.e.f. Academic Session 2019-2020
Semester-II

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-201	Microbiology	Core	4	4	10	65	75	Three
BTI-202	Biophysics	Core	4	4	10	65	75	Three
BTI-203	Animal Diversity	Core	4	4	10	65	75	Three
BTI-204	Plant Diversity	Core	4	4	10	65	75	Three
BTI-205	Inorganic Chemistry	Core			4	33	37	Three
BTI-206	Physical Chemistry	Core	4	4	4	33	37	Three
BTI-207	Organic Chemistry	Core			3	33	36	Three
BTI-208	Lab. Course -III based on Paper- BTI-201 &BTI-202	Core	4	4	10	40	50	Three
BTI-209	Lab. Course -IV based on Paper- BTI-203 & BTI-204	Core	4	4	10	40	50	Three
BTI-210	Lab. Course -V based on Paper- BTI-105, BTI-106, BTI-107, BTI-205, BTI-206 & BTI-207	Core	4	4	15	65	80	Six (Two sessions of three hours each)
		Total credits-32					Total Marks-590	

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M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)

w.e.f. **Academic Session 2020-2021** Semester-III

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-301	Biomathematics	Core	4	4	10	65	75	Three
BTI-302	Enzymology	Core	4	4	10	65	75	Three
BTI-303	Animal Physiology	Core	4	4	10	65	75	Three
BTI-304	Plant Physiology	Core	4	4	10	65	75	Three
BTI-305	Introduction to Computer	Core	4	4	10	65	75	Three
BTI-306	Lab. Course-VI based on Paper -BTI-301 &BTI-305	Core	4	4	10	40	50	Six (Two sessions of three hours each)
BTI-307	Lab. Course -VII based on Paper - BTI-302, BTI-303 & BTI-304	Core	6	6	15	60	75	Six (Two sessions of three hours each)
		Total credits-30				Total Marks-500		

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M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2020-2021
Semester-IV

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-401	Cytochemistry & Histochemistry	Core	4	4	10	65	75	Three
BTI-402	Metabolism	Core	4	4	10	65	75	Three
BTI-403	Anatomy	Core	4	4	10	65	75	Three
BTI-404	Microbial Genetics	Core	4	4	10	65	75	Three
BTI-405	English	Core	4	4	10	65	75	Three
BTI-406	Lab. Course – VIII based on Paper BTI-401 & BTI-403	Core	4	4	10	40	50	Six (Two sessions of three hours each)
BTI-407	Lab. Course IX based on Paper BTI -402 & BTI-404	Core	4	4	10	40	50	Six (Two sessions of three hours each)
			Total credits-28				Total Marks-475	

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2021-2022

Semester-V

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-501	Immunology-I	Core	4	4	10	65	75	Three
BTI-502	Molecular Biology-I	Core	4	4	10	65	75	Three
BTI-503	Development Biology	Core	4	4	10	65	75	Three
BTI-504	Neutraceuticals	Core	4	4	10	65	75	Three
BTI-505	Hindi/Sanskrit	Core	4	4	10	65	75	Three
BTI-506	Lab. Course -X based on Paper BTI-501 & BTI-502	Core	4	4	10	40	50	Six (Two sessions of three hours each)
BTI-507	Lab. Course -XI based on Paper- BTI-503 & BTI-504	Core	4	4	10	40	50	Six (Two sessions of three hours each)
		Total credits-28					Total Marks-475	

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2021-2022

Semester-VI

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-601	Medical Biotechnology	Core	4	4	10	65	75	Three
BTI-602	Recombinant DNA Technology	Core	4	4	10	65	75	Three
BTI-603	Animal cell Culture	Core	4	4	10	65	75	Three
BTI-604	Plant Cell Culture	Core	4	4	10	65	75	Three
BTI-605	Microbial Biotechnology	Core	4	4	10	65	75	Three
BTI-606	Lab. Course -XII based on Paper- BTI-601 & BTI-602	Core	4	4	10	40	50	Six (Two sessions of three hours each)
BTI-607	Lab. Course -XIII based on Paper - BTI-603, BTI-604 & BTI-605	Core	6	6	15	60	75	Six (Two sessions of three hours each)
		Total credits-30					Total Marks-500	

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2022-2023
Semester-VII

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-701	Biostatistics	Core	4	4	10	65	75	Three
BTI-702	Molecular Biology -II	Core	4	4	10	65	75	Three
BTI-703	Animal Biotechnology-I	Core	4	4	10	65	75	Three
BTI-704	Plant Biotechnology-I	Core	4	4	10	65	75	Three
BTI-705	Bio-entrepreneurship	Core	4	4	10	65	75	Three
BTI-706	Lab. Course -XIV based on Paper- BTI-701, BTI-702 & BTI-705	Core	6	12	15	60	75	Six (Two sessions of three hours each)
BTI-707	Lab. Course-XV based on Paper-BTI-703&BTI-704	Core	4	8	10	40	50	Six (Two sessions of three hours each)
		Total credits-30					Total Marks-500	

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M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2022-2023

Semester-VIII

Paper No.	Nomenclature		Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-801	Bioinformatics		Core	4	4	10	65	75	Three
BTI-802	Immunology-II		Core	4	4	10	65	75	Three
BTI-803	Animal Biotechnology -II	Any One	Elective	4	4	10	65	75	Three
BTI-804	Plant Biotechnology -II		Elective	4	4	10	65	75	Three
BTI-805	Environmental Biotechnology		Core	4	4	10	65	75	Three
BTI-	Seminar		Core	1	1	25		25	one
BTI-	Stem Cell Technology/MOOC Course on SWAYAM Portal		Open elective	2	2	10	40	50	Three
BTI-808	Lab. Course -XVI based on Paper-BTI-801 & BTI-802		Core	4	8	10	40	50	Six (Two sessions of three hours each)
BTI-809	Lab. Course -XVII based on Paper-BTI-803/BTI-804 &BTI-805		core	4	8	10	40	50	Six (Two sessions of three hours each)
			Total credits-27					Total Marks-475	

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2023-2024
Semester-IX

Paper No.	Nomenclature	Paper type	Credits	Contact hours per week	Internal marks	External Marks	Total marks	Duration of exam (hours)
BTI-901	Food Biotechnology	Core	4	4	10	65	75	Three
BTI-902	Nano–Biotechnology	Core	4	4	10	65	75	Three
BTI-903	Research Methodology	Core	2	2	10	40	50	Three
BTI-904	IPR, Bio safety & Bioethics	Core	2	2	10	40	50	Three
BTI-905	Fermentation Technology/ _(Any one)_	Elective	4	4	10	65	75	Three
BTI-906	Bioinstrumentation	Elective	4	4	10	65	75	Three
BTI-907	Seminar	Core	1	1	25		25	one
BTI-	DNA Bar coding/MOOC Course from SWAYAM Portal	Open elective	2	2	10	40	50	Three
BTI-909	Lab Course-XVIII based on Paper-BTI-901, BTI-902, &BTI-905/BTI-906	Core	6	12	15	60	75	Six (Two sessions of three hours each)
BTI-910	Lab Course-XIX based on Paper-BTI-903 & BTI-904	core	2	4	5	20	25	Three (One sessionof three hours)
		Total credits-27					Total Marks-500	

M. Sc. Biotechnology Five Years Integrated Course
Scheme of Examination (CBCS)
w.e.f. Academic Session 2023-2024

Semester-X

Paper No.	Nomenclature	Credits	Internal marks	External Marks	Total marks
BTI-1001	Dissertation	30	100	400	500
	Total Credits=30			Total Marks=500	

Syllabus for
M. Sc. Five Year Integrated Course (CBCS)
w.e.f. Academic Session 2019-2020 (in a phased manner)

Semester-I

Paper BTI-101
Introduction to Biotechnology

Max Marks: 65
Internal assessment: 10
Time: 3 hrs.

NOTE

1. Seven Questions will be set in all.

2. Q. No. 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.

3. As far as possible the question will be of short answer type.

4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I

Definition & scope of Biotechnology; introduction of genetic engineering; plant and animal tissue culture; fermentation technology; immobilized enzymes; monoclonal antibodies and hybridoma technology; embryo transfer technology; introduction to gene and genomes, Proteins and proteome, history of genetic manipulations; recombinant DNA technology, DNA fingerprinting and forensic analysis.

Unit II

Application of biotechnology in agriculture; animal and veterinary sciences, pharmaceutical industry, food industry and chemical industry. Bioremediation and waste treatment biotechnology. Biotechnology research in India. Biotechnology in context of developing world. Brief account of safety guidelines and risk assessment in biotechnology. Ethics in Biotechnology, Intellectual property rights.

REFERENCES

1. Elements of Biotechnology - PK Gupta

2. Gene Biotechnology - S.N. Jogdand

3. Biotechnology 5th Edition (Cambridge) - John E. Smith

4. Biotechnology for beginners - Reinhard Renneberg Academic Press

Paper BTI-102
Biomolecules

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I

Biomolecules: Introduction, important features, covalent and non-covalent interactions.

Carbohydrates: Introduction and Biological Significance.
Definition and classification: Monosaccharides; families of monosaccharides; simple aldoses and ketoses, Configuration and Conformation, Stereoisomerism/ Asymmetric centres, Fischer and Haworth projection formula, pyranose and furanose ring forms, reducing and non-reducing sugars, sugar derivatives viz. sugar alcohols, amino sugars, deoxy sugars, acidic sugars, Glycosidic bond Disaccharides and Oligosaccharides: Definition, structure and function of important di and oligosaccharides viz. lactose, sucrose, maltose, raffinose, stachyose, verbascose etc.
Polysaccharides: Homo and Hetero polysaccharides, storage polysaccharides: Starch and Glycogen. Structural polysaccharides: Cellulose and Chitin. A brief account of structure and function of mucopolysaccharides/Glycosaminoglycans (Hyaluronic acid, Chondroitin sulphate), Glycoproteins and Proteoglycans.

Amino acids and Peptides: Classification and structure of amino acids, essential amino acids, rare and non-protein amino acids, optical and chemical properties of amino acids; acid-base behaviour/zwitterions; pKa value and titration curve. Peptide bond – nature and characteristics. Definition; structure and function of some biologically important peptides.

Unit II

Proteins: Classification based on structure and function. Structural organization of proteins: Primary structure; Secondary structure-α-Helix, β- pleats and β - turn Tertiary structure – myoglobin and lysozyme etc. Quaternary structure-hemoglobin. Forces stabilizing different structural levels. Amino acid analysis/N-terminal amino acid analysis- Sanger's method, Edmann's degradation, dansyl chloride and dabsyl chloride

Lipids: Introduction and Classification – simple and complex lipids, Fatty acids - structure and nomenclature, soap value, acid value, iodine number, rancidity. Essential fatty acids. A general account of structure and function of triacylglycerols, phospholipids, glycolipids, sphingolipids, steroids, bile acids, bile salts and terpenes

Nucleotides and Nucleic acids:
Building blocks: bases, sugars and phosphates. Structure and nomenclature of nucleosides and nucleotides; polynucleotides, DNA (A, B, Z-DNA) and RNA (rRNA, mRNA, tRNA). Properties of DNA - absorption, denaturation, renaturation, hybridization, Tm/Cot values. Biologically important nucleotides and their functions - ATP, GTP, Coenzyme A, NAD, FAD and cAMP.

REFERENCES
1. Principles of Biochemistry - Albert L. Lehninger, CBS Publishers & Distributors
2. Biochemistry - Methews and Methews
3. Biochemistry - Voet and Voet
4. Biochemistry - Keshav Trehan Wiley Eastern Publications
5. Fundamentals of Biochemistry - J.L. Jain, S. Chand and Company

Paper BTI-103
Cell Biology

Max Marks: 65
Internal assessment: 10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit- I
Basics of Cell Biology - Discovery of cell and Cell Theory; Comparison between plant and animal cells;

Cell Structure - Protoplasm; cell wall; plasma membrane; modification of plasma membrane and intracellular junctions; cytoskeleton; mitochondria; chloroplast; ER; golgi complex; lysosome, endosome and microbodies; ribosome; centriole; nucleus; chromosomes, chemical components of a cell; catalysis and use of energy by cells.

Biogenesis of Cellular organelles - Biogenesis of mitochondria, chloroplast, ER, Golgi complex; Biosynthetic process in ER and golgi apparatus; Protein synthesis and folding in the cytoplasm; Degradation of cellular components.

Unit- II
Structure and function of prokaryotic cell & its components - The slime and the cell wall of bacteria containing peptidoglycan and related molecules; the outer membrane of gram-negative bacteria, the cytoplasmic membrane. Water and ion transport, mesosomes, flagella, pilus, fimbriae, ribosomes,carboxysomes, sulfur granules, glycogen, polyphosphate bodies, fat bodies, gas vesicles; endospores,exospores, cysts. Mycelia of fungi and actinomycetes, cytoskeleton filament, heterocysts and akinets of cyanobacteria, gliding and motility.

Membrane structure & transport - Models of membrane structure, Membrane lipids, proteins and carbohydrates; Solute transport by Simple diffusion, Facilitated diffusion and Active transport

Cell cycle - An overview of cell cycle; Components of cell cycle control system; Intracellular and Extra-cellular control of cell division, Programmed cell death (Apoptosis).

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REFERENCES

1. Molecular Biology of cell – Bruce Alberts et al, Garland publications
2. Molecular Cell Biology – Daniel , Sceintific American Books.
3. Cell Biology – Jack D.Bruke, The William Twilkins Company.
4. Cell Biology – Ambrose & Dorouthy M Easty, ELBS Publications.
5. Fundamentals of Cytology – Sharp, Mc Graw Hill Company
6. Cell Biology & Molecular Biology – EDP Roberties & EMF Roberties, Sauder College.

Paper BTI-104
Genetics

NOTE

1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit- I

Genetics - Definition, history and scope

Mendelism & Chromosome Theory – Mendel's principles, applications of Mendel's principles,Chromosome Theory of Heredity (Sutton-Boveri), Inheritance patterns, phenomenon of Dominance, Inheritance patterns in Human (Sex-linked, Autosomal, Mitochondrial, Unifactorial , Multi-factorial). Deviation from Mendel's Dihybrid phenotype, Linkage, Sutton's view on linkage, Morgan's view on linkage, Bateson & Punnet's Coupling & Repulsion hypothesis.

Linkage & Crossing over - Chromosome theory of Linkage, kinds of linkage, linkage groups, types of Crossing over, mechanism of Meiotic Crossing over, kinds of Crossing over, theories about the mechanism of Crossing over, cytological detection of Crossing over, significance of Crossing over.

Allelic Variation & Gene function – Multiple allele, Genetic interaction, Epiststic interactions, Non-Epistatic inter-allelic genetic interactions, Atavism/Reversion, Penetrance (complete & incomplete), Expressivity, Pleiotropism, Modifier/Modifying genes.

Non-Mendelian inheritance – Evidences for Cytoplasmic factors, cytoplasmic inheritance, extranuclear inheritance (mitochondrial, chloroplast)

Unit- II

Chromosomal variation in Number & Structure – Euploidy, Non-disjunction & Aneuploidy,Aneuploid segregation in plants, Polyploidy in Plants & Animals, Induced Polyploidy, applications of Polyploidy, Chromosomal Mosaics, Giant chromosome, Deletion, Duplication, Inversion, Translocation, Position Effect, Centromeric & Non-centromeric breaks in chromosomes, chromosomal rearrangements in Human being, Chromosomal aberrations & evolution. Gene Mutation

Chromosome Mapping - Haploid mapping (2 point & 3 point cross), Diploid mapping (Tetrad analysis), determination of linkage groups, determination of map distance, determination of gene order, cytological mapping.

Human Cyto-Genetics – Human karyotype, Banding techniques, classification, use of Human Cyto-genetics in Medical science, Chromosomal abnormalities in spontaneous abortions, viable monosomies & trisomies, chromosomal deletions & duplications, genetics of chromosomal inversions & translocations, human traits, Genomic position effects on Gene expression, In born diseases

Pedigree analysis – Symbols of Pedigree, Pedigrees of Sex-linked & Autosomal (dominant & recessive), Mitochondrial, Incomplete dominance & Penetrance.

REFERENCES
1. Principles of Gene Manipulations – Old & Primrose, Black Well Scientific Publications.
2. Principles of Genetics – E.J.Gardener, M.J.Simmons and D.P.Snustad, John Wiley & Sons Publications
3. Elements of Genetics – PK Gupta, Rastogi Publications
4. Molecular Biology and Genetic Engineering – PK Gupta
5. Cytogentics, Evolution and Plant Breeding – PK Gupta

Paper BTI-105
Inorganic Chemistry

Max Marks: 33
Internal assessment: 4
Time: 3 hrs.

Note: Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting at least two questions from each section. As far as possible questions will be short answer type and not essay type

Unit- I (23 Periods)

Atomic Structure: Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, , quantum numbers, radial and angular wave functions and probability distribution curves, shapes of s, p, d orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule. Electronic configurations of the elements, effective nuclear charge, Slater's rules.

Periodic Properties: Atomic and ionic radii, ionization energy, electron affinity and electronegativity – definition, methods of determination or evaluation, trends in periodic table (in s & p block elements).

Unit- II (22 Periods)

Covalent Bond: Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions (BeF_2, BF_3, CH_4, PF_5, SF_6, IF_7 SO_4^{2-}, ClO_4^-)Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, CIF_3, ICI_2^- and H_2O. MO theory of heteronuclear (CO and NO) diatomic molecules, bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference.

Ionic Solids: Ionic structures (NaCl, CsCl, ZnS (Zinc Blende), CaF_2) radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy (methamtical derivation excluded) and Born-Haber cycle, solvation energy and its relation with solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule.

Paper BTI-106
Physical chemistry

Max Marks: 33
Internal assessment: 4
Time: 3 hrs.

Note: Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting atleast two questions from each section. As far as possible questions will be short answer type and not essay type.

Unit- I (22 Periods)

Gaseous States: Maxwell's distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity and most probable velocity. Collision diameter, collision number, collision frequency and mean free path. Deviation of Real gases from ideal behaviour. Derivation of Vander Waal's Equation of State, its application in the calculation of Boyle's temperature (compression factor) Explanation of behaviour of real gases using Vander Waal's equation.

Critical Phenomenon: Critical temperature, Critical pressure, critical volume and their determination. PV isotherms of real gases, continuity of states, the isotherms of Vander Waal's equation, relationship between critical constants and Vander Waal"s constants. Critical compressibility factor. The Law of corresponding states. Lequifaction of gases.

Unit- II (23 Periods)

Liquid States: Structure of liquids. Properties of liquids – surface tension, viscosity vapour pressure and optical rotations and their determination.

Solid State: Classification of solids, Laws of crystallography – (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements of crystals. Definition of unit cell & space lattice. Bravais lattices, crystal system. X-ray diffraction by crystals. Derivation of Bragg equation. Determination of crystal structure of NaCl, KCl.

Liquid crystals: Difference between solids, liquids and liquid crystals, types of liquid crystals. Applications of liquid crystals.

Paper BTI-107
Organic Chemistry

Max Marks: 33
Internal assessment: 3
Time: 3 hrs.

Note: Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting atleast two questions from each section. As far as possible questions will be short answer type and not essay type

Unit- I (23 Periods)

Structure and Bonding: Localized and delocalized chemical bond, van der Waals interactions, resonance: conditions, resonance effect and its applications, hyperconjugation, inductive effect, Electromeric effect & their comparison.

Stereochemistry of organic compounds: Concept of isomerism. Types of isomerism. Optical isomerism - elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, R & S systems of nomenclature. Geometric isomerism - determination of configuration of geometric isomers. E & Z system of nomenclature. Conformational isomerism - conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds,. Newman projection and Sawhorse formulae, Difference between configuration and conformation.

Unit- II (22 Periods)

Mechanism of Organic Reactions: Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking. Types of reagents – electrophiles and nucleophiles. Types of organic reactions. Energy considerations. Reactive intermediates - carbocations, carbanions, free radicals, carbenes, (formation, structure & stability).

Alkanes and Cycloalkanes: IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties. Mechanism of free radical halogenation of alkanes: reactivity and selectivity. Cycloalkanes - nomenclature, synthesis of cycloalkanes and their derivatives –photochemical (2+2) cycloaddition reactions, , dehalogenation of α,ω-dihalides, pyrolysis of calcium or barium salts of dicarboxylic acids, Baeyer's strain theory and its limitations., theory of strainless rings.

Paper BTI-108
(Lab. Course -1 based on Paper- BTI-101 &102)

<div align="right">

Max Marks: 40
Internal assessment: 10
Time: 3 hrs.

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1. Qualitative tests for Carbohydrates

2. Qualitative tests for Proteins and Amino acids

3. Qualitative tests for Lipids

4. Separation of Lipids by TLC method

5. Separation of sugars/amino acids by Paper Chromatography

6. Determination of saponification value of Lipids.

7. Determination of acid value of Lipids

8. Verification of Beer's Lambert law.

9. Protein estimation by Lowry's method.

10. Estimation of Lactose in given sample.

11. Isolation of DNA from Onion peel.

12. Estimation of DNA by diphenylamine method.

Paper BTI-109
Lab. Course - II based on Paper- BTI-103 & 104

Max Marks: 40

Internal assessment: 10

Time: 3 hrs.

1. Cell division: Permanent slides of animal and plant cells and cell division;

2. Mitotic and meiotic studies in grasshopper testes, onion root tips and flower buds

3. Chromosomes: Mounting of polytene chromosomes

4. Effect of different osmotic concentration solutions on animal and plant cells

5. Buccal smear – Barr bodies

6. Karyotype analysis – Man and Onion

7. Man – Normal and Abnormal – Down and Turner's syndromes (with the help of slides)

8. Simple genetic problems (Problems and Interaction of genes)

9. Chromosome mapping using three point test cross; tetrad analysis,

10. Induction and detection of mutations through genetic tests;

11. Demonstration of genetic principles using laboratory organisms;

12. Pedigree analysis in humans,

Semester II

Paper BTI-201
Microbiology

Max Marks: 65
Internal assessment: 10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I

Introduction and Scope of Microbiology: Definition and history of microbiology, contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, Importance and scope of Microbiology as a modern Science Branches of microbiology.

Microscope: Construction and working principles of different types of microscopes – compound, dark field, Phase contrast, Fluorescence and Electron (Scanning and transmission)

Microbial techniques Sterilization: Principles and Applications of a. Physical Methods. Autoclave, Hot air oven, Laminar airflow, Seitz filter, Sintered glass filter, and membrane filter.

Chemical Methods: Alcohol, Aldehydes, Phenols, Halogens and Gaseous agents.
Radiation Methods: UV rays and Gamma stains. Stains and staining techniques: Principles of staining, types of stains – simple stains, structural stains and Differential stains.

Unit II

Microbial Taxonomy: Concept of microbial species and strains, classification of bacteria based on – morphology (shape and flagella), staining reaction, nutrition and extreme environment.

General Account of Viruses and Bacteria

A. Bacteria – Ultrastructure of bacteria cell (both Gram positive and Gram negative) including endospore and capsule
B. Viruses – Structure and classification
    Plant viruses – CaMV
    Animal viruses – Hepatitis B
    Bacterial Virus – Lamba Phage

Pathogenic Microorganisms

A. Bacterial diseases of man – tetnus, Tuberculosis, Pneumonia and Cholera
B. Viral diseases: AIDS (HIV)

Microbial Growth and Metabolism: Kinetics of microbial growth, growth curve, synchronous growth, factors affecting bacterial growth Respiration: EMP, HMP and ED Pathways, Kreb's cycle, Oxidative Phosphorylation. Bacterial Photosynthesis: Photosynthetic apparatus in prokaryotes, Photophosphorylation & Dark reaction.

REFERENCES

1. **Microbiology – PD Sharma**

Paper BTI-202
Biophysics

Max Marks: 65
Internal assessment: 10
Time: 3 hrs.

NOTE

Seven Questions will be set in all.

1. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
2. As far as possible the question will be of short answer type.
3. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit- I

Measurement of pH: Principles of glass and reference electrodes.

Hydrodynamic Methods: Sedimentation: sedimentation velocity including factors affecting it, preparative and analytical centrifugation techniques, ultracentrifugation, determination of molecular weight by hydrodynamic methods (derivations excluded and numericals included).

Chromatographic techniques- General principles and applications of adsorption, ion-exchange, molecular-sieve, thin layer, hydrophobic, affinity & paper chromatography.

Unit- II

Electrophoresis- Basic principles of electrophoresis; Native & SDS-PAGE; Agarose gel electrophoresis and Isoelectric focussing.

Radioisotopic Techniques: Types of radiations, radioactive decay, units of radioactivity, detection and measurement of radioactivity (methods based on gas ionization and liquid scintillation counting) and Quenching. Autoradiography: overview, nuclear emulsions used in biological studies, isotopes commonly used in biochemical studies (^{32}P, ^{35}S, ^{14}C and ^{3}H), track length of emitted particles and physical arrangements between emitting source and emulsion. Biological hazards of radiations and safety measures in handling radioisotopes. Biological applications of radioisotopes.

Spectroscopic Techniques: Beer-Lambert law, light absorption and its transmittance, extinction coefficient, a brief account of instrumentation and applications of visible and UV spectroscopic techniques (structure elucidation excluded).

REFERENCES

1. Physical Biochemistry, 2nd edition, by D Friefelder (1983). W.H. Freeman & Co., U.S.A.

2. Biophysical Chemistry: Principles and Techniques, 2nd edition, by A. Upadhyay, K. Upadhyay and N.Nath. (1998). Himalaya Publishing House, Delhi.
3. Principles & Techniques of Practical Biochemistry, 5th edition, by Keith Wilson and John Walker (2000). Cambridge University Press.
4. Introductory Practical Biochemistry by S.K. Sawhney and Randhir Singh (2000). Narosa Publishing House, New Delhi.

Paper BTI-203
Animal Diversity

Max Marks: 65
Internal assessment: 10
Time: 3 hrs.

.NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit- I

General classification of animal kingdom.

Non-chordates:

Study of phylum Protozoa, Porifera, Ceolenterata

Platyhelmenthes, Nemathelmenthes, Arthropoda, Mollusca &

Echinodermata – General characters, biodiversity with economic importance

Unit- II

Chordates:

Study of Urochordates , Cephalochordates and Vertebrates-General

characters ,biodiversity with economic importance

Paper BTI-204
Plant Diversity

Max Marks: 65
Internal assessment: 10
Time: 3 hrs.

NOTE

1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. Each question will carry 13 marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit- I

General Classification of Plant Kingdom: Aims, objectives and functions of taxonomy. Binomial nomenclature and its significance; Principles of ICBN, Study of outline of Bentham and Hooker's system of classification

Algae – General characters and economic importance
Fungi – General characters and economic importance
General account of Lichens and its importance
Bryophytes – General characters and economic importance

Unit- II

Pteridophytes – General characters and economic importance
Gymnosperms – General characters and economic importance
Angiosperms – General characters and economic importance

10(1042)

Paper BTI-205
Inorganic Chemistry

Max Marks: 33
Internal assessment: 4
Time: 3 hrs.

Note: Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting at least two questions from each section. As far as possible questions will be short answer type and not essay type

Unit- I (23 Periods)

Hydrogen Bonding & Van der Waals Forces

Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application

Brief discussion of various types of Vander Waals Forces

Metallic Bond and Semiconductors

Metallic Bond- Brief introduction to metallic bond, band theory of metallic bond

Semiconductors- Introduction, types and applications.

s-Block Elements

Comparative study of the elements including , diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems.

Chemistry of Noble Gases

Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon.

Unit- II (22 Periods)

p-Block Elements

 Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).

Boron family (13th gp):-

Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure Trihalides of Boron – Trends in fewis acid character structure of aluminium (III) chloride.

Carbon Family (14th group)

Catenation, pπ– dπ bonding (an idea), carbides, fluorocarbons, silicates (structural aspects), silicons – general methods of preparations, properties and uses.

10(1043)

Nitrogen Family (15th group)

Oxides – structures of oxides of N,P. oxyacids – structure and relative acid strengths of oxyacids of Nitrogen and phosphorus. Structure of white, yellow and red phosphorus.

Oxygen Family (16th group)

Oxyacids of sulphur – structures and acidic strength H_2O_2 – structure, properties and uses.

Halogen Family (17th group)

 Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine – structure and comparison of acid strength.

Paper BTI-206
Physical Chemistry

Max Marks: 33
Internal assessment: 4
Time: 3 hrs.

Note: Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting atleast two questions from each section. As far as possible questions will be short answer type and not essay type.

Unit- I (22 Periods)

Kinetics: Rate of reaction, rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half life period of a reaction. Methods of determination of order of reaction, effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions.

Unit- II (23 Periods)

Electrochemistry: Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance, equivalent conductance and relation among them, their vartion with concentration. Arrhenius theory of ionization, Ostwald's Dilution Law. Debye- Huckel – Onsager's equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included), Kohlarausch's Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch's Law in calculation of conductance of weak electrolytes at infinite diloution. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pK_a, Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action.

Paper BTI-207
Organic Chemistry

Max Marks: 33
Internal assessment: 3
Time: 3 hrs.

Note: Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting atleast two questions from each section. As far as possible questions will be short answer type and not essay type

Unit- I (23 Periods)

Alkenes

Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.

Chemical reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration–oxidation, oxymercuration-reduction, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$

Arenes and Aromaticity

Nomenclature of benzene derivatives:. Aromatic nucleus and side chain.

Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non - aromatic compounds.

Aromatic electrophilic substitution - general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams. Activating , deactivating substituents and orientation.

Unit- II (22 Periods)

Dienes and Alkynes

Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene. Chemical reactions - 1,2 and 1,4 additions (Electrophilic & free radical mechanism), Diels-Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation of alkynes,

Alkyl and Aryl Halides

Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams.

Methods of formation and reactions of aryl halides, The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions.

Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

Paper BTI-208
Lab. Course -III based on Paper- BTI-201 &BTI-202

Max Marks: 40
Internal assessment: 10
Time: 3 hrs.

1. To study the safety measure in microbiology laboratory

2. To study various staining techniques

3. Isolation of bacterial culture from Soil, Water and Air Samples

4. Techniques of spreading and streaking.

5. Different microscopic techniques

6. Identifications of different characteristics of bacteria

7. Preparation of buffers using buffer tables

8. Isolation of cellular components by differential centrifugation

9. Verification of Beer's Lambert law

10. Preparation of standard curve and determination of protein concentration by Lowry's method

11. Separation of amino acids by paper chromatography.

12. Agarose Gel electrophoresis

Paper BTI-209
Lab. Course -IV based on Paper- BTI-203 & BTI-204

Max Marks: 40
Internal assessment: 10
Time: 3 hrs.
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- Study of museum specimens and field visits to study animal biodiversity
- Study of museum specimens and field visits to study plant biodiversity

Paper BTI-210
Lab. Course -V based on Paper- BTI-105, BTI-106, BTI-107, BTI-205, BTI-206 & BTl-207

Max Marks: 65
Internal assessment: 15
Time: 6 hrs.

Unit- I (Inorganic)

Volumetric Analysis
1. **Redox titrations**: Determination of Fe^{2+}, $C_2O_4^{2-}$ (using $KMnO_4$, $K_2Cr_2O_7$)
2. **Iodometic titrations:** Determination of Cu^{2+} (using standard hypo solution).
3. **Complexometric titrations:** Determination of Mg^{2+}, Zn^{2+} by EDTA.

Paper Chromatography
Qualitative Analysis of the any one of the following Inorganic cations and anions by paper chromatography (Pb^{2+}, Cu^{2+}, Ca^{2+}, Ni^{2+}, Cl^-, Br^-, I^- and PO_4^{3-} and NO_3^-).

Unit- II (Physical)

1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetatecatalyzed by hydrogen ions at room temperature.
2. To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi – and trivalent anions.
3. To determine the surface tension of a given liquid by drop number method.
4. To determine the viscosity of a given liquid**.**
5. To determine the specific refractivity of a given liquid

Unit- III (Organic)
1. Preparation and purification through crystallization or distillation and ascertaining their purity through melting point or boiling point
   (i)   Iodoform from ethanol (or acetone)
   (ii)   m-Dinitrobenzne from nitrobenzene (use 1:2 conc. HNO_3-H_2SO_4 mixture if fuming HNO_3 is not available)
   iii)   p-Bromoacetanilide from acetanilide
   iv)   Dibenzalacetone from acetone and benzaldehyde
   v)   Aspirin from salicylic acid
2. To study the process of) sublimation of camphor and phthalic acid,

Semester –III

Paper BTI-301
Biomathematics

Max. Marks: 65
Internal assessment: 10
Time: 3 hrs

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit I
Complex Numbers: Introduction, Operations on complex numbers, Complex conjugate, Modules and argument of complex number and simple examples on it.,.4 DE MOIVRE'S Theorem., Simple examples on above theorem ,th n roots of a complex number and simple examples on it.

Matrices: Definition and types of Matrices, Algebra of Matrices (addition, subtraction, scalar multiplication and multiplication of matrices), Examples on operation of Matrices, Inverse of a matrix by a ad joint method, Rank of a Matrix (Definition) and examples, System of Linear equation, Non homogenean, Homogenean with examples, Eigen values and eigen vectors with simple examples

Unit II
Differential equation: Definition of ordinary differential equation and degree, order of differential equation Exact differential equation with simple examples, Linear differential equation $dy/dx+py =Q$ method of solution with simple examples. Bernoulli's differential equation with examples, Application of differential equation i) Growth and decay problems ii) Newton's law of cooling with examples.
Partial differentiation: Introduction, Simple examples on evaluation of partial derivatives, Composite function with examples, Homogenous function (Definition), Euler's theorem for first and second order., Simple examples on above theorems., Extreme values with examples., Lagrange's method of undetermined multipliers (with proof), Examples on above method.

REFERENCES:
1. Partial Differential Equation by IN Sneiden
2. Matrices by Shanti Narayan
3. Complex Variables by Shanti Narayan
4. Ordinary Differential Equation by Saplay & Ross

Paper BT1-302
Enzymology

Max. Marks: 65
Internal assessment: 10
Time: 3 hrs

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit- I

Enzymes: Historical perspectives, general characteristics, nomenclature & classification, significance of numbering system, holoenzyme, apoenzyme, coenzymes, cofactors, activators, inhibitors, active site, metallo-enzymes, isoenzymes, monomeric enzymes, oligomeric enzymes, multifunctional enzyme and multi-enzyme complexes. Enzyme specificity. Measurement and expression of enzyme activity: Enzyme assay, enzyme units, enzyme turn over number and specific activity.

Role of cofactors in enzyme catalysis: NAD/NADP, FMN/FAD, coenzyme A, biocytin, Vitamin B12 Coenzyme, lipoamide, TPP, pyridoxal phosphate, tetrahydrofolate and metal ions with special emphasis on coenzyme functions

Enzyme catalysis:
Reaction co-ordinate diagram, transition state, Acid-base catalysis, covalent catalysis, proximity and orientation effects, strain and distortion theory. Mechanism of action of chymotrypsin, carboxypeptidase,and ribonuclease.

Enzyme Purification:
Methods of isolation of enzymes, purification of enzymes - ammonium sulfate precipitation, molecular-sieving, ion-exchange chromatography, affinity chromatography, criteria of homogeneity and determination of molecular weight of enzyme.

Unit- II

Enzyme Kinetics:
Factors affecting enzyme activity- enzyme concentration, substrate concentration, pH and temperature. Derivation of Michaelis - Menten equation for uni-substrate reactions. Km and its significance. Lineweaver-Burk plot. Importance of Kcat/Km. Bi-substrate reactions- brief introduction of sequential and ping-pong mechanisms with examples. Reversible (competitive, non-competitive and uncompetitive inhibitions) and irreversible inhibition. Determination of Km & Vmax in the presence and absence of inhibitor.

Enzyme regulation:

Feed back inhibition, Allosteric enzymes. Covalently modulated enzymes. Zymogen activation.

Immobilized enzymes:
Advantages, methods of immobilization - Adsorption, ionic binding, covalent coupling, cross-linking, entrapment, microencapsulation etc. Applications of immobilized enzymes (A brief account). Industrial applications of enzymes (Production of glucose from starch, cellulose and dextran; use of lactase in dairy industry; production of glucose-fructose syrup from sucrose; use of protease in food, detergent and leather industry).

REFERENCES:
1. Enzymes: Biochemistry, Biotechnology and Clinical Chemistry by Trevor Palmer (2001) Horwood Publishing.
2. Fundamentals of Enzymology, 3rd edition, by Nicholas C. Price and Lewis Stevens (1999) Oxford U.
3. The Chemical Kinetics of Enzyme action by K.J. Laidler and P.S. Bunting, Oxford University Press London.
4. Structure and mechanism in Protein Science, 2nd edition, by Alan Fersht (1999). W.H. Freeman and Co., NY

Paper BT1-303
Animal Physiology

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit- I

Digestive system: Types of nutrition, ingestion, digestion, absorption, and assimilation, BMR.

Cardiovascular System: Types of circulatory systems, Composition of Blood, blood coagulation, Haemopoiesis, blood volume, blood pressure, control of blood pressure, cardiac cycle, origin and conduction of heart beat, control of heart beat, ECG – its principle and significance

Respiratory system: transport of gases, exchange of gases, neural and chemical regulation of respiration.

Excretory system: excretory products, kidney, structure of nephron, urine formation, urine concentration, micturition, osmoregulation

Unit- II

Nervous system: Neurons, generation and transmission of nerve impulse neurotransmitors

Muscle physiology: Types of muscular tissue, ultrastructure of myofibrillar filaments, neuro muscular junctions, physical and chemical changes in muscle contraction, energy for muscle contraction, Cori's cycle

Endocrinology: Endocrine glands and their functions, basic mechanism of Peptide and steroid hormones,

Reproduction: Menstrual and oestrual cycle, implantation, gestation, parturition

REFERENCES:
1. Guyton Medical Physiology Textbook By Guyton and Hall
2. C. C. Chatterji, Human Physiology
3. Human physiology: the basis of medicine V Higgins Edited by Gillian Pocock, Christopher D Richards. Published by Oxford University Press, 2004, ISBN
4. Ross & Wilson, Anatomy & Physiology in Health & Illness, Churchill
5. Livingstone.Tortora GJ, & Anagnodokos NP, Principles of Anatomy & Physiology, Harper & Rave Publishers, New Delhi.
6. Keele, C.A., Niel, E and Joels N, Samson Wright's Applied Physiology, Oxford University Press

Paper BTI-304
Plant Physiology

Max. Marks: 65
Internal assessment: 10
Time: 3 hrs

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit I

Photosynthesis: Introduction and significance, structure of chloroplast, photosynthetic pigments, Light and dark reaction

Respiration: Introduction and significance, Aerobic and anaerobic respiration, Glycolysis, Citric acid cycle; plant mitochondrial electron transport and ATP synthesis.

Mineral Nutrition: Essential micro and macro elements and their role in plant growth, nitrogen metabolism-a brief account

Unit II

Growth and development: Introduction and phases of growth, role of growth hormones (Auxins, Gibberellins, Cytokinins, Ethylenes, Abscisic acid) Photoperiodism and Physiology of Flowering.

Plant water relation: Importance of water and its physical properties, diffusion, osmosis**,** absorption and transport of water in plants, transpiration and physiology of opening and closing of stomata.

Stress physiology: Abiotic (water, temperature and salt) stresses; An introduction to responses of plants to biotic (pathogen and insects) stresses.

REFERENCES:
1. Buchanan BB,Gruissem,W and Jones RL (2000) Biochemistry and Molecular Biology of Plants.American Society of Plant Physiologists, Maryland, USA
2. Davies, Peter J(1995) Plant Hormones: Physiology, Biochemistry and Molecular Biology.2nd edition, Kluwer Academic Publishers, The Netherlands
3. Noggle, GR and Fritz GJ (1983) Introductory Plant Physiology, Prentice-Hall of India Pvt Ltd, New Delhi,2nd Ed 7th reprint 1993
4. Salisbury, FB and Ross CW (1992) Plant physiology.4th ed, Wadsworth Publishing Co Belmont, California, USA
5. Taiz L and Zeiger,E (1998) Plant Physiology,2nd ed Sinauer Associates, Inc.,Publishers,Massachusetts,USA.
6. Wilkins,MB (1987) Advanced Plant Physiology,ELBS,Longman,England.

Paper BTI-305
Introduction to Computer

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit-I

Operating System: Definition, Functions, Process Management, Multiprogramming, Multitasking, Multiprocessing, Time sharing, Memory Management, Uni-programming, Memory model, Multiprogramming Memory Model, Virtual Memory, Security, Some popular O.S., Ms-DOS, Microsoft Windows, Unix

Office Operation: Microsoft Word-concept of toolbar, character, paragraph & document formatting, drawing toolbar, Header, Footer, Document editing, Page setup, short cut Keys, Text and graphics

Microsoft Excel-Concept of spreadsheet, Creating worksheet, Well formatted documents, concept of row, column, cell and formula bar, using function, using shortcuts, charts, conditional formatting

PowerPoint- Slide presentation, slide layout, Design, custom animation

Unit-II

Database Management System-Need of database, data models-Hierarcical, Network, Relational, Object Oriented, Main components of DBMS-DDL, DML.

Introduction to Programming- Algorithm, Flowchart, Pseudocode, Fundamentals of C Character set, keywords, identifiers, data types, constants, symbolic constants, escape sequences, variables. Arithmetic, relational & logical operators, type conversions in expressions.

Input/output-
Printf(), scanf(), getchar(), putchar(), gets(), puts(), enum, sizeof() operator
Formatting input/output
Control Structures & Array
If, if..else, nested if, switch statement, while loop , do.. while loop , for
loop, continue & break statement

Array- declaration, initialization of One dimensional & two
dimensional array, character array, strlen(), strcpy(), strcmp(), strcat().

REFERENCES:
1. Let us C by Yashwant
2. Ms Office BPB publications
3. Operating System by Galvin
4. C-Language by Gotfried   Schwan's series

Paper BTI-306
Lab. Course-VI based on Paper -BTI-301 &BTI-305

Max. Marks: 40
Internal assessment: 10
Time: 6 hours
(Two sessions)

1. Three Exercise based on each of the following as per theory syllabus:

   - Complex numbers

   - Matrices

   - Differential equation

   - Partial differentiation

2. Exercises based on C and MS office

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Paper BTI-307
Lab. Course -VII based on Paper - BTI-302, BTI-303 & BTI-304

Max. Marks: 60
Internal assessment: 15
Time: 6 hours
(Two sessions)

1. Estimation of acid phosphatase activity from germinating mungbean seeds.
2. Estimation of specific activity of acid phosphatase.
3. Effect of enzyme concentration on enzyme activity.
4. Effect of substrate concentration on acid phosphatase activity and determination of its Km value.
5. Effect of pH on enzyme activity and determination of optimum pH.
6. Effect of Temperature on enzyme activity.
7. RBC Count by hemocytometer
8. Determine TLC/DLC/ESR
9. Estimation of Hb by Sahli's method
10. Qualitative analysis of sugar, protein, ketone bodies and bile pigments in urine.
11. Effect of temperature, pH on the activity of salivary amylase
12. Demonstration of osmosis and plasmolysis and imbibition
13. Isolation of photosynthetic pigments by chromatography
14. Study of effects of conc. of CO_2 and quality of light on the rate of photosynthesis
15. Demonstration of aerobic and anaerobic respiration
16. Demonstration of rate of plant growth by Arc Auxanometer method
17. Study of transpiration by Four leaf method and Cobalt chloride method
18. Demonstration of Transpiration by Ganong's Potometer method.

REFERENCES:

- Introductory Practical Biochemistry by S.K.Sawhney & R. Singh (2000). Narosa Publishers
- Practical Biochemistry by David Plummer (1990). Tata Mc-Graw Hill
- Biochemical Methods by Sadasivam & Manickam (1996) New Age International (P) Ltd.
- Modern Experimental Biochemistry, 3rd edition, by R. Boyer (2002) Addison-Wesley Longman.
- A Lab. Manual in Biochemistry by J. Jayaraman (1996) New Age International (P) Ltd.

Semester-IV
Paper BTI-401
Cytochemistry & Histochemistry

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit-I

Scope of cytochemistry
Principles, Instrumentation and application of microscopy
1. Light microscopy
2. Phase contrast microscopy
3. Fluorescence microscopy
4. Confocal microscopy
5. Transmission Electron microscopy
6. Scanning Electron microscopy

Unit-II

Scope of histochemistry
Methodology and instrumentation
1. Fixatives Types and choice
2. Tissue processing techniques for light microscope
3. Tissue processing techniques for election microscopy (SEM and TEM).
4. Classification and chemistry of biological stains. General and specific vital stains and fluorochromes
5. Types of microtomes-Rotary, Sledge, Freezing Cryostat and Ultratomes
6. Detection and localization of primary metabolites- Carbohydrates (PARS reaction), Proteins (Coomassie brilliant blue staining), Lipids (Sudan Black method). Brief mention about other methods also.
7. Enzyme histochemistry (General design and applications)

REFERENCES:
1. Gary, P. 1964. Hand Book of basic microtechnique, John Wiley & Sons, New York.
2. Harris, Electron microscopy in Biology
3. Kierman, J.A. 1999. Histological and Histochemical Methods. Butterworth Publications, London
4. Pearse, histochemistry, Vol. I and Vol.II.

Paper BTI-402
Metabolism

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

UNIT-I

Bioenergetics: Concept of free energy, standard free energy, relation between equilibrium constant and standard free energy change and coupled reactions. Biological oxidation-reduction : redox potentials, relation between standard reduction potentials and free energy change (numericals included). High-energy compounds: phosphate group transfer potential, free energy of hydrolysis of ATP, PEP and glucose-6 phosphate along with reasons for high ΔG.

Carbohydrate Metabolism: Reactions and energetics of glycolysis. Alcoholic and lactic acid fermentations. Feeder pathways, Entry of fructose into glycolysis. Reactions and energetics of TCA cycle. Regulation of glycolysis and TCA cycle. Gluconeogenesis. Glycogenesis and glycogenolysis. Reactions and physiological significance of pentose phosphate pathway.

Electron Transport Chain and Oxidative Phosphorylation: Structure of mitochondria, organization and sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Oxidative phosphorylation: chemiosmotic theory, structure of ATP synthase, Inhibitors and uncouplers of oxidative phosphorylation. Transport of reducing equivalents from cytosol into mitochondria.

UNIT-II

Lipid Metabolism: Introduction, hydrolysis of triacylglycerols, activation of fatty acids, transport of fatty acyl CoA into mitochondria, beta-oxidation of saturated, and odd chain fatty acidss. ATP yield from fatty acid oxidation. Biosynthesis of saturated fatty acids. triglycerides. Metabolism of ketone bodies.

Amino acid Metabolism: General reactions of amino acid metabolism: transamination, oxidative and non-oxidative deamination and decarboxylation. Urea cycle. Glycogenic and ketogenic amino acids. Biosynthesis of aromatic amino acids. Glucose-Alanine cycle.

Nucleotide Metabolism: Sources of the atoms in the purine and pyrimidine molecules, denovo biosynthesis and degradation of purine and pyrimidine nucleotides, Regulation of purine and pyrimidine biosynthesis. Salvage pathways of purines and pyrimidines.

REFERENCES:

1. Lehninger: Principles of Biochemistry, 3rd edition, by David L. Nelson and M.M. Cox (2000) Maxmillan/ Worth publishers.
2. Fundamentals of Biochemistry by Donald Voet and Judith G Voet (1999). John Wiley & Sons, NY
3. Biochemistry, 2nd edition, by R.H. Garrett and C.M. Grisham (1999). Saunders College Publishing, NY.
4. Outlines of Biochemistry by E.E.Conn, P.K.Stumpf, G. Bruenimg and Ray H.Doi (1987). John Wiley & Sons, NY
5. Biochemistry, 2nd edition, by Laurence A. Moran, K.G. Scrimgeour, H. R. Horton, R.S. Ochs and J. David Rawn (1994), Neil Patterson Publishers Prentice Hall.

Paper BTI-403
Anatomy

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

UNIT-I

Comparative account of various systems in chordates (with particular reference to Labeo, Frog, Lizard, Pigeon and rat)
Integument and its derivatives: general structure and function of skin and its derivatives: Glands, scales, horns, claws, nails, hoofs, feathers and hairs
Circulatory system: General plan of circulation in various groups, Comparative account of heart
Respiratory system: Comparative account of respiratory organs

UNIT-II

Urinogenital system: Evolution of urinogenital system in vertebrate series, Comparative account of urinogenital system
Nervous system: Comparative anatomy of the brain. Nerves-cranial, peripheral and autonomous nervous systems
Sense organs: Eye, ear, Lateral line system, Jacobsons' organ

REFERENCES:
1. Alexander, R.M. The Chordata. Cambridge University Press,London.
2. Carter, G.S. Structure and habit in vertebrate evolution. Sedwick and Jackson, London.
3. Kingsley, J.S. Outlines of comparative autonomy of vertebrates.Central Book Depot, Allahabad.
4. Kent, C.G. Comparative anatomy of vertebrates.
5. Smith, H.S. Evolution of chordate structure. Hold Rinehart and Winstoin Inc., New York.
6. Romer, A.S. Vertebrate Body, III Ed. W.B. Saunders Co.,Philadelphia
7. Young, J.Z. Life of vertebrates. The Oxford University Press,London
8. Weichert, C.K. and Presch, W. Elements of Chordate anatomy.4th Edn. McGraw Hill Book Co., New York.
9. Kent, G. C. and R.K. Carr. 2001. Comparative anatomy of the vertebrates. 9th edition. McGraw Hill Publ., Boston, MA. 524 pp.

Paper BTI-404
Microbial Genetics

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

NOTE: Seven questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining six questions will be set taking three questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting two questions from each unit. All questions carry equal marks.

Unit-I

Prokaryotic Genomes: Physical organization of bacterial genomes (Structure of the bacterial nucleoid, Replication and partitioning of the bacterial genome).

DNA replication: Mechanism of DNA replication-conservayive, semiconservative and dispersive types, experimental evidence for semiconservative replication, enzymes and accessory proteins, proof reading, inhibitors in prokaryotic replication.

Mutations: Spontaneous and induced (physical and chemical mutagens), DNA repair mechanisms Direct repair- photolyase and Ada, Mismatch repair- *mutSLH*, Recombinational repair- *recA, recFOR, recBCD*, SOS and translation synthesis- *umuCD*, Mutator genes. Molecular mechanisms of mutations: Point mutations, base substitution-transition and transversion (framshift mutations deletion, addition),

Unit-II

Genetic Transformation: Griffith's Experiment, Genetic change: transformation, transduction, conjugation, plasmids.

Mechanism of genetic exchange: Plasmid and bacterial sex, Types of plasmids (F Plasmid : a Conjugate plasmid', Mobilization of Non-conjugative plasmid, R plasmid, Col plasmid Copy number and incompatibility), Episomes. Transposable elements (Insertion sequence and transposons, Integrons and Antibiotic-Resistance cassettes, Multiple Antibiotic Resistant bacteria, Mu–virus);

Bacteriophages: Stages in the Lytic Life Cycle of a typical phage, Properties of a phage infected bacterial culture, Specificity in phage infection, E. coli PhageT4, E.coli Phage T7, E.coli phage lambda, Immunity to infection, Prophage integration, Induction of prophage, Prophage excision, Repressor, Structure of the operator and binding of the repressor and the Cro product, Decision between the lytic and lysogenic Cycles, Transducing phages, E.coli phage phiX174, filamentous DNA phages, Single stranded RNA phages, The lysogenic Cycle.

REFERENCES:
1. Maloy et al 1994, Microbial genetics, Jones & Barlett publishers

2. Dale JW 1994, Molecular Genetics of Bacteria, John Wiley & sons
3. Lewin 2002, Gene IX oxford University Press
4. Hayes W, Bacterial & Viral Genetics
5. General microbiology (Vth edi) Stanier, Ingraham, Wheelis & Painter
6. Dubey & Maheshwari , Text book of Microbiology

Paper BTI-405
English

Max. Marks: 65
Internal assessment: 10
Time: 3 hours

Text Book   **35**
The following text is prescribed for intensive study:
1. Following essays from <u>Ideas Aglow</u> edited by Dinesh Kumar and V.B. Abrol (Publication Bureau, Kurukshetra University, Kurukshetra)
    a) C.E.M. Joad : Our Civilization
    b) Jayant V. Narlikar: It's Question Time
    c) N.Ram :An Interview with Christiaan Barnard
    d) B.R. Ambedkar: Untouchability and the Caste System
    e) Huck Gutman: In humanisation of War
    f) Amartya Sen: Seven Types of Gender Inequality

General English   **30**
1. Translation from English to Hindi
2. Precis
3. Official Correspondence: Letter Writing

Scheme of question paper

The paper will have seven questions as per details given below

Q.1. The candidate will be asked to answer comprehension questions based on an extract from the text book. There will be internal choice.   **1 x 10=10**

Q.2. The candidate will be asked to explain with reference to the context an extract from the text book. There will be internal choice.   **5**

Q.3. There will be five short answer type questions based on the text book. The candidates will be asked to give answers in about 30 words each. There will be internal choice.   **2 x 5 =10**

Q.4. There will be two essay type questions based on the text book with internal choice.   **10**

Q.5. Translation of a passage of about 10 sentences from English to Hindi   **10**

Q.6. Précis: The candidates will be required to summarize a given passage in contemporary English of about 250 words to one-third of its length and also give it a suitable heading.   **10**

Q.7. The candidate will be asked to write an official letter. There will be internal choice.   **10**

Paper BTI-406
Lab. Course –VIII based on Paper BTI-401 & BTI-403

Max. Marks: 40
Internal assessment: 10
Time: 6 hours
(Two sessions)

1. Tissue fixation, processing and sectioning to prepare histological slides

2. Staining (H&E) and permanent slide preparation

3. Detection of carbohydrates/ lipids/ muco polysaccharides/ nucleic acids /proteins in the tissues by histochemical techniques

4. To study the anatomy of various mammalian organs.

5. To study the skin derivatives i.e. hair, feather, claws,

REFERENCES:
- Gary, P. 1964. Hand Book of basic micro technique, John Wiley & Sons, New York.
- Harris, Electron microscopy in Biology
- Kierman, J.A. 1999. Histological and Histochemical Methods. Butterworth Publications, London
- Pearse, histochemistry, Vol. I and Vol.II.
- Fishbeck, D. W. and A. Sebastiani. 2001. Comparative Anatomy Manual of Dissection. Morton Publ. Co., CO.

Paper BTI-407
Lab. Course IX based on Paper BTI -402 & BTI-404

Max. Marks: 40
Internal assessment: 10
Time: 6 hours
(Two sessions)

1. Estimation of nitrogen by micro-Kjeldahl method/Nessler`s reagent.

2. Estimation of blood glucose by o-toludine method.

3. Estimation of ascorbic acid by titrimetric method.

4. Preparation of starch from potato and its hydrolysis by salivary amylase

5. Determination of achromatic point for salivary amylase.

6. Isolation of total lipids by Folch method.

7. Titration of amino acids and determination of pKa value

8. Preparation of Nutrient Agar Media

9. Different Method of Plating and preparation of agar slant.

10. Preparation of pure culture

11. Culture of E.coli in Luria Bertani Media and Study of Bacterial Cell Count by using spectrophotometer

12. Isolation of DNA from E.coli and analysis by agarose gel electrophoresis

13. Isolation of RNA from E.coli

14. Isolation of Plasmid from E.coli and analysis by agarose gel electrophoresis

REFERENCES:

● Introductory Practical Biochemistry by S.K.Sawhney & R. Singh (2000). Narosa Publishers
● Practical Biochemistry by David Plummer (1990). Tata Mc-Graw Hill
● Biochemical Methods by Sadasivam & Manickam (1996) New Age International (P) Ltd.

Semester V

Paper BTI 501
Immunology-1

Max Marks: 65
Internal Assessment: 10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I
Introduction to immune system: Memory, specificity, diversity, innate and acquired immunity, self vs non-self-discrimination, structure and functions of primary and secondary lymphoid organs
Cells involved in immune responses: Phagocytic cells and their killing mechanisms; T and B lymphocytes, differentiation of stem cells and idiotypic variations
Nature of antigen and antibody: Antigens vsimmunogen, haptens, structure and functions of immunoglobulins; isotypic, allotypic and idiotypic variations

Humoral and cell mediated immune responses: kinetics of primary and secondary immune responses, complement activation and its biological consequences, antigen processing and presentation, cytokines and costimulatory molecules- role in immune responses, T and B cell interactions.

Major Histocompatibility Complex (MHC) genes and products: polymorphism of MHC genes, role of MHC antigens in immune responses, MHC antigens in transplantation

Unit II
Generation of diversity in immune system: Clonal selection theory- concept of antigen specific receptor, organization and expression of immunoglobulin genes- generation of antibody diversity, T cell receptor diversity.

Measurement of antigen –antibody interaction: Production of polyclonal and monoclonal antibodies- principles, techniques and applications; Agglutination and precipitation techniques; Radio immunoassay; ELISA; Immunofluorescence assays-Fluorescence activated cell sorter (FACS) technique.

Immunization: Active & passive immunization, vaccines and their types, role of vaccines in the prevention of diseases

10(1068)

Tolerance vs activation of immune system: Immune tolerance, immunosuppression, hypersensitivity (Types I, II, III and IV).

Immune responses in diseases: Immune responses to infectious diseases- viral, bacterial and protozonal; cancer and immune system, immunodeficiency disorders and autoimmunity

REFERENCES:

1. Immunology, 4th ed. by Roitt et al., Mosby Publications
2. Cellular and Molecular Immunology, 5th ed. by Abbas and Litchman (2003), Saunders Publication.
3. Kuby Immunology, 4rd ed. by R.A. Goldsby et al, W.H. Freeman & Co.
4. Immunology: an introduction, 4th Edition by Ian R Tizard, (1995), Saunders College Publishing

Paper BTI 502
Molecular Biology-1

Max Marks: 65
Internal Assessment: 10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I

Basic Concepts of Genetic Information: Structure of DNA, various forces responsible for stability of DNA, various forms of DNA, DNA topology, topological and geometric properties, DNA supercoiling, Topoisomerases in prokaryotes and eukaryotes, DNA organization in prokaryotes and eukaryotes, C-value paradox, denaturation: different ways for carrying out denaturation, renaturation: requirements, kinetics, significance, various classes of DNA: highly repetitive, moderately repetitive and unique sequence, RNA: structure and types.

DNA replication, mutations and DNA repair: Possible modes of DNA replication, Meselson-Stahl experiment, DNA polymerases and other enzymes involved in DNA replication, Okazaki fragments, Mechanism of replication in prokaryotes and eukaryotes, inhibitors of DNA replication, molecular basis of mutations, DNA repair mechanisms like direct, base-excision, nucleotide-excision, mismatch, SOS and recombinational repair.

Unit II

Transcription and post-transcriptional modifications: RNA polymerase/s in prokaryotes and eukaryotes, DNA footprinting technique, initiation, elongation and termination of transcription in prokaryotes and eukaryotes, inhibitors of transcription, RNA replicase, reverse transcriptase, post-transcriptional modifications: different types of introns and their splicing mechanisms, processing of mRNA, rRNA and tRNA precursors, overlapping genes and split genes.

Protein synthesis, targeting and degradation: Characteristics of the genetic code, biological significance of degeneracy, decoding the code, Wobble hypothesis, ribosomes structure and function in prokaryotes and eukaryotes, AminoacyltRNA-synthetases various factors and steps involved in protein synthesis in prokaryotes and eukaryotes, polyribosomes, post-translational processing, signal hypothesis and protein targeting to

lysosomes, Plasma membrane, extracellular matrix and different compartment of mitochondria and chloroplast, protein degradation.

REFERENCES:

1. Molecular Cell Biology, 5th edition H Lodish et al. (2004) W H Freeman and Company.
2. Genes VIII, B Lewin (2004) Pearson Education International.
3. Freifelder's Essentials of Molecular Biology, 4rd edition, D Freifelder. (2005) Narosa publishing house
4. Biochemistry, 2nd edition, Moran. Neil Patterson Publishing.
5. Fundamentals of Biochemistry, 2nd edition, D Voet& G J Voet. John-Wiley & sons.
6. Biochemistry, 5th edition, JM Berg et al. W H Freeman & Co. N York.
7. Lehninger's Principles of Biochemistry, 4nd edition, D L Nelson and M M Cox. (2005) W H Freeman & Co. N York.
8. The Biochemistry of Nucleic acid, 11th edition, R L Adams et al, Chapman and Hall.
9. Molecular Biology of the Gene, 5th Edition, Watson et al (2004) Pearson Education International.

Paper BTI 503
Developmental Biology

Max Marks: 65
Internal Assessment:10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.
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Unit I
Development Biology: Scope & historical perspective
Gametogenesis-Spermatogenesis, Metamorphosis of spermatid, Oogenesis
Fertilization-Definition, mechanism, types of fertilization
Cleavage-definition, types, patterns, Mechanism
Gastrulation- Morphogenetic movements-epiboly, emboly, extension, invagination,
Convergence, de-lamination.
Formation and differentiation of primary germ layers
Fate maps in early embryos

Unit II
Differentiation: Cell commitment and determination-epigenetic landscape: a model of determination and differentiation at the level of genome, transcription and post transcriptional
Concept of embryonic induction: Primary ,secondary and tertiary embryonic induction. Neuronal induction and induction of vertebrate lens
Pathway selection, target and address selection
Extra embryonic membranes, placenta in mammals
Neurulation, notogenersis, Development of vertebrate eye
Fate of primary germ layers
Development of behaviour: constancy and plasticity
Aging & Senescence

REFERENCES:
1. **Developmental Biology** by Scott Gilbert

Paper BTI-504
Neutraceuticals

Max Marks: 65
Internal Assessment:10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit 1:
Concept, Biochemistry of nutrition and dietetics
Classification of food components based on nutritional value, nutritional assessment of carbohydrates, proteins and fats, recommended dietary intake, acceptable dietary intake, nitrogen balance, protein efficiency ratio, net protein utilisation. Basics of energy balance - Basal Metabolic Rate (BMR), Body Mass Index (BMI) and Standard Dynamic Action (SDA) with special reference to nutraceutical industry.

Nutrition related diseases and disorders
Malnutrition and factors responsible for nutritional disorders and anti-nutritional factors (cyanogens, lectins, enzyme inhibitors, phytoallexins and phytates); Metabolic disorders - types, nutritional factors, prevention and treatment using nutraceuticals with special reference to diabetes mellitus, hypertension, hypercholesterolemia and others. Concept of antioxidants - use of antioxidants as dietary supplements in prevention and treatment of cancer, obesity and stress. Role of nutraceuticals and functional foods in pediatrics, geriatrics, sports, pregnancy and lactation.

Unit 2
Nutraceuticals of plant and animal origin
Plant secondary metabolites, classification and sub-classification - Alkaloids, phenols, Terpenoids. Extraction and purification, applications in general health and as stimulants. Role of medicinal and aromatic plants in nutraceutical industry
Animal metabolites - Sources and extraction of nutraceuticals of animal origin. Examples: chitin, chitosan, glucosamine, chondroitin sulphate and other polysaccharides of animal origin, uses and applications in preventive medicine and treatment.

Microbial and algal nutraceuticals
Concept of prebiotics and probiotics - principle, mechanism, production and technology involved, applications - examples of bacteria used as probiotics, use of prebiotics in maintaining the useful microflora - extraction from plant sources. Synbiotics for

maintaining good health. Algae as source of omega - 3 fatty acids, antioxidants and minerals - extraction and enrichment.

REFERENCES:

1. Handbook of nutraceuticals and functional foods by Robert E C. Wildman, CRC/Taylor&Francis
2. Handbook of nutraceuticals Vol I by Yahwant Vishnupant Pathak, CRC press.2009
3. Handbook of nutraceuticals Vol II by Yahwant Vishnupant Pathak, CRC press,2011
4. Handbook of Prebiotics, Glenn R. Gibson, Marcel Roberfroid, CRC press, 2008.
5. Swaminathan M., Essentials of Food and Nutrition, 2nd Ed, 1985, Ganesh and Co.
6. Understanding Nutrition, 8'" Edition, by Whitney, E.N. & Rolfes, S.R.. (1999): WesV Wadsworth, An International Thomson Publishing Co.
7. Nutrition in Health and Disease 17th Edition; Anderson, Dibble, Turkki, Mitchell, Rynbergen J.B. Lippincott Company, 1982
8. Nutritional Quality Index of Foods; R.G. Hansen, B.W. Wyse, A.W. Sorenson AVI Publishing Co., Inc., 1979.
9. Dietary Supplements of Plant Origin, M. Maffei (Ed.), Taylor & Francis, 2003.
10. Bioprocesses and Biotechnology for Functional Foods and Nutraceuticals, Jean – Richard Neeser & J. Bruce German, Marcel Dekker, Inc., 2004.
11. Herbal Products –Timotht S. Tracy, Richard L. Kingston.
12. Herbal beauty products with formulation & processes-H. Panda
13. Medicinal Plants (Traditional Knowledge)-P C Trivedi
14. Nutritional Biochemistry, II edition by Tom Brody
15. Nutraceuticals in health and disease prevention, Klaus Krämer, Peter-Paul Hoppe, Lester Packer
16. Zubay, Geoffrey L., Biochemistry, 4th Ed, Dudagye, IAWCB Wm. C. Brown Publishers, 1988, London.
17. Nutraceutical beverages Chemistry, Nutrition and health Effects, Shahidi and Weerasinghe (Ed.), American Chemical Society, 2004.
18. Functional Foods: Principles and Technology, M. Guo, CRC press, 2009.
19. Marine Products for Healthcare, Vazhiyil Venugopal, CRC press, 2008
20. Phytochemicals, Mark S. Meskin, Wayne R. Bidlack, R. Keith Randolph, CRC press, 2008.

M.Sc. integrated Biotechnology
(5-years course)
w.e.f. session 2015-16

BTI- 505 (5ᵗʰ Semester)
HINDI

Max Marks: 65
Internal Assessment: 10
Time: 3 h

पाठ्यग्रंथ :

अभिनव काव्य गरिमा, महर्षि दयानंद विश्वविद्यालय, रोहतक का प्रकाशन
इस पाठ्यपुस्तक में निम्नलिखित चार कवि और उनका काव्य निर्धारित किए गए हैं-
मैथिलीशरण गुप्त, जयशंकर प्रसाद, सूर्यकान्त त्रिपाठी 'निराला' और रामधारी सिंह 'दिनकर'।

निर्देश-

खण्ड : एक (काव्य)

1. पाठ्यपुस्तक से दिए गए चार अवतरणों में से दो की सप्रसंग व्याख्या करनी होगी। प्रत्येक सप्रसंग व्याख्या के लिए 8 अंक निर्धारित है। पाठ्यग्रंथ में दिए गए कवियों में से दो का साहित्यिक परिचय पूछा जाएगा, परीक्षार्थी को किसी एक कवि का साहित्यिक परिचय लिखना होगा। इसके लिए 8 अंक निर्धारित है। इस प्रकार, इस खण्ड के लिए कुल 24 अंक निर्धारित किए गए हैं।

खण्ड : दो (निबन्ध-लेखन)

2. पाठ्यक्रम में निर्धारित निम्नलिखित आठ विषयों में से पूछे गए पाँच विषयों में से किसी एक विषय पर निबन्ध लिखना होगा। इसके लिए 9 अंक निर्धारित है।
विषय-(1) साक्षरिकता, (2) नैतिक शिक्षा, (3) मद्यनिषेध, (4) विज्ञान और औद्योगिकरण, (5) वैज्ञानिक प्रगति में भारत का योगदान, (6) वैश्वीकरण और विज्ञान, (7) दूरदर्शन, (8) वैश्वीकरण और विज्ञान।

खण्ड : तीन (पत्र-लेखन)

3. सरकारी पत्रों में से पूछे गए दो पत्रों में से एक पत्र लिखना होगा। इसके लिए 9 अंक निर्धारित किए गए हैं।

खण्ड : चार (वैज्ञानिक शब्दावली)

4. पाठ्यक्रम में निर्धारित निम्नलिखित 50 अंग्रेजी शब्दों में से पूछे गए किन्हीं दस शब्दों को हिन्दी-तकनीकी-अर्थ लिखने होंगे। इसके लिए 15 अंक निर्धारित है।

1.		सैमाटिकी
2.		संवारोषण
3.		मिश्र धातु
4.		प्रकन्धक
5.		विश्लेषण
6.		प्रतिजैविक
7.		वायुमंडल
8.		उभायावल ताल
9.		परिवलन यंत्र
10.		अंशन
11.		निस्तापन
12.		कोशिका
13.		उद्धेपक
14.		दाहकक्षार
15.		केन्द्रीय अक्ष
16.		प्रमस्तिक
17.		गुणसूत्र
18.		गुच्छ
19.		गुणांक
20.		मित्र
21.		संघनन

22प	क्षद अमारजापयद	संवहन
23प	क्षदअम्ग	अवराल
24प	क्षठसग	धूमकेतु
25प	कमघवठछबबेपजपवद	आसयन
26प	कर्मसिमबजापवद	परिस्थिति विज्ञान
27प	क्षपीलकतेजपबद	प्रत्यास्थता
28प	क्षधानिछषद	विद्युत परासण
29प	क्षेजपधसबंजपवद	संतुलन
30प	म्बलमछहल	तुल्यांक
31प	म्लैजपष्बप्जास	उष्मारोधी
32प	समजजत बेझखतपमे	निष्कर्ष
33प	मुषधसपछाषपतद	किण्वन
34प	मुषअेसमदज	निबंधन
35प	ष्दकवजीउप्ष	जमना
36प	माजतंजजपबाद	खंडन
37प	क्षराठमदजंजपषवद	सूत्र
38प	क्षताजपसप्रजपवद	जीवाश्म
39प	क्षामझपदह	घर्षण
40प	क्षेपबद	धारामापी
41प	क्षबतठतसें	जीवाणुमापी
42प	क्षतपबजपबद	ग्रंथि
43प	अेसअंदबठसजमसत	समरोपना
44प	डसअेयरठगजमत	तापक
45प	डअतरपधबपक्रम	कमजात
46प	क्षसंदक	संकर
47प	ठतबॉज	जलयोजन
48प	भाजमत	ज्वलन
49प	अजरुसमछहपे	सूचक
50प	क्षछद्रतपक	जड़त्व

पाठ्यग्रंथ—

1. अभिनव काव्य गरिमा, महर्षि दयानंद विश्वविद्यालय, रोहतक।

सहायक ग्रंथ—

1. प्रतियोगात्मक निबंध संचय : डॉ० चमनलाल गुप्त, मिनर्वा बुक हाऊस, शिमला।
2. निबन्ध सौरभ : रामसुखराम गुप्त, सूर्यभारती प्रकाशन, दिल्ली।
3. पत्र-व्यवहार निर्देशिका : डॉ० भोलानाथ तिवारी, वाणी प्रकाशन, दिल्ली।
4. पत्र-कौशल : रामसुखराम गुप्त, सूर्यभारती प्रकाशन, दिल्ली।

BTI- 505 (5th Semester)
Sanskrit

Max Marks: 65
Internal Assessment: 10
Time: 3 h

विशेष निर्देश–

1. प्रश्न-पत्र अधिकतम 65 अड्डों का होगा। 10 अड्ड आन्तरिक मूल्यांकन के लिये निर्धारित हैं।

2. प्रश्न-पत्र में कुल पाँच प्रश्न दिये जाएँगे। प्रत्येक प्रश्न 13 अड्डों का होगा। प्रथम प्रश्न पाठ्यक्रम में निर्धारित चारों घटकों पर आधारित तथा अनिवार्य होगा।

घटक-I : संस्कृत-चयनिका (कुरुक्षेत्र विश्वविद्यालय प्रकाशन):

पद्यभाग : पाठ 1 से पाठ 5 तक–

(1) ईशस्तव:, (2) वयं त्वां भजाम:, (3) धर्मज्ञो राम:,

(4) साधुव्रतं चर, (5) विभीषणस्य विलाप:।

घटक-II : संस्कृत-चयनिका :

गद्यभाग : पाठ 1 से पाठ 5 तक–

(1) अनुशासनम्, (2) सद्वृत्तम्, (3) बुद्धिर्यस्य बलं तस्य,

(4) नीलवर्ण: श्रृगाल:, (5) शशकस्य चातुर्यम्।

घटक-III : संस्कृत-व्याकरण :

शब्द-रूप : राम, देव, लता, फल, मुनि, साधु, मातृ, तद् (तीनों लिड्गों में), अस्मद्, युष्मद्।

घटक-IV : अच्सन्धि : गुण, वृद्धि, यण्, अयादि।

Paper BTI-506
Lab. Course -X based on Paper BTI-501 & BTI-502

Max. Marks: 40
Internal assessment: 10
Time: 6 hours
(Two sessions)

1. To identify blood group

2. To estimate Hb by cyan-meth haemoglobin method

3. To isolate γ-globulins by ammonium sulfate fractionation

4. To separate globulins and estimate albumin globulin ratio in blood

5. To perform Radial immunoassay

6. To perform Widal test to detect antigen

7. To isolate genomic DNA from plant/animal tissue.

8. Quantification of isolated DNA by UV-spectrophotometer and check its purity.

9. To study DNA denaturation by using UV-spectroscopy.

10. To isolate proteins from chloroplast-enriched fraction of spinach leaves.

11. To perform native and denaturing PAGE

Max. Marks: 40
Internal assessment: 10
Time: 6 hours
(Two sessions)

1. To perform candling experiment to find out fertilization status of egg.

2. To prepare window in chick egg

3. To study development stages of chick embryo

4. Life cycle of Mosquitoes/ Frog

5. Determination of blood urea

6. Determination of blood uric acid.

7. Determination of blood creatinine.

8. Estimation of blood cholesterol.

9. Determination of free radical scavenging activity and IC50 value for ascorbic acid

10. Determination of reducing capability and IC50 value for ascorbic acid by phosphomolybdate reagent.

11. Determination of superoxide radical scavenging activity and IC50 value for standard antioxidant

Semester VI

Paper BTI 601
Medical Biotechnology

Max. Marks: 65
Internal Assessment:10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I

Classification of genetic diseases:
Chromosomal disorders – Numerical disorders e.g. trisomies & monosomies, Structural disorders e.g. deletions, duplications, translocations & inversions, Chromosomal instability syndromes. Gene controlled diseases – Autosomal and X-linked disorders, Mitochondrial disorders and Multifactorial conditions. Identification of disease genes, Functional cloning –Eg. haemophilia gene. Positional cloning - eg. DMD and CGD genes. Candidate gene approach – Eg. Marfan's syndrome, Alzeimer's disease. Molecular basis of human diseases - Pathogenic mutations. Gain of function mutations: Oncogenes, Huntingtons Disease, Pittsburg variant of alpha 1 antitrypsin. Loss of function - Tumour Suppressor Genes, PAX- 3 gene; Gene Dosage Effect - PMP22 , Collagen gene; Genomic Imprinting -Mechanisms, Praderwilli / Angelman syndrome, WAGR syndrome, Beckwith Weidemann Syndrome; Dynamic Mutations - Fragile- X syndrome, Myotonic dystrophy; Mitochondrial diseases: MELAS, LHON, MERRF
Immuno Pathology, Hepatitis, HIV, Autoimmune Disorders-SLE, RA

Diagnostics
Prenatal diagnosis - Invasive techniques - Amniocentesis, Fetoscopy, Chorionic Villi Sampling (CVS), Non-invasive techniques - Ultrasonography, X-ray, TIFA, maternal serum and fetal cells in maternal blood; Diagnosis using protein and enzyme markers, monoclonal antibodies. DNA/RNA based diagnosis Hepatitis, CML – bcr/abl, HIV - CD 4 receptor; Microarray technology- genomic and c DNA arrays, application to diseases

Unit II

10(1080)

Therapeutics

Clinical management and Metabolic manipulation - PKU, Familial Hypercholesterolemia, Rickets, ADA, Congenital hypothyroidism; Gene therapy Ex-vivo, Invivo, Insitu gene therapy Stratagies of gene therapy: gene augmentation – ADA defeiciency, CFTR Prodrug therapy/ suicide gene – glioma, evoking immune response – melanoma TFO, Antisense therapy, Ribozymes, Protein Aptamers, Intrabodies

Vectors used in gene therapy Biological vectors – retrovirus, adenoviruses, Herpes Synthetic vectors– liposomes, receptor mediated gene transfer; Gene therapy trials – Familial Hypercholesterolemia, Cystic Fibrosis, Solid tumours. Cell and tissue engineering: Encapsulation technology and therapeutics - Diabetes, Hypothyroidism, HaemophiliaBioartificial organs, Artificial Cells- For Haemophilia, Phenylkeptonuria, Diabetes

Stem cell therapy - Embryonic and adullt Stem Cells, Totipotent, Pluripotent and Mulltipotent Cells; Testing and generation of embryonic stem cells, Testing for adult stem cells and differentiation; Potential use of stem cells – Cell based therapies; Nanomedicine - Nanoparticles, Nanodevices-medical microrobotics, nanorobotics Microbiovers, Nanomedicine and Nanosurgery – for cancers, neurological disorders.

Gene products in medicine: Functional cloning – anti-haemophilic factor; Positional cloning- Dystrophin; Gene products in medicine - Humulin, Erythropoietin, Growth Hormone/Somatostatin, tPA, Interferon; DNA based vaccines
subunit vaccines – Herpes Simplex Virus
Attenuated Vaccines– Cholera
Vector vaccines – Cholera and Salmonella

Paper BTI 602
Recombinant DNA Technology

Max Marks: 65
Internal Assessment:10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I
SALIENT FEATURES OF CLONING VECTORS: Types of cloning vectors viz. Plasmids, cosmids, ssDNA Phages, Yeast cloning vectors, Animal viruses, Ti plasmids and Cauliflower Mosaic Virus.

PLASMID BIOLOGY: Structural and Functional Organization of Plasmids, Plasmid Replication, Stringent and Relaxed Plasmids, Incompatibility of Plasmid Maintenance.

BIOLOGY OF BACTERIOPHAGE LAMBDA: Lambda Phage as a natural in vivo vector, in vitro construction of lambda vector, Classes of vectors and their use.

ENZYMES IN GENETIC ENGINEERING: DNA polymerase, Polynucleotide kinase, T4 DNA ligase, Nick translation system, Terminal deoxynucleotidy1 transferase, Reverse transcriptase Restriction endonucleases Type I & II.

ISOLATION OF GENOMIC AND NUCLEAR DNA: DNA digestion and restriction fragment analysis and sequencing by chemical, enzymatic and big-bye terminator methods.

Unit II
CLONING AND SUBCLONING STRATEGRY: Construction of recombinant DNA: Preparation of competent cell-Transformation, transfection – Recombinant selection and screening; Genomic DNA library; cDNA synthesis strategies – Linkers – Adapters – Homopolymer tailing; Making genomic and cDNA libraries in plasmids and phages. PCR product cloning (TA cloning). Cloning strategies in yeast, E. coli and B. subtilis

SELECTION OF RDNA CLONES AND THEIR EXPRESSION PRODUCTS:

10(1082)

Direct and indirect methods.Drug resistance, gene inactivation, DNA hybridization, colony hybridization and in-situ hybridization (Southern, Northern and Dot blots and immunological techniques Western blotting).

GENE MODIFICATION & APPLICATION OF RECOMBINANT DNA TECHNOLOGY: Mutagenesis - Deletion mutagenesis, Oligonucletoide derived mutagenesis, Site directed mutagensis – Its applications; Applications of rDNA technology in Diagnistics; Pathogensis; Genetic diversity; Therapeutic proteins-Vaccines. Molecular probes (Production, labelling and uses), P.C.R.

REFERENCES
1. "Principles of Gene Manipulation" by R.W.Old and S.B.Primrose Third Edition Blackwell Scientific Publication
2. "Genes VI" by B. Lewin
3. "From Genes to Clones" by E. L. Winnecker.
4. "Gene Cloning " by T. A. Brown

Paper BTI 603
Animal cell culture

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I
Biology of the Cultured Animal Cells
Cell culture environment, cell adhesion, initiation of the culture, evolution of cell lines, development of continuous cell lines, dedifferentiation, cultured cell, functional environment
Culture Media
Introduction to the balanced salt solutions and simple growth medium. Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium. Role of carbon dioxide. Role of serum and supplements, Serum & protein free defined media and their application.
Primary Cell Cultures
Establishment and evolution of primary cultures, characteristics of limited life-span cultures
Continuous Cell Lines
Establishment and properties of continuous cell lines

Unit-II
Cell Line Characterization
Species identification, lineage or tissue markers, unique markers, transformation, morphology, chromosome content, DNA content, RNA and protein, enzyme activity, antigenic markers, differentiation

Cell Cloning
Development of cloning techniques, uses of cloning, special requirement of cells growing at very low densities, cell cloning methods

Stem Cell Cultures
Embryonic and adult stem cells and their applications. Totipotent, Pluripotent and Multipotent stem cells.
Applications of Animal Cell Culture

In vitro toxicity testing, production of viral vaccines, production of high value therapeutics

REFERENCES
1. Animal Cell Culture - Practical Approach, Ed. John R.W. Masters, OXFORD.
2. Animal Cell Culture Methods In: Methods in Cell Biology, Vol. 57, Ed. Jenni P Mather and David Barnes, Academic Press.
3. Animal Cell Culture Techniques. Ed. Martin Clynes, springer.
4. Biotechnology, Vol. 7b 1993 Rehm. H.J. and Reed, G.(eds) VCH Publications.
5. Cell Culture Lab Fax. Eds. M Butler & M. Dawson, Bios Scientific Publications Ltd. Oxford.
6. Cell Growth and Division: a Practical Approach. Ed. R. Basega, IRL Press.
        7. Culture of Animal Cells, (3rdedition), R. Ian Freshney. Wiley-Liss.

Paper BTI 604
Plant Cell Culture

Max Marks: 65
Internal Assessment:10
Time: 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit - 1

Plant cell, tissue and organ culture; Introduction to plant cell and tissue culture and historical perspective. Concept of cellular differentiation and totipotency; Laboratory organization, aseptic manipulations and culture media – composition, preparation and development.

Micropropagation – technique, factors affecting micropropagation (physical, chemical, genotypic and others), applications and limitations of micropropagation.
Somaclonal variations, molecular basis of variation and their significance in plant breeding. In vitro germplasm conservation and cryopreservation.

Unit II

Callus culture; Initiation and maintenance of suspension culture- batch and continuous culture, assessment of growth and viability; Organogenesis, somatic embryogenesis and synthetic seeds. Meristem(shoot tip)culture & production of virus free plants
In vitro production of haploid plants – Androgenesis (anther and pollen culture) and Gynogenesis (ovary and ovule culture).Significance and uses of haploids in agriculture.

Wide hybridization and embryo rescue technique.
Protoplast culture and somatic hybridization – Isolation, culture and fusion of protoplast, selection of fusion products and plant regeneration, assessment of somatic hybrid plants, production of cybrids, applications of protoplast culture and somatic hybridization in the improvement of crop plants.

Paper BTI-605
Microbial Biotechnology

Max. Marks : 65
Internal Assessment:10
Time : 3 hrs.

NOTE
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit – I

Microbial Biotechnology : Scopes application and challenges. Isolation preservation and improvement of industrially important microorganisms.Kinetics of microbial growth and product formation.Fermentation system; batch and continuous system, fed batch system, multistage system.Solid state fermentation.

Fermentation raw materials : Media for industrial fermentations; criteria used in media formulation. Fermenter/bioreactor design and operation; types of fermenter, stirred tank reactor, bubble column reactor, airlift reactor, packed bed reactor, fluidized bed reactor and trickle bed reactor, agitation and aeration in a reactor, mass transfer. Foam formation and control.

Unit - II

Industrial production of alcohol (ethanol, wine and beer) and improvement by genetic engineering.Overproduction of primary and secondary metabolites.Microbial production of acids (citric, acetic and gluconic acid) solvents (glycerol acetone and butanol) aminoacids (lysine and glutamic acid).

Microbial polysaccharides : fermentative production of xanthan gums, dextrins and cyclodextrins. Bacterial bioplastics, genetic engineering of micro-organisms and plants for the production of poly-3 hydroxyalkanoates. Biomass production : single cell protein (SCP) production; microbial inoculants; Microbial transformation of steroids and sterols.

REFERENCES:
1. Stansbury P.F. et al. (1997), Principles of Fermentation Technology, Pergmon Press Oxford.
2. Ward O.P., (1998), Fermentation Biotechnology – Principles, Process and Products. Prentice Hall Publishing, New Jersey.
3. Rehm H.J. Reed G.B. Punler A and Stadler (1993), Biotechnology, Vol. 1-8, VCH Publication.
4. Prescolt and Dunn (1992), Industrial Microbiology, 4th Edition CBS Publication, New York.

5. Arnold I. Demain and Julian E. Davies (1999), Manual of Industrial Microbiology and Biotechnology, 2nd Edition, ASM Press, Washington D.C.
6. Glazer and Nikaido (1998) Microbial Biotechnology By WH Freeman & Company, New York.
7. Cruger and Cruger (2002), Biotechnology – A Textbook of Industrial Microbiology, 2nd Edition, Panima Publishing Corporation, New Delhi.

Paper BTI-606
Lab. Course -XII based on Paper- BTI-601 & BTI-602

Max. Marks : 40
Internal Assessment:10
Time : 6 hours
(Two sessions)

1. To perform DOT-ELISA.

2. To perform experiment of DNA isolation from blood and its quality determination by agarose gel electrophoresis.

3. Determination of growth inhibition Zone

4. Study in vitro DNA damage and analysis by agarose gel electrophoresis.

5. To study chromosomal aberrations

6. Designing primers in Gene Runner for PCR.

7. To perform PCR with given template and primers.

8. To perform Restriction digestion of given DNA sample.

9. Exploration of Restriction Enzyme Database REBASE

10. Drawing vector DNA map with specified features.

Lab. Course -XIII based on Paper - BTI-603, BTI-604 & BTI-605

Max. Marks : 60
Internal Assessment:15
Time : 6 hours
(Two sessions)

1. Preparation and sterilization of different types of cell culture media *i.e.* RPMI 1640, Balanced Salt solutions, MS basal media, NAM.
2. To isolate lymphocytes from whole blood by gradient centrifugation
3. To culture lymphocytes using RPMI1640 media.
4. To check cell viability by cell counting
5. To check cell viability by MTT staining
6. To study stained preparation of lymphocytes from whole blood
7. To identify the starch/cellulose-degrading bacteria from soil/ termitarium sample(s).
8. Biomass production under solid state fermentation conditions.
9. Surface sterilization of plant explants
10. To induce callus culture from different explants.
11. Seed germination and growth of plantlet by tissue culture.
12. Transfer of the plantlet to hardening medium.
13. To synthesize artificial seeds.

Paper BTI-701
Biostatistics

Objectives: The objectives of this course are to introduce basic principles of statistics and mathematics and their applications in relation to Biological system. The aim of the course is to make students able to analyze the experimental data and design scientific proposal.

Outcomes: The students will be aware about importance of statistics; they will also be familiar to various statistical methods to analyze their experimental data.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I

Statistics, its meaning and objectives. Population samples, frequency tables and their graphs, measures of central tendency (mean, mode, median) and their dispersion. Concepts of moments, Skewness and kurtosis, Intuitive definition of random variables, probability mass function and probability density function, expectation and variance .Standard distribution; binomial, Poisson and normal distribution with their important properties and significance.

UNIT-II

Fitting of main distributions and testing of goodness –of – the –fit with special reference to χ^2- test, t –test, Z-test. Fitting of trends; linear and quadratic with least square method. Lines of regression, coefficient of correlation, coefficient of variation and their significance. Analysis of variance; one way and two way classification. Learn applications of statistics in the field of biology

REFERENCES:
1. Biostatistics; Arora PN, Malhotra PK, Himalaya Publishing House.
2. Introduction to Biostatistics; Sokal S & Rohit S, Toppan Publication.

Paper BTI-702
Molecular Biology-II

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of the course is to make the students understand the diverse mechanisms of regulation of gene expression in prokaryotic and eukaryotic organisms. The role of regulatory RNA molecules and molecular biology of transposons and cancer are also introduced to the students.

Outcomes: After the completion of the course, the students will learn the regulatory mechanisms at molecular level, which control the processes related with metabolism, development and differentiation in bacterial, phage and eukaryotic systems. The pivotal role of RNA in regulation will also be appreciated. The nature and spread of transposable elements as well as molecular basis of cancer will also be learnt.

NOTE
1. Seven questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
Gene regulation in prokaryotes: Inducer, repressor, co-repressor and activator concept, +vely and −vely regulated genes, description of various levels of control of gene expression in prokaryotes, operon concept, lac operon: regulation by +ve and −ve mechanisms, trp operon: regulation by -ve and attenuation mechanisms, regulon, regulation of gene expression in lambda phages.

Gene regulation in eukaryotes: Regulatory sequences in eukaryotes like promoter, enhancers, response elements, insulators and silencers, short-term and long term regulation of gene expression, molecular aspects of regulation of gene expression at transcription level like transcription repression by nucleosomes, histone modification by ubiquitination, acetylation, and phosphorylation, at post-transcriptional level like regulation of RNA splicing, RNA transport, RNA stability, at translational, post-translational and protein degradation level in eukaryotes.

UNIT-II
Transposable genetic elements: Discovery, mechanism of nonreplicative and replicative transposition, bacterial transposable genetic elements: simple transposons, complex transposons- the composite family and Tn3 transposon family and mechanisms of

transposition, bacteriophage Mu elements. Eukaryotic transposable genetic elements - Ty elements of yeast, various autonomous and non autonomous elements of maize and mechanism of transposition.

RNA world: RNA world hypothesis, messenger RNA (mRNA), transfer RNA (tRNA), ribosomal RNA (rRNA), antisense RNA, RNA as an Enzyme, as a regulator.
MicroRNA (miRNA)- History of microRNA, definition, composition, Dicer, RNA induced
silencing complex (RISC), modern concepts on their roles in translation inhibition.
Small interfering RNA or silencing RNA (siRNA) - History of siRNA, composition and structure, roles in post-transcriptional gene silencing and potential as therapeutics

Molecular Biology of Cancer: Benign and malignant tumors, types of cancers, cancer causing agents- radiations, chemical compounds, DNA and RNA viruses, mechanism of carcinogenesis, important characteristics of cancerous cells, proto-oncogenes and oncogenes, promoter insertion, enhancer insertion, chromosomal translocation, gene amplification and point mutation as mechanism for activation of proto-oncogenes.

REFERENCES:
1. The Biochemistry of the Nucleic Acids; Adams RLP, Knowler JT and Leader DP,
2. Chapman and Hall Publication.
3. Genetics; Peter JR and Benjamin S, Cummings Publication.
4. Recombinant DNA; Watson JD, Tooze T, Kurtz DT, Scientific American Books.
5. Principles of Gene Manipulation; Old RW and Primose SB. Blackwell Scientific
6. Publication.
7. Molecular Biotechnology; Glick and Pasternack, ASM press.

Paper BTI-703
Animal Biotechnology-1

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of this course is to familiarize the students to the potential applications of animal cell transfection along with various methods of foreign gene transfer into the animal cells. It discusses all the fields, insects to humans, where animal cell transfection is used for human and animal welfare.

Outcomes: This program will make the students familiar with different zones of animal biotechnology. After completing the course, the students will have the knowledge of all possible applications of animal biotechnology for the welfare of society.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I

Biotechnology in Pest control, Aquaculture and sericulture, Role of biotechnology in biodiversity conservation

Gene Transfer into Animal Cells

DNA transfer techniques into mammalian cells: calcium phosphate precipitation, DEAE-dextran procedure, polycation DMSO, microinjection, electroporation; Selectable markers, viral vectors for gene transfer into mammalian cells: SV40, adenovirus, baculovirus, retrovirus

Transgenic animals

Transgenic mice: Methodology and applications; Transgenic cattle, sheep and fish. Use of mouse embryonic stem cells in gene targeting and gene trapping

UNIT-II

Biotechnology for Animal Improvement

Conventional methods of animal improvement, predominantly selective breeding and cross breeding, Superovulation, Embryo collection, evaluation, and transfer, *In vitro* maturation of oocytes, In vitro fertilization and embryo culture, Embryo preservation, Embryo sexing, Marker-assisted selection and genetic improvement of livestock.

Gene therapy and other molecular genetics-based therapeutic approaches

Principles of molecular genetics-based therapies and treatment with recombinant proteins or genetically engineered vaccines, Technology of classical gene therapy, Therapeutics based on 4 targeted inhibition of gene expression and mutation correction in vivo, Gene therapy for inherited disorders, Gene therapy for neoplastic disorders and infectious disease, Ethics of human gene therapy

Animal and Human cloning
Concepts of animal cloning, Principles and techniques of cloning, Applications of animal cloning, Ethical of animal cloning Reproductive and therapeutic cloning, Ethical of human cloning

REFERENCES:
1. Animal Cell Biotechnology; Spier, RE and Griffiths JB (eds), Academic Press.
2. Animal Cell Culture - Practical Approach; John RW (eds) Oxford, Academic Press.
3. Animal Cell Culture - Methods in Cell Biology; Jenni PM and David B (eds),
4. Academic Press.
5. Biotechnology; Rehm HJ and Reed G (eds), VCH Publications.
6. Comprehensive Biotechnology; Murray MY (ed.) Academic Press.

Paper BTI-704
Plant Biotechnology-1

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of this course is to make the students aware of the potential applications of plant genetic tranformation along with various techniques of foreign gene transfer into the plant cells. It discusses all the fields where plant biotechnology is used for human welfare.

Outcomes: This program will make the students familiar with different areas of plant biotechnology. After completing the course, the students will have the knowledge of all possible applications of transgenic plants as well as plant cell cultures.

NOTE:

1. Seven Questions will be set in all.

2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.

3. As far as possible the question will be of short answer type.

4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I

Plant genetic transformation:

Organization of plant genome – Nuclear, Chloroplast and Mitochondrial Genome, T-DNA Tagging; Chloroplast transformation – vector designing, method and advantages *Agrobacterium* mediated transformation-Ti and Ri plasmids, role of virulence genes, mechanism of T-DNA transfer, vectors based on Ti and Ri plasmids – co-integrate and binary vectors, technique and factors affecting *Agrobacterium* mediated transformation of plants. Direct gene transfer – particle bombardment, PEG-mediated, electroporation, microinjection and alternative methods. Screenable and selectable markers, molecular characterization of transformants

Marker free methodologies, methods for multiple gene transfer in plants.

Applications of Plant Transformation for Productivity and performance: Herbicide resistance - phosphoinothricin, glyphosate, sufonyl urea, atrazine Insect resistance, Bt genes, Non-Bt like protease inhibitors, alpha amylase inhibitor Virus resistance, coat protein mediated, nucleocapsid gene Disease resistance- chitinase, 1-3 beta glucanase, RIP, antifungal proteins, thionins, PR Proteins Nematode resistance, Abiotic stress – drought tolerance, salt tolerance

UNIT-II

Plant cells as biofactories for the production of secondary metabolites:

Production of useful secondary metabolites through plant cell cultures, Strategies used for high yield of product – development and selection of high yielding cell line cultures,

optimization of factors affecting yield of plant cells (physical culture conditions, media and other biochemicals), bioreactors and immobilized plant cell culture, permeabilization of cells and removal of secreted products. Biofuel and Bioremediations

Molecular pharming in plants - Production of therapeutic proteins, antibodies, edible Vaccines

Molecular Marker-aided Breeding: RFLP maps, AFLP, RAPD markers, SCAR (Sequence Characterized Amplified Regions), SSCP (single strand conformational polymorphism). Green house and Green-Home technology

REFERENCES:
1. Plant Genetic Engineering; Singh RP and Jaiwal PK (eds), Sci tech Publishing LLC.
2. Elements of Biotechnology; Gupta PK, Rastogi Pub.
3. Plant Tissue Culture -Theory and Practice; Bhojwani SS and Razdan MK, Elsevier
4. Publication.
5. Plant Biotechnology; Hammond J, McGarvey P and Yusibov V (eds), Springer
6. Verlag.
7. Plant Gene Isolation – Principles and Practice; Foster GD and Twell D, John Wiley &
8. Sons.
9. Plant Biotechnology – The Genetic Manipulation of Plants; Slater A, Scott N and
10. Fowler M, Oxford Publications.
11. Practical Application of Plant Molecular Biology; Henry RJ, Chapman and Hall.

Paper BTI-705
Bio-entrepreneurship

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objectives of this course are to introduce the students to the basics of entrepreneur which include introduction of bio-entrepreneur with different characteristics. The purpose of this course is to teach the students about the role of entrepreneur in field of biotechnology.

Outcomes: The end of the course, the students will have good understanding of various aspects of bio entrepreneur and role of entrepreneur in field of biotechnology. The course will work as interface between technology and entrepreneur.

NOTE:
• Seven Questions will be set in all.
• Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
• As far as possible the question will be of short answer type.
• Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I

Creativity & Entrepreneurial personality and Entrepreneurship in Biotechnology
Organizational structure & Management
Capital Management
Product innovation and management
Government schemes for commercialization of technology (Eg. Biotech Consortium)
Basics of production management: Methods of manufacturing-Project/Jobbing, Batch Production, Flow/Continuous production, process production-Characteristics of each method. Plant location-Importance-Factors affecting location-factory Building-Plant layout-Installation of Facilities.

UNIT-II

Operational Research: Linear Programming, PERT and CPM; Production Planning & Control-Scheduling-Gantt Charts-Documentation-Production Work Order.
Kaizen (Continuous improvement in product & management)
Biotech enterprises: Small, Medium & Large
Quality control in Biotech industries
Govt. regulations for biotech products
Public policy, regulatory and ethical challenges facing the biotechnology entrepreneurship
Business development for medical products

REFERENCES:

1. Innovation and Entrepreneurship in Biotechnology: Concepts, Theories & Cases;
2. Hyne D and Kapeleris J.
3. Entrepreneurship in Biotechnology: Managing for growth from start-up; Martin Gross Mann.
4. Best Practices in Biotechnology Education; Friedman Y, Logos Press.

Paper BTI-706
Lab. Course -XIV based on Paper- BTI-701, BTI-702 & BTI-705

Max. Marks : 60
Internal Assessment:15
Time : 6 hours
(Two sessions)

1. For the given ungrouped data, construct the exclusive and inclusive type frequency distribution.
2. Draw the multiple and subdivided bar diagram for the given data.
3. To find the various measures of central tendency for the given frequency distribution.
4. To find the quartiles, deciles and percentiles for the given frequency distribution.
5. Calculate the mean deviation, variance, standard deviation and coefficient of variation for the given data.
6. Fit a binomial distribution for the given data.
7. Fit a Poisson distribution for the given data.
8. Fit a normal distribution for the given data.
9. To test a given null hypothesis using Chi-square test of goodness of fit.
10. To test the single mean using t-test.
11. To test if there is any significance difference between means from two different samples.
12. To test the single proportion using t-test.
13. To fit a straight line using principle of least squares.
14. To fit a parabola for the given bivariate data using principle of least squares.
15. Isolation and quantification of Histone proteins from dark-grown wheat coleoptiles.
16. Separation of various Histone proteins using denaturing PAGE.
17. Finding promoter sequence of given animal gene and determining its sequence elements using CISTER.
18. Finding promoter sequence of given plant gene and determining its sequence elements using PlantCare.
19. To analyze your entrepreneurial personality and creativity
20. To analyze your entrepreneurial potential by performing online Bill Wager's self assessment test.
21. To analyze your personality type by performing online Jung & Myer Brigg's assessment test.
22. To analyze personality type by performing online DISC self assessment test.
23. To make a business plan.
24. To study Biotech Enterprises.

Paper BTI-707
Lab. Course-XV based on Paper- BTI-703 &B TI-704

Max. Marks : 40
Internal Assessment:10
Time : 6 hours
(Two sessions)

1. Anther culture

2. Protoplast isolation using enzymes.

3. Test of various medicinal plant extracts for their antibiotic activity.

4. To perform node culture.

5. To perform suspension culture of different explants.

6. To perform embryo culture.

7. To perform the experiment of Polymerase chain reaction and confirm the result by an experiment of agarose gel electrophoresis.

8. To study the restriction digestion pattern of *Eco*R I on λ DNA (substrate).

9. To determine the molecular size of DNA fragments in test sample by agarose gel electrophoresis.

10. To carry out an experiment of DNA fingerprinting using RAPD technique.

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Semester VIII

Paper BTI-801
Bioinformatics

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: This course aims at training the students to understand and retrieve data from biological databases and analyze it according to their needs. It also focuses on phylogenetic analysis of gene families as well as gene predicting, nucleic acid and protein structure predictions using probabilistic methods.

Outcomes: After completing the course, the students will become acquainted with several biological databases and will be able use of bioinformatics in interpreting biological data. The student will inculcate the skill of sequence alignment, editing, and construction of dendrograms and their statistical validation. Students will learn to predict the location of genes in the genome, and secondary structural elements in RNA and protein sequences.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

Unit I

Introduction to bioinformatics, Classification of biological databases, Biological data formats, Application of bioinformatics in various fields. Introduction to single letter code of aminoacids, symbols used in nucleotides, data retrieval- Entrez and SRS.Introduction to Sequence alignment. Substitution matrices, Scoring matrices – PAM and BLOSUM. Local and Global alignment concepts, Dot plot. Dynamic programming methodology: Needleman and Wunsch algorithm. Smith–Waterman algorithm. Statistics of alignment score.

Multiple sequence alignment. Progressive alignment. Database search for similar sequences using FASTA and BLAST Programs. Evolutionary analysis: distances, Cladistic and Phenetic methods. Clustering Methods. Rooted and unrooted tree representation. Bootstrapping strategies, Use of Clustal and PHYLIP.

Unit II

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Gene finding methods. Gene prediction: Analysis and prediction of regulatory regions. Fragment assembly. Genome sequence assembly, Restriction Mapping, Repeat Sequence finder.
Concepts of secondary structure prediction of RNA and Protein. Probabilistic models: Markov chain, Hidden Markov Models-other applications.

Suggested reading:
1. Bioinformatics – Concepts, Skills, Applications". S.C. Rastogi, NamitaMendiratta, ParagRastogi.
2. Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins. Andréa's D. Baxevanis, B.F. Francis Ouellette.
3. Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids. Richard Durbin et al.
4. Computer Methods for Macromolecular Sequence Analysis. Doolittle R.F. (Ed.) (Methods in Enzymology, Vol. 266).
5. Shanmughavel, P. 2005. Principles of Bioinformatics, Pointer Publishers, Jaipur, India.
6. DNA and Protein Sequence Analysis. A Practical approach. Bishop M.J.Rawlings C.J. (Eds.).
7. Introduction to Bioinformatics. Teresa. K. Atwood and David J. Parry-Smith.
8. (http://www.imtech.res.in/raghava/gpsr/).

Paper BTI-802
Immunology-II

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of the course is to introduce the students to the elements of immune system, different stages of development and differentiation of T-cells and B-cells. Different pathways of complement system, cytokines and their actions, inflammatory responses and immune responses to various kinds of diseases other aspects of autoimmunity, hypersensitivity, transplantation immunity and cancer will also be introduced.

Outcomes: After the completion of the course, students will be aware of activation and differentiation of the cells of immune system. Role of cytokines and complement proteins in generating a robust immune response will also be learnt. The students will also understand the basics of immune responses against diseases caused by bacteria, viruses and worms. They will gain insight into complications of graft rejection, autoimmunity, hypersensitivity and cancer.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
T-cell maturation activation and differentiation: Different stages of T-cell maturation in Thymus, positive and negative selection, elements of positive and negative selection, T-cell activation, signal transduction pathways involved in T-cell activation and T-cell differentiation.
T cell Receptor B-cell generation, activation and differentiation: B-cell maturation, B-cell activation and proliferation, Role of T helper cells in B-cell response, class switching and regulation of B-Cell development.
Complement system: Classical, Alternate and lectin pathways; Function, activation, regulation and deficiencies of complement.
Cytokines: Chemokines and co stimulatory molecules: Role in regulation of immune response.
Leukocyte migration and Inflammation: Cell adhesion molecules, neutrophil extravasations, lymphocyte extravasations, mediators of inflammation, inflammatory process and anti-inflammatory agents.

UNIT-II

Immune response to infectious diseases: Bacteria, viruses, Intracellular parasites and helminthes, AIDS & other immunodeficiencies: Primary & secondary immunodeficiencies.

Auto immunity: Organ specific, cellular damage, evidences implicating the CD4+, T-cells, MHC & TCR in autoimmunity, induction & treatment of autoimmunity. Hypersensitivity reactions.

Transplantation immunity: Immunological basis of graft rejection, clinical manifestations of graft rejection, immunosuppressive therapies, immune tolerance to allograft, clinical transplants.

Cancer and immune system: Malignant transformation of cells, oncogenes and cancer induction, tumour antigens, cancer immunotherapy.

Vaccines: Designing vaccines for active immunization, purified macromolecules as vaccines, recombinant vaccines, DNA vaccines and multivalent vaccines.

REFERENCES:
1. Immunology- Roitt et al, Mosby Publications
2. Cellular and Molecular Immunology- Abbas and Litchman, Saunders Publication.
3. Kuby Immunology- Tizard RI, Saunders College Publishing.
4. Roitt's Essential Immunology- Roitt I, Blackwell Publishing.

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Paper BTI-803
Animal Biotechnology-II

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Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

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Objectives: The objective of this course is to teach students the different aspects of animal cell culture. Also it is desired to make them understand that how a culture is established, propagated and characterized and what are the applications of animal cell cultures, gene therapy and stem cells.

Outcomes: At the end of the course, the students are expected to understand the establishment, maintenance, characterization as well as applications of animal cell cultures. Students will also learn the use of animal cells for production of high value therapeutics as well as for various *in vitro* tests. The students would be aware of the applications such as transgenic animals, stem cells and role in biodiversity conservation.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

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UNIT-I

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Maintenance of cell culture: cell separation. Scaling-up of animal cell culture Cell synchronization. Cell cloning and micromanipulation. Organ and histotypic cultures. Three dimensional culture and tissue engineering
Transfection of animal cells: transfection methods. Methods for cell fusion, Selectable markers, HAT selection and Antibiotic resistance. Cloning and expression of foreign genes in animal cells: Expression vectors
Over production and preparation of the final product i.e. expressed proteins. Production of vaccines in animal cells
Hybridoma Technology: Production of monoclonal antibodies and their applications.
Embryo transfer technology- technique, its applications

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UNIT-II

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Transgenic Animals: transgenic sheep, cow, pig, goat etc. Production of transgenic mice, ES cells can be used for gene targeting in mice, applications of gene targeting.
Biotechnology in Pest control, Aquaculture and sericulture
Role of biotechnology in biodiversity conservation
Therapeutic products through genetic engineering – blood proteins, insulin, growth hormone etc

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Gene Therapy: introduction, types of gene therapy, vectors in gene therapy, major achievements, problems and prospects.
Stem Cells: Applications, Ethical issues.

REFERENCES:
1. Culture of animal cells; Freshney RI, John Willey & Sons.
2. Basic Cell Culture protocols, Methods in Biotechnology Series, Helgason CD & Mille, CL, Humana Press.
3. Animal Cell Biotechnology; Partner R, Humana Press.
4. Cell Culture; Butler M & Dawson M, Lab Fax, Bios Scientific Publications Ltd. Oxford.

Paper BTI-804
Plant Biotechnology- II

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: This course deals with the various methodologies of plant cell culture. Different methods of plant cell transformation and their applications like transgenic plants, production of secondary metabolites by plant cell cultures are discussed. Further the applications of plant biotechnology for the betterment of environment are given in the course.

Outcomes: The students gain the knowledge of different aspects of plant biotechnology after completing the course. They have gone through all types of plant cell cultures, their genetic engineering, transgenic plants and the potential applications to address various issues related to health and environment.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
Plant transformation technology: basis of tumor formation, hairy root, features of Ti and Ri plasmids, mechanisms of DNA transfer, role of virulence genes, use of TI and RI as vectors, binary vectors, use of 35S and other promoters, use of reporter genes, methods of nuclear transformation, viral vectors and their applications, multiple gene transfers, Vectors-less or direct DNA transfer, particle bombardment, electroporation, microinjection, transformation of monocots. Transgene stability and gene silencing
Application of Plant Transformation for productivity and performance: herbicide resistance, phosphoinothricin, glyphostate, sufonyl urea, atrazine, insect resistance, Bt genes, Non-Bt like protease inhibitors, alpha amylase inhibitor, virus resistance, coat protein mediated nucleocapsid gene, disease resistance chitinase. Transformation: advantages, vectors, success with tobacco and potato.

UNIT-II
Metabolic Engineering and industrial products: Plant secondary metabolites, control mechanisms and manipulation of phenylpropanoid pathway, shikimate pathway, alkaloids, terpenoids, Industrial enzymes, Plantibodies, Edible vaccines
Molecular Marker-aided Breeding: RFLP maps, linkage analysis, RAPD markers, STS, Microsatellites, SCAR (sequence characterized amplified regions), SSCP (single strand

conformational polymorphism), AFLP ,Biofuel, Bioremediations & Biosensors.

REFERENCES:

1. Plant Genetic Transformation and Gene Expression – A Laboratory Manual; Scott JR,
2. Armitage P, Walden R, Blackwell Scientific Publications, Oxford.
3. An Introduction to Biotechnology; Gupta PK, Rastogi Publications.
4. Principles of Gene Manipulation: An Introduction to Genetic Engineering; Old RW,
5. and Primrose SB, Blackwell Scientific Publications, Oxford.
6. Plant Molecular Biology – A Practical Approach; IRL Shaw C. H. Press Oxford.
7. Plant Biochemistry and Molecular Biology; Lea PJ and Leegood RC, Wiley Publishing.

Paper BTI-805
Environmental Biotechnology

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The course will provide a basic knowledge of applications of biotechnology in field of environmental studies. The objectives of the course is to understand a general overview, concepts and basic principles in the subject of environment science with emphasis on how to apply techniques of biotechnology to clean up contaminated environment and to generate/save valuable resources for future use.

Outcomes: On the successful completion of the course, the students will get sufficient scientific knowledge of different types of biotechnological methods to improve/save environment. The learners will get an insight into the techniques used in environment monitoring and remediation.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
Ecology & Biodiversity
Introductory concepts, The biological world and Ecology: Ecological balance and consequences of change, Biological word and eco-systems; Biochemical Diversity in ecosystem development; Diversity indices; Cellular diversity and the classification of living system – Prokaryotic & Eukaryotic organisms, General physical properties and Tolerance to environmental conditions; Microbial Biodiversity – strategies – bio-prospecting and recovery.
Air Pollution Control Methods and Equipment
Primary and secondary air pollutants, standards, sampling, basic ideas of air pollution control equipments, Bag Filter, Electrostatic Precipitators, cyclone separators, Wet-scrubbers, Bioscrubbers, Electrostatic precipitators, High volume sampler, RSPM Sampler, Control of specific gaseous pollutants.

UNIT-II
Wastewater Treatment by Biotechnological Processes
Water pollution; sources and classification of pollutants, B.O.D, C.O.D, D.O, T.D.S, Oil and grease, Metals etc. Standards, sampling and method of analysis, Bacteriological measurements. Overview of treatment principles and theory of aeration, Municipal Sewer and Industrial Wastewater Treatment –Principles, operation and design aspects of:

Activated Sludge process, Extended Aeration, Nitrification-denitrification, Trickling Filter, Mechanically aerated lagoons, Concepts of Waste stabilization ponds, Aquatic plant systems, Ranking of waste water treatment processes, common effluent treatment plant.

Environmental Biotechnology: Specialized aspects

Oil pollution – treatment with micro-organisms, Bioremediation—recovery of metals from waste water and sludge, xenobiotics, degradative capabilities of microorganisms with reference to toxicology, pesticides, herbicides, polyaromatic hydrocarbons, Anaerobic and aerobic composting, Vermiculture, Wetland Management, Membrane based waste water treatment processes – case studies.

REFERENCES:

1. Fundamentals of Ecology; Odum EP.
2. Wastewater Engineering – Treatment, Disposal and Reuse; Metcalf & Eddy, Tata McGrawhill
3. Environmental Pollution Control Engineering, Rao CS, New Age International Publication.
4. Wastewater treatment for pollution control; Arceiwala SJ, TMH Publication.

Paper BTI-807
Stem Cell Technology

Max.**Marks: 40**
Internal Assessment: 10
Time: 3 hrs

Objectives: The course will provide a basic knowledge of applications of Biotechnology in the field of stem cell science.

Outcomes: After the completion of the course, the students would learn the basics of tools and techniques of animal cell culture. The student will have the knowledge of stem cell biology with special reference to the techniques used and the applications of Stem cell culture

NOTE:
Nine questions will be set in all
Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit-wise with four questions from each unit. The candidates will be required to attempt Question No. 1 and four others selecting two questions from each unit.
All questions will carry equal marks

Unit-I

Basics of cell culture and related techniques: Cell and Tissue culture; Animal, Plants and Microbial Culture; Sterilization (Physical methods: Autoclave, Hot Air Oven, Laminar Airflow, Sintered glass filter and Membrane filter; Chemical and Radiation methods); Stains and staining techniques: simple stains, structural stains and Differential stains including Cell Viability stain, MTT assay; Microscope: Compound and System, Inverted and Upright, Dark field, Phase contrast, Fluorescence and Electron (Scanning and Transmission); BOD incubator, CO2 incubator, Orbital shaker, Cell Counter; Culture Media: General Media preparation (Plating, Broth preparation)

Unit-II

Stem Cell Biology: Animal Cell culture media: Introduction to the balanced salt solutions and simple growth medium. Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium. Role of carbon dioxide, Role of serum and supplements, Serum & protein free defined media and their application; Primary Cell Cultures and Continuous Cell Lines; Embryonic and adult stem cells and their applications. Totipotent, Pluripotent and Multipotent stem cells. Induced Pluripotent stem cells (iPS); Scope of Stem Cell Biology; Ethics: Ethical issues associated with stem cell biology in industrial and medical biotechnology.

Paper BTI-808
Lab Course based on BTI-801&BTI-802

1. To perform BLAST for sequence alignment

2. To perform FASTA for sequence alignment

3. To perform CLUSTAL W for sequence alignment

4. To perform GLIMMER for gene prediction

5. To perform GENMARK for gene prediction

6. To view structure in RASMOL

7. To view 3D structures in cn3d

8. To perform prosite for domain perdiction

9. To perform Pfam for motif prediction

10. To perform RNA FOLD for rna structure prediction

11. T perform jpred

12. To perform GENSCAN

Max.**Marks: 40**
Internal Assessment: 10
Time: 6 hrs
(Two sessions).

- Isolation of DNA from different varieties of wheat /rice and analyze biomarker by RFLP
- Preparation of primary tissue culture
- DNA Barcoding of available fauna
- To study pH and moisture content of soil
- To study carbonate and nitrate content of soil
- To determine dissolved oxygen (DO) of given water sample.
- Determination of COD of given water sample.
- DNA isolation from soil microbial community
- Isolation of azotobacter species from soil
- Perform Western Blotting using β-actin as an internal control
- Perform ELISA
- Perform Immunostaining depending on availability of tissues/cells

Semester IX

Paper BTI-901
Food Biotechnology

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: Food biotechnology has great scope in present and future. The course is designed to teach students about the use of biotechnology in food sciences. The objectives of the course is to make students learn about the different food additives and preservation techniques, various food packaging materials and their functioning sterilization techniques of food and packaging materials.

Outcomes: On completion of the course students get training and skill development in field of food biotechnology such as basic food and supplements as GM food, food from fungi, algae and bacteria and their large scale production

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
- History background
- Composition of food
- Growth of microorganisms in food: Intrinsic and extrinsic factors
- Traditional fermented foods: Bread, cocoa, coffee, tea, sauerkraut, cheese, butter, yoghurt, meat, fish, etc.
- Alcoholic beverages: Beer, wine and whisky
- Value addition products: High fructose syrup, invert sugars etc.
- Edible fungus: Mushrooms

UNIT-II
- Single cell proteins: Spirulina, yeast etc. as food supplements
- Improvement of food resources: Golden rice, Potato etc.
- Food and water borne disease: Gastroenteritis, Diarrhea, Shigellosis, Salmonellosis,
- Typhoid, Cholera, Polio, Hepatitis etc.
- Food borne intoxications: Staphylococcal, Bacillus, Clostridium etc.

- Detection of food borne pathogens.
- Food preservation and storage.

References:
1. Food Sciences and Food Biotechnology, Lopez GFP, Canas G, Nathan EV, CRC Publications
2. Genetically Modified Foods; Ruse M, Castle D, Prometheus Book publication.
3. Biotechnology and Food Process Engineering; Schwartzberg HG, Rao MA, Marcel Dekker.
4. Modern Food Biotechnology; Jay JM, Lossner MJ, Golden DA.
5. Food Science; Potter NN, Hotchkiss JH.

Nano Biotechnology

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of this course is to make students understand the concept of nano particles and associated technology followed by application in biological system.

Outcomes: After successful completion of this course the students will imbibe the knowledge of formation and functioning of various nano particles. They will be aware of its uses in various sectors like health care, tissue engineering, targeted drug delivery and other associated sectors.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
Introduction to BioNanotechnology - Cellular nanostructures, self-assembly of colloidal nanostructures of biological relevance, bioactive nanoparticles (respiratory surfactants, magnetic nanoparticles), Nanoparticles for drug delivery (including solid lipid nanoparticles, synthetic and biopolymeric nanoparticles), carbon nanotubes, polymeric nanofibers, Implications in neuroscience, tissue engineering and cancer therapy, and Environmental and safety aspects of bio-nanotechnology

UNIT II
Introduction to Nanotechnology (Definitions, history and current practice), Multilayer Thin Film: Polyelectrolyte multilayers, coated colloids, smart capsules, LbL self-assembly, Colloids and Colloid Assemblies for Bio-nanotechnology, Nanoengineered biosensors, Fiber Optic Nano-sensors in medical care, Semiconductor and Metal Nanoparticles: Synthesis and Applications, Nanotechnology in Tissue Engineering, Microemulsions and Drug Delivery in Nanotechnology. Overview of current industry applications; nanoscale science and engineering principles

References:
1. Multilayer Thin Films; Decher G, Schlenoff JB, Wiley-VCH Verlag GmbH & Co.
2. Bionanotechnology : Lessons from Nature; Goodsell DS, Wiley-Liss.
3. Nanotechnology - A Gentle Introduction to the Next Big Idea; Ratner and Ratner, Prentice Hall PTR.

Paper BTI-903
Research Methodology

Max. Marks: 40
Internal Assessment: 10
Time: 3 hrs.

Objectives: The aim of the course is to elaborately discuss various approaches of data sampling, data collection and data analysis. The course aims at making the learner aware of concepts and principles of scientific report writing, research paper, thesis writing etc.

Outcomes: After the students understand this course they will be able to explore various available resources in a much efficient manner and to present and conserve the results and other findings in much organized and formalized. The student will be ready to implement the techniques more accurately in formal manner.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I

Research: Meaning –Purpose, Types and significance of research in basic/applied sciences. Steps in Research: Identification, selection and formulation of research problem- Research questions-Research design- Formulation of hypothesis- Literature collection, Review of literature. Sampling Technique: Sampling theory-Types of sampling-Steps in sampling- Sampling and Non-sampling error-Sample size –Advantages and limitations of sampling. Web browsing for information search; search engines and their mechanism of searching; Hidden Web and its importance in scientific research; Internet as a medium of interaction between scientists; Effective email strategy using the right tone and conciseness.

UNIT-II

Data for Research: Primary data-Meaning-Collection methods-Observation–Interview-Questionnaire-Schedule-Pretest-Pilot study –Experimental and case studies- Secondary data- Meaning – Relevance, limitations and cautions. Processing Data: Checking-Editing-Coding- transcriptions and Tabulation-Data analysis- Meaning and methods-Quantitative and Qualitative analysis Structuring the Report: Chapter format- Pagination-Identification- Using quotations- Presenting footnotes – abbreviations- Presentation of tables and figures- Referencing- Documentation-Use and format of appendices- Indexing

Preparation of Research report- Thesis - dissertation -Manuscript/research article – monograph/review, Oral and poster presentation of research papers in conferences/symposia.

REFERENCES:
- MS office; Sexena S, Vikas Publishing House.
- Statistical methods; Snedecor GW and Cohran WG, Oxford and IBH publishing CO Pvt.
  Ltd.
- Biometry; Sokal RR and Rohlf FJ, Freeman WH publishing House.
- Biostatistical analysis; Zar JH, Prentice Hall Publishing House.

Paper BTI-904
IPR, Biosafety & Bioethics

Max. Marks: 40
Internal Assessment: 10
Time: 3 hrs.

Objectives: The course enable students to know about the legal and safety enigmas concerned with various ancient achievements and latest biotechnological upcoming developments or products.

Outcomes: After the students gone through this course will be able to understand and follow issues and norms regarding bioethics, biosafety, types of intellectual property and its protection accordingly in various manner.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I

General Introduction to intellectual property rights and its different forms. Farmers Rights, Animal and Plant breeders rights. Development of patent system in India. WTO agreement and TRIPS Patent Cooperation treaty, Basic requirements of patentability, patentable subject matter, novelty and the Public Domain; Non obviousness Compulsory licensing, Patent infringements and revocation. Special issues in Biotechnology Patents: Disclosure Requirements, Collaborative research, competitive research, Patent Litigation:. Recent Development in Patent System and Patentability of Biotechnology invention, Budapest treaty.

UNIT-II

Introduction; Historical Background; Introduction to Biological Safety Cabinets; Primary Containment for Biohazards; Biosafety Levels; Biosafety Levels of Specific Microorganisms; Recommended Biosafety Levels for Infectious Agents and Infected Animals; Biosafety guidelines - Government of India; Definition of GMOs & LMOs; Roles of Institutional Biosafety Committee, RCGM, GEAC for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication. Brief account of bioethics in Biotechnology

REFERENCES:
- Elements of Biotechnology; Gupta PK, Rastogi Publications, Meerut.
- Intellectual Property rights in the WTO and Developing countries; Watal J, Oxford

- University Press.
- Intellectual Property Bulletin, New Delhi

Paper BTI-905
Fermentation Technology

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of this course is to let students know about different types of fermentations, strains used, their preservation and production of metabolites and their purification.

Outcomes: As outcome of this course the students will become familiar with different methods and techniques being used in fermentation industries. The students will have understanding of use and preservation of microbial cultures for better and efficient production of desired metabolites.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
- Isolation and screening of microbes of industrial importance.
- Strain improvement: mutation and genetic manipulations.
- Culture preservation techniques
- Primary and Secondary metabolites
- Feedback inhibition & repression
- Fermentative processes:
    o Sub-merged
    o Solid state,
    o Fed Batch
- Continuous etc.
- Inoculums development, fermentation media
- Types of industrial fermenters, Fermentation equipment: Design of fermenters, tank construction materials, control panels, antifoam, autoclaving

UNIT-II
- Energetics of microbial growth in fermenters: Reaction rates, heat and mass transfer, transport phenomenon in reactors, macrscopic balances of energy and energy flow etc.
- Upstream and downstream processing of industrial fermentations.
- Cell disruptions, Flocculation, Filterations, Ultrafilteration, ultracentrifugation, gel filtration, chromatographic methods, two phase aqueous separations. Cells and

10(1122)

- enzyme immobilizations Fermentation of :
  - o Antibiotics (Penicillin, Streptomycin)
  - o Organic acids (Citric acid, Lactic acid)
  - o Enzymes (Penicillin G Acylase, Streptokinase) d. ethanol.
- Recombinant Proteins (Insulin).
- Hygiene and safety in fermentation laboratory

REFERENCES:
- Biotransformations and Bioprocesses (Biotechnology and Bioprocessing Series); Doble
  M, Kruthiventi AK and Gaikar VG, CRC Publisher.
- Bioprocess Engineering Basic Concepts; Prentice Hall Publisher
- Principles of Fermentation Technology; Stanbury PF, Whitaker, A Hall S.
- Bioprocess Engineering: Basic Concepts; Shuler ML and Kargi F, Prentice Hall PTR
  Publisher.
- Solid-State Fermentation Bioreactors: Fundamentals of Design and Operation; Mitchell
- DA, Krieger N, and Berovic M, Springer Publisher.

Paper BTI-906
Bioinstrumentation

Max. Marks: 65
Internal Assessment: 10
Time: 3 hrs.

Objectives: The objective of this course is to introduce students with principles, instrument and application of various techniques like spectroscopy, centrifugation, biosensors; DNA/RNA based techniques and immunotechniques.

Outcomes: As an outcome of the present course students will be capable of using the instruments with in-depth knowledge of working and principles of the various techniques in future research for better elucidation of living world and its best usage in betterment of life.

NOTE:
1. Seven Questions will be set in all.
2. Q. No 1 which will be objective/short answer type covering the entire syllabus, will be compulsory. The remaining questions will be set section wise with questions 3 from each section. The candidates will be required to attempt Q. No. 1 & four others selecting 2 questions from each section. All questions will carry equal marks.
3. As far as possible the question will be of short answer type.
4. Each question should be divided into parts & the distribution of marks be indicated part wise.

UNIT-I
Spectroscopy: Raman, Fluorescence and NMR spectroscopy; ORD & CD; Mass spectrometry, MALDI-TOF, LC-MS; X-ray diffraction; Atomic absorption spectroscopy Applications of these spectroscopic techniques in the study of Biomolecules
Centrifugation: Basic principles of sedimentation; types of centrifuge (Bench top, high speed & ultracentrifuges); types of rotor; Preparative & analytical centrifugation. Separation methods-Differential centrifugation, Density gradient centrifugation Subcellular fractionation- Disruption of cells, isolation of subcellular organelles from liver & plant cells and marker enzymes
Advanced purification techniques: FPLC, HPLC

UNIT-II
Nucleic acid based techniques – Northern, Southern, Sequencing of proteins and nucleic acids, PCR, RT-PCR, QRT-PCR, DNA microarray, DNA fingerprinting (RFLP, RAPD, AFLP, SSR)
Immunotechniques - Flow cytometry, Immuno-cytochemistry, immune-fluorescence and Western & Dot blots, Florescence activated cell sorter (FACS) technique, Cytotoxicity assay
Biosensors - Principle and application

REFERENCES:

- Bioinstrumentation, Student; John GW, John Wiley & Sons Ltd.
- Practical Biochemistry Principles and Techniques; Wilson K and Walker J, Cambridge University Press.
- Essentials of Molecular Biology; Malacinski GM, Freifelder D, Jones & Bartlett Publishers.
- Proteins-Structure and Molecular Properties; Creighton TE, Freeman and Company.
- Genes IX; Benjamin L, Jones and Bartlett Publishers.

Paper BTI-908

DNA Barcoding

Max. Marks: 40
Internal Assessment: 10
Time: 3 hrs

Objectives: The objective of the course is to impart the knowledge of biodiversity with reference to genetic matrial variations. The course aims at the use of technology for the study and conservation of biodiversity

Outcomes: On the completion of the course the student will be aware of the diversity at molecular level and will be able to explore the use of Molecular Techniques, Bioinformatics and Biostatistics in Genomics study.

NOTE:

Nine questions will be set in all

Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit-wise with four questions from each unit. The candidates will be required to attempt Question No. 1 and four others selecting two questions from each unit.

All questions will carry equal marks

Unit-I

Biodiversity, Organisms & Molecular Biology in systematic study: Brief about Species, Speciation and Biological Evolution; Taxonomy, Classification, nomenclature and Identification; Biological Sampling and Vouchering, Cell, Gene, Genomic DNA, Mitrochondrial DNA, DNA barcoding basics and opportunities

Unit-II

Molecular Techniques, Bioinformatics and Biostatistics in Genomics study: DNA isolation, electrophoresis, DNA Sequencing; Primer designing; Polymerase Chain Reaction (PCR) & its role in DNA barcoding; PCR-RFLP; RT-PCR; Bioinformatics: An essential tool for DNA barcoding; Basics of Databases, tools; DNA, Protein sequence formatting and alignment, Gene characterization and genetic traits, Online database and retrieval of Biological information; Data analysis and Phylogenetic study and Genetic distance, Brief on Biostatistics and various tests

Paper BTI-909
Lab Course based on Paper-BTI-901, BTI-902, &BTI-905/BTI-906

Max. Marks: 60
Internal Assessment: 15
Time: 6 hrs
(Two sessions)

1. To test the quality of milk by Methylene Blue Reduction Test (MBRT)
2. Determination of quality of milk samples by Methylene Blue Reduction Test (MBRT)
3. Isolation of casein protein from milk
4. Preparation of glue from milk protein
5. To synthesize silver nano particles by *E.coli*
6. To synthesize silver nanoparticles by chemicals
7. To study ellipsometry
8. To study ninthi software
9. To study nanotube modeler software
10. To study XRD.
11. Isolation of important amylase producing bacteria from soil
12. Preservation of amylase producing bacterial strain on agar slant.
13. Production of Sauerkraut by microorganisms
14. To study the acidity of sauerkraut

Fermentation Technology
15. Production of red wine.
16. Estimation of acids formed during wine production.
17. Estimation of alcohol produced in wine by dichromate titration method.

Bioinstrumentation
15. To prepare absorption spectrum of plant pigments by UV- Vis spectroscopy
16. Isolation of subcellular organells from animal tissue and identification by marker enzymes
17. Isolation of subcellular organells from plant tissue and identification by marker enzyme.
18. PCR
19. Western blot
20. Determination of cytotoxic concentration (IC50)

Paper BTI-910
Lab Course based on Paper-BTI-903 & BTI-904

Max. Marks: 20
Internal Assessment: 5
Time: 3 hrs
(One Sessions)

Practicals will be based on theory papers.

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KURUKSHETRA UNIVERSITY, KURUKSHETRA

(Established by the state Legislature Act XII of 1956)

('A⁺' Grade, NAAC Accredited)

आचार्यः (फ़लित ज्योतिषम्) पाठ्यक्रमः

w.e.f. 2019-20 in phased manner

प्रथमं वर्षम्

<u>**प्रथमं पत्रम्**</u>पूर्णांकः-100 अंकाः

<u>**समयः होरात्रयम्**</u>

भारतीयकुण्डलीविज्ञानम्(सम्पूर्णम्)

(श्री मीठालालहितरामओझा कृतम्)

भागः -1 तः 4 यावत्

भागः -1 तः 2 यावत्   35 अंकाः

भागः -3 तः 4 यावत्   35 अंकाः

1) जातकालंकारः (सम्पूर्णः)   30 अंकाः

   (श्री गणेशदैवज्ञकृतः)

टिप्पणी :

1.- प्रश्नपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

द्वितीयं पत्रम्   पूर्णाकः-100 अंकाः

समयः होरात्रयम्

1) मुहूर्तचिन्तामणिः (विवाहप्रकरणं यावत्)
   (श्रीरामाचार्यकृतः)
   शुभाशुभप्रकरण तः संक्रान्तिप्रकरणं यावत् -   35 अंक
   गोचरप्रकरण तः विवाहप्रकरणं यावत्-   35 अंकाः
2) लघुजातकम्(सम्पूर्णणम्)   30 अंकाः
   (श्री वराहमिहिरकृतम्)

टिप्पणी :

1.-   प्रश्नपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

तृतीयं पत्रम्   पूर्णाकः-100 अंकाः

समयः- होरात्रयम्

1) वृहदसंहिता (वास्तुविद्याध्यायं यावत)-   70 अंकाः

   (श्री वराहमिहिराचार्यकृता)

2) भावकुतूहलम (सम्पूर्णम्)   30 अकाः
   (श्री जीवनाथकृतम्)

टिप्पणी :

1.- प्रश्नपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवं अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

चतुर्थं पत्रम्पूर्णांकाः-100 अंकाः

समयः- होरात्रयम्

1) संस्कृत साहित्येतिहासः :-70 अंकाः
   (आचार्य रामचन्द्रमिश्रकृतः)
   (चौखम्बा विद्या -भवनप्रकाशितः)
2) संस्कृतसाहित्येतिहास :-   30 अंकाः
   (वैदिकयुगः) by A.A.Macdonell
   (श्री चारुचन्द्र शास्त्री कृतः हिन्द्यानुवादः
   (चौखम्बा विद्याभवनप्रकाशितः)

टिप्पणी :

1.- प्रश्नपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

आचार्यः (फ़लित ज्योतिषं) पाठ्यक्रमः

w.e.f. 2020-21

द्वितीयं वर्षम्

प्रथमं पत्रम् **पूर्णांकः 100 अंकाः**

समयः होरात्रयम्

1) सारावली (त्रिंशोध्याय यावत्)-   60 अंकाः
   (श्री मत्कल्याण वर्मरचिता)
2) नारदसंहिता (सम्पूर्णम्)-   40 अंकाः
   (नारदमुनिप्रणीता)

टिप्पणी :

1.- प्रश्नपत्रपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम ।

द्वितीयं पत्रम्   पूर्णांकः-100 अंकाः

समयः होरात्रयम

1) वृहदसंहिता -   70 अंकाः
   (अर्गलाध्याय तः ग्रहगोचराध्यायं यावत्)
   (श्री वराहमिहिराचार्यप्रणीता)

2) मुहूर्तचिन्तामणि -   30 अंकाः
   (वधूप्रवेशप्रकरण तः गृहप्रवेशप्रकरणं यावत्)
   (श्री रामाचार्यकृता)

टिप्पणी :

1.-   प्रश्नपत्रपत्रनिर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

तृतीयं पत्रम्   पूर्णाकः-100 अंकाः

समयः- होरात्रयम्

1)फलित विकासः (सम्पूर्णः)-   50 अंकाः

(श्री रामरत्न ओझाकृतः)

2) वृहद्वास्तुमाला (सम्पूर्णा)-   50 अंकाः

(स्व.पं॰रामनिहोरद्विवेदिना संगृहीता)

टिप्पणी :

1.-   प्रश्नपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

चतुर्थं पत्रम्पूर्णाकः-100 अंकाः

समयः- होरात्रयम्

1) ज्योतिष साहित्येतिहास :   70 अंकाः
(आचार्य लोकमणिदाहलकृतः)
(चौखम्बा विद्या - भवनप्रकाशितः)
2) ज्योतिषसाहित्येतिहास :   30 अंकाः
(वैदिकयुगः)
(श्री बालकृष्ण दीक्षितकृतस्य मराठी पुस्तकस्य हिन्द्यानुवादः)
अनुवादकः- श्री शिवनाथः झारखंडी

टिप्पणी :

1.- प्रश्नपत्रस्य निर्माणं संस्कृतभाषायामेव करणीयम्

2. प्रश्नपत्रे / समीक्षात्मकेषु / निबधात्मकेषु प्रश्नेषु 100% प्रतिशतम्एवम्अन्येषु प्रश्नेषु न्यूनतमं 50% प्रतिशतं विकल्पं देयम्।

Group – B: CRIMINAL LAW

Object: This group is designed to discuss history and principles of criminal law, comparative criminal procedure, criminology, penology and juvenile delinquency.

Outcome: The students shall be well versed with each and every aspect of criminal law in addition to Juvenile Justice Law.

LL.M. 2nd Semester
203-Paper -I (ELECTIVE PAPER): History and Principles of Criminal Law

Max. Marks: 100
Credits: 5
Time: 3 Hours

Note: (1)   There shall be total V Units in the question paper. Unit-I shall contain one compulsory question having four parts of five marks each. This question shall be spread over the entire syllabus. There shall be two questions in each Unit i.e. Unit-II to Unit-V. The student is required to attempt four questions by selecting one question from each Unit i.e. Unit-II to Unit-V. Each question shall carry twenty marks.

Unit – I

1.   Principles of Criminal law
2.   General Principles of Criminal liability
3.   Crime : Definition; nature; elements of crime; Different levels of Mensrea and their relevance in constitution of Crime; History of Mensrea as an essential element of crime in criminal jurisprudence.

Differences : Crime and Civil Wrong
                 Crime and Moral Wrong

Inter-relationship of Crimes and Torts.

4.   Theories of Criminal Liability
5.   Theories of Causation of Crime
6.   Actus Reus Non Facit Reum Nisi Mens Sit Rea
7.   Actus mi envictu reus, nisi mens facit reum.

Unit – II

1.   Constructive joint Liability:
    (a)   Common intention
    (b)   Common Object
2.   Stages of Crimes
3.   Concept of Individualization of Punishment
4.   Modern view of Punishment and Indian Penal Code
5.   Executive Clemency : Meaning; Historical development; types
- Power of Executive Clemency under constitution of India.
- Clemency Petition: Procedure; scope before trail, during trail and after conviction.
- Is executive clemency derogatory or supplementary to Administration of Justice.

1.   General defences : Excusable and Justifiable
   - Difference between two types of defences
   - Excusable defences under IPC
   - Justifiable defences under IPC
2.   Inchoate Criminal Offences
   - Attempt
   - Criminal Conspiracy
   - Attempts
3.   Reforms in Criminal Law: Role of Judiciary Legislature and Law Commission in India.

Unit – IV
1.   Presumptions and Burden of Proof under India Penal Code
2.   Criminal Liability: An overview
3.   Corporate criminal liability: History of evolution of corporate criminal liability in India.
4.   Vicarious liability under criminal law in India; Vicarious liability of state; Vicarious liability under special statues

Select Bibliography:
   1. William , Glanville   : `   Criminal Law (General Part)
   2. Kennys   :   Outlines of Criminal Law (edited by J.W.C Turner)
   3. Stuwart, S.W   :   A Modern View of the Criminal Law (Pergamon) Press Ltd., Oxford, 1969)
   4. Nigam, R.C.   :   Law of Crimes in India Vol. I (Principles of Criminal Law)
   5. Gour, Hari Singh   :   Penal Law of India.
   6. Bhatt, V.R.   :   Essays in Criminal Law (Karnataka University ,Dharwar, 1979)
   7. Bhattacharya, B.K.   :   Insanity & Criminal Law (Eastern Law House, Calcutta).
   8. Fitzgerlard, P.J.   :   Criminal Law & Punishment.
   9. Colin, Howard   :   Strick Responsibility (Sweet & Maxwell Ltd.,London,1963)
   10. Law Commission of India, Reports: 29,42,43 and 47
   11. Radzinowicz and Turner   : Modern Approach to Criminal Law.
   12. Edwards   :   Mens Rea in Statutory Offences.
   13. Hall   :   General Principles of Criminal Law.
   14. Stephen, James F.   :   History of Criminal Law (Vols. I,II & III).
   15. Chaturvedi, A.N.   :   Rights of the Accused under the Indian Constitution(1984)

CODE-102: PAPER-II: CONSTITUTIONAL LAW-I

Max. Marks: 100
Time: 3 Hours

Note: (i) The Entire Syllabus of the theory has been divided into **four units**. But the question paper shall have **five units**. Unit **I** to **IV** of the question paper will have two questions from each **unit** of the syllabus. The student will be required to attempt one question form each **unit.**

Unit-V will consist of one compulsory question divided in to 8 parts, carrying two parts from each unit to the syllabus. The student will be required to attempt any four parts.

(ii)   All questions shall carry equal marks.

Unit-I
- Making of the Indian Constitution
- Nature and Salient Features of the Constitution of India
- Preamble
- Union and its Territory

Prescribed Case:
Kesavananda Bharti v. State of Kerala, AIR 1973 SC 1461

Unit-II
1.   Fundamental Rights in General(Articles 12 and 13)
2.   Equality Before Law (Articles 14)
3.   Right to Equality (Articles 15-18)

Prescribed Case:
Indra Sawhney v. U.O.I AIR 1993 SC 477

Unit-III
1.   Right to Freedom (Article19)
2.   Right to Freedom (Articles 20,21 &22)
3.   Right against Exploitation (Articles 23-24)
4.   Right to Freedom of Religion (Articles 25-28)

Prescribed Case:
Maneka Gandhi v. Union of India, AIR 1978 SC 597

Unit-IV
1.   Cultural and Educational Rights (Articles 29-30)
2.   Directive Principles of State Policy (Articles 36-51) Article 31-C
3.   Right to Property (Articles 300-A, 31-A&31-B)
4.   Fundamental Duties (Article 51-A)

Prescribed Case:
Minerva Mills Ltd. v. Union of India, AIR 1980 SC 1789.

Book Recommended:
1. Basu, D.D.   : Constitution of India
2. Chander Pal   : Centre-State Relations and Co-operative Federation
3. Chander Pal   : State Autonomy in Indian Federation
4. Diwan, Paras   : Constitution of India
5. Gupta, R.K.   : Centre-State Fiscal Relations under Indian Constitution.
6. Jain, M.P.   : Indian Constitutional Law
7. Seervai, H.M.   : Constitutional Law of India
8. Singh Mahendra, P   : V.N. Shukla's Constitutional Law of India
9. Narinder Kumar   : Constitutional Law of India

CODE-403: PAPER-III: INSURANCE LAW

Max. Marks: 100

Time: 3 Hours

Note: (i) The Entire Syllabus of the theory has been divided into **four units**. But the question paper shall have **five units**. Unit **I** to **IV** of the question paper will have two questions from each **unit** of the syllabus. The student will be required to attempt one question form each **unit.**

Unit-V will consist of one compulsory question divided in to 8 parts, carrying two parts from each unit of the syllabus. The student will be required to attempt any four parts.

(ii) All questions shall carry equal marks.

Unit-I

1. Insurance: Definition, Nature, Scope and functions.
2. History of Insurance: Life, Fire, Marine.
3. Principles of Insurance: General Principles, Specific Principles and Basic Principles of Insurance.
4. Contract of Insurance: Its elements, concept of Indemnity and non indemnity.
5. Insurable Interest
6. Premium in Insurance Contract: Issue of Adequacy of Premium.
7. Modes of Payment of Premium
   Forfeiture of Policy: An overview
   Non-Forfeiture clauses in an Insurance contract.
8. Assignment of Insurance Policy : History, relevancy of assignment, conditional assignments.
9. Conditions of the policy : Express and implied conditions.
   Conditions of the Life policy
   Conditions of the Fire policy
   Conditions of the Marine policy
10. Classification of insurance Policies; form and content

Prescribed Case:
Reserve Bank of India v. Peerless General Finance and Investment Co. AIR 1987 SC 1023

Unit – II

Insurance Regulatory and Development Authority Act 1999 (41 of 1999) Structure, Duties, Powers and functions of Authority.

Life Insurance Corporation Act 1956 and the life Insurance (Emergency Provisions) Act 1956 History, establishment, composition, LIC: Object, functions and Scope.

Life Insurance: Definition, Kinds of Life Insurance, nature, scope, formation of Life Insurance contract, circumstances effecting the risk.

Amount recoverable under the life policy.

Persons entitled to payment, settlement of claims

Payment of money

Prescribed Case
LIC v. Nirmala Adi Reddy, AIR 1984 SC 346

Unit - III

Marine Insurance Act 1963: Marine Insurance Nature and scope, Kinds of Marine Policies.

Concept of Insurable Interest and Insurable value in reference to marine Insurance;

Assignment of Marine Policy.
Premium in Marine Insurance An Overview
Circumstances when half premium is refunded
Circumstances when full premium is refunded
Rights of Insurance an payment and return of premium
Perils of Sea
Measures of Indemnity.

Prescribed Case

Home insurance Co. v. Ramnath & Co., AIR 1955 Mad. 602

Unit – IV

Public Liability Insurance Act,1991

Nature, Scope and object, liability to give relief in certain cases on principles of no fault (Section 3), Duty of owner to take out insurance policies (Section 4), verification and Publication of Accident by collector (Section 5) Application for Claim for relief (Section 6), Award of Relief (Section 7)

Establishment of Environmental Relief Fund (Sections 7A); Provisions as to other right to claim compensation of death (Section 8); Powers of Collection (Section 9 to 13), Penalty for contravention (Section 15); offences by companies and Government Departments (Section 16,17)

Prescribed Case

Charan Lal Sahu v. Union of India, AIR 1990 SC 1480; (1990) 1 SCC 613

Statutory Material

1. The Life Insurance Corporation Act,1956
2. The Life Insurance (Emergency Provisions) Act,1956
3. Marine insurance Act,1963
4. Public Liability Insurance Act,1991

Books Recommended:

1. Srinivasan, M.N.   : Law and the Life Insurance Contract
2. Srivastava, Kirpa Dayal   : Commentaries on Employees State Insurance Act,1948
3. Murthy, K.S.N.   : Modern Law of Insurance in India
4. Banerjee , B.N.   : The Law of Insurance
5. Mishra, M.N.   : Law of insurance
6. Ivamy, E.R. Hardy   : Marine insurance
7. Bhattacharjee   : The Life Insurance Corporation Act
8. Naresh Mahipal   : An introduction to Insurance Laws (ed. 2017), Central Law Publications.

CODE-502: PAPER-II: LABOUR AND INDUSTRIAL LAW-I

Max. Marks: 100
Time: 3 Hours

Note: (i) The Entire Syllabus of the theory has been divided into **four units**. But the question paper shall have **five units**. Unit **I** to **IV** of the question paper will have two questions from each **unit** of the syllabus. The student will be required to attempt one question form each **unit.**

Unit-V will consist of one compulsory question divided in to 8 parts, carrying two parts from each unit of the syllabus. The student will be required to attempt any four parts.

All questions shall carry equal marks.

Unit-I: Industrial Disputes Act,1947

Definition of Industry, Industrial Dispute and Workman; Grievance Settlement Authorities- Works Committee, Court of Enquiry, Conciliation Officer and Board of Conciliation, Labour Court, Industrial and National Tribunal; Reference of Dispute to Board, Court and Tribunals (Section 10); Voluntary Reference of Disputes to Arbitration (Section 10A)

Prescribed Case

Banglore Water Supply and Sewerage Board v. A. Rajappa and others, AIR 1978 SC 548

Unit-II: Industrial Disputes Act,1947

Strikes and Lockouts, Lay Off and Retrenchment, Transfer and Closure (Chapter VA & VB), Conditions of Service etc. to remain unchanged (Sections 33-33C), Workers Participation in Management, Unfair Labour Practices.

Prescribed Case

Syndicate Bank v. K. Umesh Nayak, 1994 1 LLJ 836(SC)

Unit-III: Trade Union Act,1926

Definitions of Trade Union, Trade Disputes, Procedure of Registration of Trade Unions Cancellation of Registration, Dissolution of Trade Union, Rights, Liabilities and Immunities of the Members of Registered Trade Union, Recognition of Trade Union, Collective Bargaining.

Industrial Employment (Standing Orders) Act,1946

Concept and Meaning of Standing orders, Certification Process; Its Operation and binding Effect, Modification of Standing Orders and Temporary Application of Model Standing Orders.

Prescribed Case

In re Indian Steam Navigation Workers Union, AIR 1936 Cal. 57

Unit-IV: Equal Remuneration Act,1976

Payment of Equal Remuneration to Men and Women Workers, Prohibition of Discrimination while Recruiting Men and Women Workers, Advisory Committee and the Role of the Appropriate Government to Appoint Authorities for Deciding Claims.

The child and Adolescent labour(Prohibition and Regulation) Act,1986

Prohibition of employment of children in any occupation and process, Regulation of conditions of work of adolescents, penalties.

Prescribed Case

M/s Mackinnan Mackenzie and Co. Ltd. V. Andrey D'Costas and another, (1987) ILLJ 536(SC)

Books Recommended

1. Malhotra O.P.   : Industrial Dispute Act,1947
2. Mishra, S.N.   : Labour and Industrial Laws
3. Yadav,Sunil   : labour & Industrial Laws
4. Puri, S.K.   : Labour and Industrial Laws
5. Goswami, V.G.   : Labour Law and Industrial Laws
6. Varandani, G.   : Workers Participation in Management
7. Sabharwal, R.K.   : Job Security of Industrial Workers

CODE-601: PAPER-I: PRINCIPLES OF TAXATION LAW

Max. Marks: 100
Time: 3 Hours

Note: (i) The Entire Syllabus of the theory has been divided into **four units**. But the question paper shall have **five units**. Unit **I** to **IV** of the question paper will have two questions from each **unit** of the syllabus. The student will be required to attempt one question form each **unit.**

Unit-V will consist of one compulsory question divided in to 8 parts, carrying two parts from each unit of the syllabus. The student will be required to attempt any four parts.

(ii)   All questions shall carry equal marks.

Unit-I
Need and importance of Income Tax in India, history of the development of Income Tax, Nature of Income Tax
Concepts; Income (Sec. 2(24)), Total Income (Sec.2(45)), Agriculture Income (Sec. 2(1A)), Assessee (Sec.2(7)), Assessment Year and Previous Year (Sec. 2(9)) and Revenue; Charge of Income Tax; Income of other persons included in assessed total Income(Ss. 60-65); Income which do not form part of total Income (Ss. 10-13A)
Prescribed Case
C.I.T. v. Raja Benoy Kumar Sahas Roy, 32 ITR 466 SC (1957)
Unit-II
Salary (Ss. 15-17); Income from House Property (Ss. 2-27); Profits and gain of business or Profession (Ss. 24 to 44 AD & 68 to 69 AD; Depreciation Allowance and Development Rebate; Capital Gains (Sections 45-55 A); Income from other Sources (Ss. 56 to 59)
Prescribed Case
C.I.T. v. Dalhouse Properties Ltd. 1984 Tax. L.R. 1334 (SC)
Unit-III
Set off and carry forward of losses (Ss. 70-80); Procedure for Assessment (Ss. 139-158); Liability in special cases (Ss. 159-181); Special Provisions Applicable to Firms (Ss. 184-189 A)
Prescribed Case
Bhushan Lal Parduman Kumar v. C.I.T., 1978 Tax L.R. 1346 SC
Unit-IV
Income Tax Authorities (Ss. 117-138); Appeal, Reference and Revision and Special Provisions for Avoiding Repetitive Appeals; Collection, Recoveries and Refund (Ss. 190-234) and (237-245); Penalties, Offences and Prosecution.
The Integrated Goods and Services Tax Act, 2017
Aims and Objectives of the Act; Definitions under the Act, Administration, Levy and Collection of Tax, Determination of Nature of Supply; Place of Supply of Goods or Services, Refund of Integrated Tax, Zero rated Supply; Apportionment of Tax and Settlement of Funds, Miscellaneous
Prescribed Case:
Union of India v. Mohit Mineral Pvt. Ltd., SCC 2018 SC 1727, Date of Decision 03-10-2018
Books Recommended
1. Bhattacharya's   : Law and Practice of Income Tax
2. Chaturvedi, Kothari   : Central Sales Tax Act
3. Jain, S.N.   : Central Tax Act
4. Kanga and Pai   : Law and Practice of Income Tax
5. Saxena, A.,K.   : Income Tax Act, 1996
6. Ravi, K.   : Law of Income Tax

7. Sampath Iyenger   : Law of Income Tax
8. Kailash Rai   : Law of Income Tax

CODE-602: PAPER-II: LABOUR AND INDUSTRIAL LAW-II

Max. Marks: 100
Time: 3 Hours

Note: (i) The Entire Syllabus of the theory has been divided into **four units**. But the question paper shall have **five units**. Unit **I** to **IV** of the question paper will have two questions from each **unit** of the syllabus. The student will be required to attempt one question form each **unit.**

Unit-V will consist of one compulsory question divided in to 8 parts, carrying two parts from each unit of the syllabus. The student will be required to attempt any four parts.

(ii)   All questions shall carry equal marks.

Unit-I:
The Employee's Compensation Act, 1923
Definition of Total and Partial Disablement, Employee, Employer, Dependent, Wages. Employer's Liability for Compensation, Methods of calculating Wages, Distribution of Compensation, and Commissioner's
Employees' State Insurance Act, 1948:
ESI Corporation, Standing Committee and Medical Benefit Council, Contributions and Benefits, Adjudication of Disputes & Claims
Prescribed Case
M. Mackenzie v. I.M. Issak, AIR 1970 SC 1006
Unit-II: The Employees' Provident Funds and Miscellaneous Provisions Act, 1952
Object and Scope of the Act, Employees' Provident Fund Scheme, Authorities, Central Board of Trustees, State Board of Trustees, Regional Committees, Determination of Money due from employer, Mode of recovery of money, Power to recover damages (Section 14-B)
The Payment of Gratuity Act, 1972
Object, Scope and Concept of Gratuity, Payment of Gratuity, Ceiling of Gratuity, Determination and recovery of Gratuity
Prescribed Case
Jeewan Lal (1929) Ltd. V. Appellate Authority and Others, 1984 II LLJ 464(SC)
Unit-III: The Factories Act, 1948
Definition of Factory, Worker, Hazardous process, Occupier, Adult, Adolescent and child, Provisions relating to Health & Cleanliness, Safety, Hazardous process and welfare of workers. Employment of children and Adolescents. Annual leave with wages, penalties and procedure
Inter State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979

Definition, Registration of Establishments, Employing Inter-State Migrant Workmen; Licensing of Contractors; Duties and Obligations of Contractors, Wages, Welfare and other facilities, Inspecting Staff.
Prescribed Case

Delhi Cloth and General Mills Co. Ltd. V. The Chief Commissioner, Delhi, AIR 1971 SC 344

Unit-IV: The Minimum Wages Act, 1948

Definition of minimum Wages, Fixation of Minimum rates of Wages, Procedure for Fixation, Revision and Disposal of Claims

The Payment of Wages Act, 1936

Object and Scope of the Act, Responsibility for Payment of Wages, Deductions Fines, Claims arising out of Deduction and delay in payment, Enforcement Machinery- their powers and functions

Bonded Labour System (Abolition) Act, 1976

Object and main features of the Act, Abolition of Bonded Labour System, Extinguishment of Liability to Repay Bonded Debt, Implementing Authorities, Vigilance Committee

Prescribed Case

Bandhua Mukti Morcha v. Union of India, AIR 1984 SC 802

Books Recommended

1. Mishra, S.N.   : Labour and Industrial Laws
2. Yadav,Sunil   :   : Labour and Industrial Laws
3. Puri, S.K.   : Labour and Industrial Laws
4. Goswami, V.G.   : Labour Law and Industrial Laws
5. Sabharwal, R.K.   : Job Security of Industrial Workers
7. Inter State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979

BACHELOR OF TECHNOLOGY (AERONAUTICAL ENGINEERING)
(Credit Based)
SCHEME OF STUDIES/EXAMINATION (Modified)
SEMESTER-III w.e.f. 2019-20

S. No.	Course Code	Course Title	Teaching Schedule					Examination Schedule (Marks)				Duration of Exam (Hrs.)
			L	T	P	Hours/Week	Credits	Major Test	Minor Test	Practical	Total	
1	AER-201A	Elements of Aeronautics	3	0	0	3	3	75	25	0	100	3
2	BS-204A	Higher Engineering Mathematics	3	0	0	3	3	75	25	0	100	3
3	#ES-203A	Basic Electronics Engineering	3	0	0	3	3	75	25	0	100	3
4	AER-203A	Fluid Mechanics	3	1	0	4	4	75	25	0	100	3
5	#MEC-203A	Mechanics of Solids-I	3	1	0	4	4	75	25	0	100	3
6	#MEC-205A	Thermodynamics	3	1	0	4	4	75	25	0	100	3
7	AER-205A	Fluid Mechanics Lab	0	0	2	2	1	0	40	60	100	3
8	#MEC-209LA	Mechanics of Solids Lab	0	0	2	2	1	0	40	60	100	3
9	*AER-207A	Industrial Training – I	2	0	0	2	-	-	100	-	100	
10	**MC-901A	Environmental Sciences	3	0	0	3	-	75	25	-	100	3
		Total	23	3	4	30	23	450	230	120	800	

Note:

*1. *AER-207A is a mandatory non-credit course in which students will be evaluated for the industrial training undergone after 2nd semester and students will be required to get passing marks to qualify.*

2. **MC-901A is mandatory credit-less course in which the students will be required to get passing marks in the major test.

3. # The coursesare common with B. Tech. (Mechanical Engineering).

BACHELOR OF TECHNOLOGY (AERONAUTICAL ENGINEERING)
(Credit Based)
SCHEME OF STUDIES/EXAMINATION(Modified)
SEMESTER-IV *w.e.f.*2019-20

S. No.	Course Code	Course Title	Teaching Schedule					Examination Schedule (Marks)				Duration of Exam (Hrs.)
			L	T	P	Hours/ Week	Credits	Major Test	Minor Test	Practical	Total	
1	#ES-204A	Materials Engineering	3	0	0	3	3	75	25	0	100	3
2	AER-202A	Aircraft Structure-I	3	1	0	4	4	75	25	0	100	3
3	AER-204A	Aerodynamics-I	3	1	0	4	4	75	25	0	100	3
4	#MEC-206A	Mechanics of Solids-II	3	1	0	4	4	75	25	0	100	3
5	AER-206A	Propulsion-I	3	0	0	3	3	75	25	0	100	3
6	#ES-206LA	Materials Engineering Lab	0	0	2	2	1	0	40	60	100	3
7	AER-208A	Propulsion Lab	0	0	2	2	1	0	40	60	100	3
8	*MC-902A	Constitution of India	3	0	0	3	-	75	25	-	100	3
		Total	**18**	**3**	**4**	**25**	**20**	**375**	**205**	**120**	**700**	

Note:

1. **MC-902A is a mandatory credit-less course in which the students will be required to get passing marks in major test.*

2. *All the students have to undergo 4 to 6 weeks industrial training after 4th semester and it will be evaluated in 5th semester.*

3. #The coursesare common with B.Tech. (Mechanical Engineering).

				B. Tech (3ʳᵈ Semester) Aeronautical Engineering			
AER-201A				Elements of Aeronautics			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	-	3	75	25	100	3h
Purpose	To familiarize the students with the basics of Aeronautical Engineering						
Course Outcomes							
CO1	Introduction to basic aircraft structure						
CO2	Introduction to the concept of flight						
CO3	Understanding the concept of propulsion and thrust generation						
CO4	Introduction of basic concept of generation of lift and drag						

Unit-I

Introduction to Aircraft Structure: Early airplanes, biplanes and monoplanes, Components of an airplane and their functions, Different types of flight vehicles: classifications. General types of construction, Monocoque, semi-monocoque, typical wing and fuselage structure. Metallic and non-metallic materials, Use of aluminium alloy, titanium, stainless steel and composite materials.

Unit-II

Introduction to Aerodynamics: Differential forms of Continuity, Momentum and Energy equations, Speed of sound; Mach number. Incompressible v/s compressible flows; Inviscid v/s Viscous flows; Classification of flows based on Mach Number; Wings and airfoils; airfoil nomenclature; lift, drag and moment coefficients; Pressure coefficient; Generation of lift and drag; Classification of airfoil drag; Finite wings and concept of induced drag; Drag polar.

Unit-III

Introduction to Propulsion: Basic ideas about piston, turboprop and jet engines turbojet and turbofan engines, Use of propeller and jets for thrust production. Comparative merits and demerits.

Unit-IV

Introduction to Flight Dynamics: Equations of motion, concept of steady level flight, thrust required for level flight, thrust available and maximum velocity; Power required, available power and maximum velocity; Effect of altitude on power; Rate of climb; Gliding flight; Absolute and service ceilings; Time to climb; Range and endurance for propeller and jet engines; Takeoff and landing performance; Turning flight and V-n diagram.

Text Book:
1. Introduction to Flight: J.D. Anderson, McGraw Hill, 8ᵗʰ Edition.
2. Aviation Maintenance Technician Handbook- Volume I, FAA-H-8083-31, Himalayan Books.

Note: The paper setter will set the paper as per the question paper templates provided
Suggested Books:
1. Aircraft Structures for Engineering Students, T.H.G. Megson, 5ᵗʰ Edition, Elsevier.
2. "Flight without Formulae", Kermode, A.C., McGraw-Hill, 1997.

BS-204A	HIGHER ENGINEERING MATHEMATICS						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 h
Purpose	The objective of this course is to familiarize the prospective Engineers with Laplace Transform, partial differential equations which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						
Course Outcomes							
CO 1	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.						
CO 2	To introduce the Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.						
CO 3	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.						
CO 4	To familiar with essential tool of Numerical differentiation and Integration needed in approximate solutions for the ordinary differential equations.						

UNIT-1

Laplace Transform
Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-2

Partial Differential Equations
Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-3

Numerical Methods-1
Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

UNIT-4

Numerical Methods-2
Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules, Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations.

Textbooks/References:
1. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993. AICTE Model Curriculum in Mathematics.
2. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall, 1998.
3. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
4. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
8. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
9. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
10. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
11. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

B. Tech (3rd Semester) Aeronautical Engineering							
ES-203A		Basic Electronics Engineering					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
3	0	0	3	75	25	100	3

Purpose :	To provide an overview of electronic devices and components to Mechanical engineering students.

Course Outcomes	
CO 1	To introduce the basic electronics devices along with their applications.
CO 2	To become familiar with basic operational amplifier circuits with applications and oscillators.
CO 3	To understand the fundamentals of digital electronics.
CO 4	To become familiar with basic electroniccommunication system.

UNIT-I

Semiconductor Devices and Applications: Introduction to P-N junction Diode and V- Icharacteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. BJT structure, its input-output and transfer characteristics, BJT as a Common Emitter amplifier, frequency response and bandwidth.

UNIT-II

Operational amplifier and its applications: Introduction to operational amplifiers, inverting, non- inverting and differential modes, basic parameters of Op-amp, Op-amp in open loop configuration, study of practical op-amp IC 741, Op-amp applications: adder, subtractor, scale changer, averaging amplifer,comparator, integrator and differentiator.

Timing Circuits and Oscillators: IC 555 timer pin diagram: Astableand mono-stable operation, Barkhausen's criteria for oscillations, R-C phase shift and Wein bridge oscillators using BJT and Op- Amp and their frequency of oscillation.

UNIT-III

Digital Electronics Fundamentals : Difference between analog and digital signals, Booleanalgebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- maps, Logic ICs, half and full adder, multiplexers, de-multiplexers, flip-flops, basic counters.

UNIT-IV

Electronic Communication Systems: The elements ofcommunication system,

Transmission media: wired and wireless, need of modulation, AM and FM modulation schemes, Mobile communication systems: cellular concept and block diagram of GSM system.

Text Books:
1. Integrated Electronics, Millman&Halkias (Mc-Graw Hill)
2. Electronics Devices & Circuit Theory, RL Boylestead& L Nashelsky (PHI)
Reference Books:
1. Modern Digital Electronics, R P Jain, Tata McGraw Hill.
2. Electronic Communication Systems, G. Kennedy, McGraw Hill, 4th Edition

Note: The paper setter will set the paper as per the question paper templates provided.

	B. Tech (3rd Semester) Aeronautical Engineering						
AER-203A	Fluid Mechanics						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with the basics of Fluid flow						
Course Outcomes							
CO1	Understanding of fluid statics and potential flow						
CO2	Introduction to the concept of fluid kinematics and dynamics						
CO3	Understanding the concept of viscous flow						
CO4	Introduction to boundary layers						

Unit – I

Fluid Properties and Fluid Statics: Concept of fluid and flow, ideal and real fluids, continuum concept, properties of fluids, Newtonian and non-Newtonian fluids. Pascal's law, hydrostatic equation, pressure variation in compressible fluids, hydrostatic forces on plane and curved surfaces, stability of floating and submerged bodies, relative equilibrium.

Potential Flow: Uniform and vortex flow, flow past a Rankin half body, source, sink, source-sink pair and doublet, flow past a cylinder with and without circulation. Free and forced vortex flows.

Unit-II

Fluid Kinematics: Eulerian and Lagrangian description of fluid flow; stream, streak and path lines; types of flows, flow rate and continuity equation, differential equation of continuity in cylindrical and polar coordinates, rotation, vorticity and circulation, stream and potential functions, flow net.

Fluid Dynamics: Concept of system and control volume, Euler's equation, Bernoulli's equation, venturimeter, orifices, orificemeter. Impulse momentum relationship and its applications.

Unit-III

Viscous Flow: Flow regimes and Reynold's number, Relationship between shear stress and pressure gradient, Hagen Poisueille Equation, kinetic and momentum correction factors.

Flow Through Pipes: Major and minor losses in pipes, Hagen-Poiseuilli law, hydraulic gradient and total energy lines, series and parallel connection of pipes, branched pipes; equivalent pipe, power transmission through pipes.

Unit-IV

Boundary Layer Flow: Boundary layer concept, displacement, momentum and energy thickness, von- karman momentum integral equation, laminar and turbulent boundary layer flows, drag on a flat plate, boundary layer separation and control. Streamlined and bluff bodies lift and drag on a cylinder and an airfoil.

Turbulent Flow: Shear stress in turbulent flow, Prandtl mixing length hypothesis, hydraulically smooth and rough pipes, velocity distribution in pipes, friction coefficients for smooth and rough pipes.

Text Book:
1. Fluid Mechanics and Hydraulic Machines, R.K. Bansal, Lakshmi Publications.
2. Fluid Mechanics and Hydraulic Machines, R.K. Rajput, S Chand Publications.

Suggested Books:
1. Fluid Mechanics, Frank M. White, McGraw Hill.
2. Fluid Mechanics , John F. Douglas, John Wiley.

Note: The paper setter will set the paper as per the question paper templates provided

B. Tech. (3rd Semester) Aeronautical Engineering							
MEC-203A			**MECHANICS OF SOLIDS-Imn**				
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	1	0	4	75	25	100	3
Purpose	The objective of this course is to make the students aware of Stress, Strain and deformation of solids with the applications to beams, shafts and column and struts. The course will help the students to build the fundamental concepts in order to solve engineering problems.						
Course Outcomes							
CO1	Apply fundamental principles of mechanics & principles of equilibrium to simple and practical problems of engineering, determine centroid and moment of inertia of a different geometrical shapes and able to understand its importance. Explain the basic concepts of stress and strain and solve the problems						
CO 2	Determine and calculate the values of principal stresses. Express the concept of shear force and bending moment of beams. Construct shear force and bending moment diagram for beams.						
CO 3	Express the concept of torsion of circular shaft and able to solve the problems on torsion of circular shaft. Illustrate and solve the problems on bending and shear stresses on beams						
CO 4	Solve the problems on column and strut & slope & deflection & derive the derivations.						

Unit-I

Introduction: Force, types of forces, Characteristics of a force, System of forces, Composition and resolution of forces, forces in equilibrium, principle and laws of equilibrium, Free body diagrams, Lami's Theorem, equations of equilibrium, Concept of center of gravity and centroid, centroid of various shapes: Triangle, circle, semicircle and trapezium, theorem of parallel and perpendicular axes, moment of inertia of simple geometrical figures, polar moment of inertia. Numerical Problems

Simple Stresses & Strains: Concept & types of Stresses and strains, Poisson's ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hook's law, elastic constants & their relationships, temperature stress & strain in simple & compound bars under axial loading, Numerical problems.

Unit-II

Principle Stresses: Two dimensional systems, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stresses, Numerical Problems.

Shear Force & Bending Moments: Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without over-hang and calculation of maximum BM & SF and the point of contraflexture under (i) concentrated loads, (ii) uniformly distributed loads over whole span or a part of it, (iii)combination of concentrated loads and uniformly distributed loads, (iv) uniformly varying loads and (v) Application of moments, relation between the rate of loading, the shear force and the bending moments, Numerical Problems.

Unit-III

Torsion of Circular Members: Derivation of equation of torsion, Solid and hollow circular shafts, tapered shaft, stepped shaft & composite circular shafts, Numerical problems.

Flexural and Shear Stresses – Theory of simple bending, Assumptions, derivation of equation of bending, neutral axis, determination of bending stresses, section modulus of rectangular & circular (solid & hollow), I,T, Angle, channel sections, composite beams, shear stresses in beams with derivation, shear stress distribution across various beam sections like rectangular, circular, triangular, I, T, angle sections. combined bending and torsion, equivalent torque, Numerical problems.

Unit-IV

Columns & Struts: Column under axial load, concept of instability and buckling, slenderness ratio, derivation of Euler's formula for crippling load for columns of different ends, concept of equivalent length, eccentric loading, Rankine formulae and other empirical relations, Numerical problems.

Slope & Deflection : Relationship between bending moment, slope & deflection, moment area method, method of integration, Macaulay's method, calculations for slope and deflection of (i) cantilevers and (ii) simply supported beams with or without overhang under concentrated load, Uniformly distributed loads or combination of concentrated and uniformly distributed loads, Numerical problems.

Note: The paper setter will set the paper as per the question paper templates provided.

Text Books:
1. Strength of Materials – R.K. Rajput, Dhanpat Rai & Sons.
2. Strength of Materials – Sadhu Singh, Khanna Publications.
3. Strength of Materials – R.K. Bansal, Laxmi Publications.

Reference Books:
1. Strength of Materials – Popov, PHI, New Delhi.
2. Strength of Materials – Robert l. Mott, Pearson, New Delhi
3. Strength of Material – Shaums Outline Series – McGraw Hill

4.   Strength of Material – Rider – ELBS

B. Tech. (3rd semester) Aeronautical Engineering							
MEC-205A	THERMODYNAMICS						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**1**	**0**	**4**	**75**	**25**	**100**	**3**
Purpose	The objective of this course is to make the students aware of Energy, Entropy, and Equilibrium, various laws of thermodynamics, concepts and principles and help the students to build the fbasic concepts to apply in various applications like IC engines and Air conditioning systems.						
Course Outcomes							
CO 1	Analyze the work and heat interactions associated with a prescribed process path and to perform an analysis of a flow system.						
CO 2	Define the fundamentals of the first and second laws of thermodynamics and explain their application to a wide range of systems.						
CO 3	Evaluate entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process from such calculations.						
CO 4	Solve the problems related to Steam and plot the processes on H-S and T-S diagram. Understand thermodynamics relations.						

Unit-I

Basic Concepts: Thermodynamics: Macroscopic and Microscopic Approach, Thermodynamic Systems, Surrounding and Boundary, Thermodynamic Property – Intensive and Extensive, Thermodynamic Equilibrium, State, Path, Process and Cycle, Quasi-static, Reversible and Irreversible Processes, Working Substance. Concept of Thermodynamic Work and Heat, Zeroth Law of Thermodynamic and its utility.

First Law of Thermodynamics: Energy and its Forms, Energy and 1st law of Thermodynamics, Internal Energy and Enthalpy, 1st Law Applied to Non-Flow Process, Steady Flow Process and Transient Flow Process, Throttling Process and Free Expansion Process.

Unit-II

Second Law of Thermodynamics: Limitations of First Law, Thermal Reservoir Heat Source and Heat Sink, Heat Engine, Refrigerator and Heat Pump, Kelvin- Planck and Clausius Statements and Their Equivalence, Perpetual Motion Machine of Second Kind. Carnot Cycle, Carnot Heat Engine and Carnot Heat Pump, Carnot's Theorem and its Corollaries, Thermodynamic Temperature Scale, Numericals **Entropy:** Clausius Inequality and Entropy, Principle of Entropy Increase, Temperature-Entropy Plot, Entropy Change in Different Processes, Introduction to Third Law of thermodynamics.

Unit -III

Availability, Irreversibility and Equilibrium: High and Low Grade Energy, Available Energy and Unavailable Energy, Loss of Available Energy Due to Heat Transfer Through a Finite Temperature Difference, Availability of a Non-Flow or Closed System, Availability of a Steady Flow System, Helmholtz and Gibb's Functions, Effectiveness and Irreversibility.

Pure Substance: Pure Substance and its Properties, Phase and Phase Transformation, Vaporization, Evaporation and Boiling , Saturated and Superheated Steam, Solid – Liquid – Vapour Equilibrium, T-V, P-V and P-T Plots During Steam Formation, Properties of Dry, Wet and Superheated Steam, Property Changes During Steam Processes, Temperature – Entropy (T-S) and Enthalpy – Entropy (H-S) Diagrams, Throttling and Measurement of Dryness Fraction of Steam.

Unit-IV

Thermodynamic Relations: TDS Relations, Enthalpy and Internal Energy as a Function of Independent Variables, Specific Heat Capacity Relations, Clapeyron Equation, Maxwell Relations.

Gas Power Cycles: Air standard efficiency, Otto cycle, Diesel cycle, Dual cycle, Atkinson cycle, Stirling and Ericsson cycles, Brayton or Joule cycle, Lenoir cycle

Text Books:
1.   Engineering Thermodynamics – C P Arora, Tata McGraw Hill
2.   Engineering Thermodynamics – P K Nag, Tata McGraw Hill
3.   Thermodynamics – An Engineering Approach; Y. A. Cengel, M. A. Boles; Tata McGraw Hill

Reference Books:
1.   Thermal Science and Engineering – D S Kumar, S K Kataria and Sons
2.   Engineering Thermodynamics -Work and Heat transfer – G F C Rogers and Maghew Y R Longman

Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech (3rd Semester) Aeronautical Engineering							
AER-205A	Fluid Mechanics Lab						
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
-	**-**	**2**	**1**	**60**	**40**	**100**	**3h**
Purpose	To give the practical knowledge of handling the fluid related instruments.						
Course Outcomes							
CO	To make the students familiar with the experiments related with Fluid Mechanics.						

Note: Student will be required to perform at least 8 experiments out of the following list.

1. To determine the coefficient of impact for vanes.

2. To determine coefficient of discharge of an orifice meter.

3. To determine the coefficient of discharge of Notch (V and Rectangular types).

4. To determine the friction factor for the pipes.

5. To determine the coefficient of discharge of venturimeter.

6. To determine the coefficient of discharge, contraction & velocity of an orifice.

7. To verify the Bernoulli's Theorem.

8. To find critical Reynolds number for a pipe flow.

9. To determine the meta-centric height of a floating body.

10. To determine the minor losses due to sudden enlargement, sudden contraction and bends.

Suggested Books:
1. Instrumentation, measurements and experiments in fluids, E Rathakrishanan, Taylor and Francis Group.
2. Experiments in Fluid Mechanics, Sarabjit Singh, PHI.

	B.Tech. (3rd semester) Aeronautical Engineering							
MEC-209LA	**MECHANICS OF SOLIDS LAB**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time (Hrs.)**
0	0	2	1	0	40	60	100	3
Purpose	To make the students aware of different properties of material using different experiments.							
	Course Outcomes							
CO1	Ability to design and conduct experiments, acquire data, analyze and interpret data							
CO 2	Ability to determine the behavior of ferrous metals subjected to normal and shear stresses by means of experiments.							
CO 3	Ability to determine the behavior of structural elements, such as bars subjected to tension, compression, shear, bending, and torsion by means of experiments.							
CO 4	Physical insight into the behavior materials and structural elements, including distribution of stresses and strains, deformations and failure modes.							
CO5	Write individual and group reports: present objectives, describe test procedures and results, synthesize and discuss the test results.							

List of Experiments:

1. To study the Brinell hardness testing machine & perform the Brinell hardness test.
2. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.
3. To study the Vickers hardness testing machine & perform the Vickers hardness test.
4. To study the Erichsen sheet metal testing machine & perform the Erichsen sheet metal test.
5. To study the Impact testing machine and perform the Impact tests (Izod&Charpy).
6. To study the Universal testing machine and perform the tensile, compression & bending tests.
7. To perform the shear test on UTM.
8. To study the torsion testing machine and perform the torsion test.
9. To draw shear Force, Bending Moment Diagrams for a simply Supported Beam under point and distributed Loads.
10. To prepare the composite specimen using hot compression molding machine and test for different mechanical properties.
.

Note: At least eight experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

AER-207A	B.Tech. (3rd semester) Aeronautical Engineering							
	INDUSTRIAL TRAINING-I							
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Practical	Total	Time (Hrs.)
2	0	0	--	--	100	--	100	
Purpose	To provide comprehensive learning platform to students where they can enhance their employ ability skills and exposure to the industrial environment.							
Course Outcomes								
CO1	Capability to acquire and apply fundamental principles of engineering.							
CO 2	Become updated with all the latest changes in technological world.							
CO 3	Capability and enthusiasm for self-improvement through continuous professional development and life-long learning							
CO 4	Awareness of the social, cultural, global and environmental responsibility as an engineer.							

Note: 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 qualify.

The candidate has to submit a training report of his/her work/project/assignment completed in the industry during the training period. The evaluation will be made on the basis of submitted training report and viva-voce/presentation.

MC-901A			Environmental Sciences				
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.

- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

B.Tech. (4th Semester) Aeronautical Engineering							
ES-204A	**MATERIALS ENGINEERING**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	0	0	3	75	25	100	3
Purpose:	To understand internal structure- properties relationship of different t ypes of materials and learn about Metallographic analysis and Characterization.						
Course Outcomes							
CO 1	To understand the Crystal structures and deformation mechanism in various materials.						
CO 2	To study various types of phase diagrams, TTT curve and Iron carbon diagram. To learn about different heat treatment processes.						
CO 3	To learn about the failure mechanisms like Creep and Fatigue and designation of materials.						
CO 4	To study Basics of Metallography and Basic Principle involved in the working of various types of Material characterization techniques.						

UNIT I

Crystallography: ReviewofCrystalStructure,SpaceLattice,CoordinationNumber,NumberofAtomsperUnitCell,AtomicPackingFactor;Numerical Problems Related toCrystallography.

Imperfection in Metal Crystals: Crystal Imperfections and their Classifications, Point Defects,LineDefects,Edge&ScrewDislocations,SurfaceDefects,VolumeDefects.

Introduction to Engineering materials and Standard Materials Designation: Introduction to Engineering materials,Steel Terminology, Standard Designation System for Steels, Indian Standard specifications for steels as per BIS: Based on Ultimate Tensile Strength and based on Composition, AISI-SAE standard designation for Steels and Aluminium Alloys

UNIT II

PhaseDiagrams: Alloy Systems, Solid solutions, Hume Rothery's Rules, Intermediate phases, Phase Diagrams, Gibbs Phase Rule, Cooling curves,TheLever Rule,binary phasediagrams, Applications of Phase Diagrams, PhaseTransformation, Micro constituentsof Fe-Csystem,Allotropic FormsofIron,Iron-ironcarbide phase diagram, ModifiedIron CarbonPhaseDiagrams, Isothermal Transformation, TTT Curve,

Heat Treatment: Heattreatmentof steels,Annealing,Normalising,Hardening,Tempering, Case Hardening, Ageing, Austemperingand Martempering, Surface Hardening, Mass Effect, EquipmentsforHeatTreatment,MajorDefectsinMetalsorAlloysduetofaultyHeattreatment.

UNIT III

Deformation of Metal: Elastic and Plastic Deformation, Mechanism of Plastic Deformation, Slip; Critical Resolved Shear Stress, Twinning, Conventional and True Stress Strain Curves for Polycrystalline Materials, Yield Point Phenomena, Bauschinger Effect, Work Hardening.

Failure of Materials: Fatigue, Fatigue fracture, fatigue failure, Mechanism of Fatigue Failure, Fatigue Life calculations, Fatigue Tests, Theories of Fatigue.

Creep: Creep Curve, Types of Creep, Factors affecting Creep, Mechanism of Creep, Creep Resistant Material, Creep Fracture, Creep Test, Stress Rupture test.

UNITIV

Introduction to Metallography: Metallography, Phase analysis, Dendritic growth, Cracks and other defects Corrosion analysis, Intergranular attack (IGA), Coating thickness and integrity, Inclusion size, shape and distribution, Weld and heat-affected zones (HAZ), Distribution and orientation of composite fillers, Graphite nodularity, Intergranular fracturing.

Materials Characterization Techniques: Characterization techniques such as X-Ray Diffraction (XRD), Scanning Electron Microscopy, transmission electron microscopy, atomic force microscopy, scanning tunneling microscopy, Atomic absorption spectroscopy.

Text Books:
1. Material Science by S.L.Kakani, New Age Publishers.
2. The Scienceand Engineering of Materials, Donald R. Askeland , Chapman&Hall.
3. Fundamentals of Material Science and EngineeringbyW. D. Callister, Wiley.
4. Fundamental of Light Microscopyand Electronic Imaging by Douglas B.Murphy, KindleEdition 2001
5. Materials Science and Engineering, V. Raghvan
6. Phase Transformation in Metals and Alloys,D. A.Porter &K.E. Easterling

Reference Books:
7. Material SciencebyNarula, TMH
8. Metallographic Handbook by Donald C. Zipperian, Pace Technologies, USA.
9. Robert Cahn Concise Encyclopedia of Materials Characterization, Second Edition:2nd Edition (Advances in Materials   Science and

Engineering) Elsevier Publication 2005.

10. Smart Materials and Structures by Gandhi and Thompson, Chapman and Hall.

Note: The paper setter will set the paper as per the question paper templates provided.

	B.Tech. (4th Semester) Aeronautical Engineering						
AER-202A	**Aircraft Structure I**						
L	**T**	**P**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with the mathematical analysis of aircraft structures						
Course Outcomes							
CO1	Understanding of basic construction details of an aircraft and the materials used						
CO2	Introduction to the concept of airworthiness and airframe loads and fatigue based design.						
CO3	Understanding the theory of elasticity						
CO4	Introduction to virtual and energy methods						

Unit – I

Sructural Components of aircraft: Basic aircraft anatomy, loads on structural components, functions and fabrication of structural components, connections.

Aircraft Materials: Aluminium alloys, steel, titanium, plastics, glass, composite materials. Properties of materials.

Unit-II

Airworthiness: Factors of safety-light envelope and load factor determination.

Airframe loads: Aircraft inertia loads, symmetric manoeuvre loads, normal acceleration associated with various types of manoeuvres, gust loads.

Unit-III

Basic Elasticity: Stress, equations of equilibrium, plane stress, boundary conditions, stresses on inclined planes, principal stresses. Mohr's circle, strain, compatibility conditions, plane strain, strains on inclined planes, principal strains, Mohr's circle of strain, stress-strain relationships.

Unit-IV

Virtual Work: work, principle of virtual work and applications of the principle of virtual work.

Energy Methods: Strain energy and complimentary energy, principle of stationary value of total complimentary energy, deflection problems, statically indeterminate systems, unit load method, flexibility method, superposition principle, reciprocal theorem, temperature effects.

Text Book:

1. Aircraft Structures for Engineering Students, T.H.G. Megson, McGraw Hill.
2. Aircraft Structures, David J. Perry, McGraw Hill.

Suggested Books:

1. Analysis of Aircraft Structures- An Introduction, B.K. Donaldson, McGraw Hill.
2. Aircraft Structures, Lalit Gupta and O.P. Sharma, Himalayan Books.

Note: The paper setter will set the paper as per the question paper templates provided

	B.Tech. (4th Semester) Aeronautical Engineering						
AER-204A	Aerodynamics I						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with the fundamentals of Aerodynamics						
Course Outcomes							
CO1	Understanding conformal transformations and its applications						
CO2	Introduction to the concept inviscid, incompressible and irrotational flows						
CO3	Understanding the thin airfoil theory						
CO4	Introduction to flow over finite wings						

Unit – I

Conformal Transformations: Complex potential function, Blasius theorem, principles of conformal transformation, Kutta -Juokowaski transformation of a circle into flat plate, airfoils & ellipses.

Review of basic fluid mechanics: Differential and Integral forms of continuity, momemtum and energy equations. Pathlines and streamlines, angular velocity, vorticity and strain, circulation, stream function, velocity potential and their relationship.

Unit-II

Inviscid Incompressible flow: Bernoulli's Equation, flow in a duct, pitot tube, pressure coefficient, condition on velocity for incompressible flow, Laplace equation, uniform flow, source floe, flow past a half body and rankine oval, doublet, non-lifting flow over a circular cylinder, vortex flow, lifting flow over a circular cylinder, Kutta- Joukowski theorem.

Unit-III

Incompressible flow over airfoils: Airfoil nomenclature and characteristics, vortex sheet, Kutta condition, Kelvin's Circulation theorem and the starting vortex, Classical thin airfoil theory- symmetric and cambered airfoils, modern low speed airfoils, flow over an airfoil- the real case, role of airfoil thickness on airplane design.

Unit-IV

Incompressible flow over finite wings: Downwash and induced drag, vortex filament, Biot-Savart Law, Helmholtz theorems, Prandtl's classical lifting line theory, numerical non-linear lifting line method, flow over a delta wing.

Text Book:

1. Fundamentals of Aerodynamics, J. D. Anderson, McGraw Hill.
2. Aerodynamics for Engineers, Bertin and Smith, Prentice Hall.

Note: The paper setter will set the paper as per the question paper templates provided

Suggested Books:

1. Aerodynamics, L. J. Clancey, Pitman.
2. Aerodynamics for engineering students, Houghton EL & Brock AE.

B. Tech. (4th Semester) Aeronautical Engineering							
MEC-206A		MECHANICS OF SOLIDS-II					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs.)
3	1	0	4	75	25	100	3
Purpose	The objective of this course is to show the development of strain energy and stresses in springs, pressure vessel, rings, links, curved bars under different loads. The course will help the students to build the fundamental concepts in order to solve engineering problems						
Course Outcomes							
CO1	Identify the basics concepts of strain energy and various theories of failures and solve the problems						
CO 2	Differentiate different types of stresses induced in thin pressure vessel and solve the problems. Use of Lame's equation to calculate the stresses induced in thick pressure vessel.						
CO 3	Able to compute stresses in ring, disk and cylinder due to rotation. Classify the different types of spring and analyze the stresses produced due to loading						
CO 4	Determine the stresses in crane hook, rings, chain link for different cross section and also the deflection of curved bars and rings. Analyze the stresses due to unsymmetrical bending and determine the position of shear centre of different section.						

Unit I

Strain Energy & Impact Loading: Definitions, expressions for strain energy stored in a body when load is applied (i) gradually, (ii) suddenly and (iii) with impact, strain energy of beams in bending, beam deflections, strain energy of shafts in twisting, energy methods in determining spring deflection, Castigliano's theorem, Numerical.

Theories of Elastic Failures: Various theories of elastic failures with derivations and graphical representations, applications to problems of 2- dimensional stress system with (i) Combined direct loading and bending, and (ii) combined torsional and direct loading, Numericals.

Unit II

Thin Walled Vessels: Hoop & Longitudinal stresses & strains in cylindrical &spherical vessels & their derivations under internal pressure, wire would cylinders, Numericals.

Thick Cylinders & Spheres: Derivation of Lame's equations, radial & hoop stresses and strains in thick, and compound cylinders and spherical shells subjected to internal fluid pressure only, hub shrunk on solid shaft, Numericals.

Unit III

Rotating Rims & Discs: Stresses in uniform rotating rings & discs, rotating discs of uniform strength, stresses in (I) rotating rims, neglecting the effect of spokes, (ii) rotating cylinders, hollow cylinders & solids cylinders. Numericals.

Springs: Stresses in closed coiled helical springs, Stresses in open coiled helical springs subjected to axial loads and twisting couples, leaf springs, flat spiral springs, concentric springs, Numericals.

Unit IV

Bending of Curved Bars : Stresses in bars of initial large radius of curvature, bars of initial small radius of curvature, stresses in crane hooks, rings of circular & trapezoidal sections, deflection of curved bars & rings, deflection of rings by Castigliano's theorem, stresses in simple chain links, deflection of simple chain links, Problems.

Unsymmetrical Bending: Introduction to unsymmetrical bending, stresses due to unsymmetrical bending, deflection of beam due to unsymmetrical bending, shear center for angle, channel, and I- sections, Numericals.

Text Books:
1. Strength of Materials – R.K. Rajput, Dhanpat Rai & Sons.
2. Strength of Materials – Sadhu Singh, Khanna Publications.
3. Strength of Materials – R.K. Bansal, Laxmi Publications.

Reference Books:
1. Strength of Materials – Popov, PHI, New Delhi.
2. Strength of Materials – Robert I. Mott, Pearson, New Delhi
3. Strength of Material – Shaums Outline Series – McGraw Hill
4. Strength of Material – Rider – ELBS

Note: The paper setter will set the paper as per the question paper templates provided.

	B.Tech. (4th Semester) Aeronautical Engineering						
AER-206A	Propulsion I						
L	**T**	**P**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	0	-	3	75	25	100	3h
Purpose	To familiarize the students with the fundamentals of Propulsion						
Course Outcomes							
CO1	Comparison between ideal cycles and practical cycles						
CO2	Mathematical analysis of jet propulsion cycles						
CO3	Understanding the centrifugal compressor						
CO4	Introduction to axial flow compressors						

Unit – I

Ideal cycles and their analysis: Assumptions, simple gas turbine cycle, cycles with heat exchange, reheat and inter-cooling and their combinations, comparison of various cycles, Ericsson Cycle.

Practical cycles and their analysis: Assumptions, stagnation properties, compressor and turbine efficiency, pressure losses, heat exchanger effectiveness, effect of varying mass flow and variable specific heat, mechanical losses and losses due to incomplete combustion, cycle efficiency, poly-tropic efficiency, actual cycle performance.

Unit-II

Jet propulsion cycles and their analysis: Propeller engines, gas turbine engines, Ramjet, Pulse Jet, Turboprop and Turbojet engines, analysis of turbofan engines, Thrust and thrust equation, specific thrust of the turbojet engine, efficiencies, parameters affecting flight performance, thrust augmentation.

Unit-III

Centrifugal Compressor: Essential parts, principle of operation, ideal energy transfer, blade shapes and velocity triangles, flow analysis through the compressor, diffuser, volute casing, performance parameters, losses in centrifugal compressors, compressor characteristics, surging and choking.

Unit-IV

Axial flow compressors: Historical background, geometry and working principle, stage velocity triangles, work done factor, h-s diagram, stage efficiency, performance coefficients, degree of reaction, flow through blade rows, flow losses, stage losses, pressure rise calculation in blade ring, performance characteristics, comparison with centrifugal compressors.

Text Book:

1. Gas Turbines, V Ganesan, McGraw Hill.
2. Gas Turbine Theory, H. Cohen, GFC Rogers and HIH Saravanamuttoo, Pearson.

Note: The paper setter will set the paper as per the question paper templates provided

Suggested Books:

1. Gas Turbine, Jet and Rocket Propulsion, Mathur, M.L. and Sharma, R.P., Standard Publishers & Distributors.
2. Aero thermodynamics of Aircraft Engine Components, G.C. Oates, AIAA Education Series.

	B. Tech. (4th Semester) Aeronautical Engineering							
ES-206LA	**MATERIALS ENGINEERING LAB**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time (Hrs.)**
0	**0**	**2**	**1**	**-**	**40**	**60**	**100**	**3**
Purpose	To make the students aware of material structure and properties of material using different experiments.							
Course Outcomes								
CO 1	Ability to design and conduct experiments, acquire data, analyze and interpret data							
CO 2	Ability to determine the grain size and microstructure in different Ferrous alloys by means of experiments.							
CO 3	Ability to learn about microstructures of different Non-Ferrous alloys by means of experiments.							
CO 4	To learn about heat treatment processes through experiments.							
CO 5	Ability to Analyze microstructure of Heat-treated specimens and perform Fatigue and creep test on different materials.							

List of Experiments:
1. To Study various Crystal Structures through Ball Models.
2. To study the components and functions of Metallurgical Microscope.
3. To learn about the process of Specimen Preparation for metallographic examination.
4. To perform Standard test Methods for Estimation of Grain Size.
5. To perform Microstructural Analysis of Carbon Steels and low alloy steels.
6. To perform Microstructural Analysis of Cast Iron.
7. To perform Microstructural Analysis of Non-Ferrous Alloys: Brass & Bronze.
8. To perform Microstructural Analysis of Non-Ferrous Alloys: Aluminium Alloys.
9. To Perform annealing of a steel specimen and to analyze its microstructure.
10. To Perform Hardening of a steel specimen and to analyze its microstructure.
11. To performFatiguetest on fatiguetestingmachine.
12. To perform Creep test oncreep testingmachine.

Note: At least eight experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

				B.Tech. (4th Semester) Aeronautical Engineering			
AER-208A				**Propulsion Lab**			
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
-	**-**	**2**	**1**	**60**	**40**	**100**	**3h**
Purpose	To give the practical knowledge of Propulsion.						
	Course Outcomes						
CO	To make the students familiar with the experiments related with Propulsion.						

Note: Student will be required to perform at least 8 experiments out of the following list.

1. To study the constructional details of axial flow compressor.
2. To study the constructional details of centrifugal compressor.
3. To study of accessory gear box and its construction.
4. To study the constructional details of main fuel pump.
5. To study the constructional details of combustion chamber.
6. To study the constructional details of after burning system.
7. To study the constructional details of piston engines.
8. To study the functioning of complete jet engine.
9. To study the constructional details of propellers.

Suggested Books:
1. Gas Turbines, V Ganesan, McGraw Hill.
2. Gas Turbine Theory, H. Cohen, GFC Rogers and HIH Saravanamuttoo, Pearson.

Note: - For better understanding of the experiments, department is also required to utilize the resources available on various websites, digital media & industrial visits etc.

	B. Tech. (4th Semester) Aeronautical Engineering						
MC-902A	Constitution of India						
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time
3	0	0	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India						
	Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.						
CO2	To know about fundamental duties and federal structure of Constitution of India.						
CO3	To know about emergency provisions in Constitution of India.						
CO4	To know about fundamental rights under constitution of India.						

UNIT I

Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.

Scheme of the fundamental rights

UNIT II

The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.

Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT III

Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.

Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT IV

Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books

1.   Constitution of India. Prof. Narender Kumar (2008) 8th edition. Allahabad Law Agency.

 Reference Books:

1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

Bachelor of Technology (Biotechnology)
Credit-Based
SCHEME OF STUDIES/EXAMINATIONS (Modified)
Semester – III (w.e.f. the session 2019-20)

S. No.	Course No.	Course Title	Teaching Schedule				Credits	Allotment of Marks				Duration of Exam (Hrs.)
			L	T	P	Hours/Week		Major Test	Minor Test	Practical	Total	
1	BTE-201A	Cell Biology & Genetics	3	0	0	3	3.0	75	25	0	100	3
2	BTE-203A	Microbiology	3	0	0	3	3.0	75	25	0	100	3
3	BTE-205A	Biochemistry	3	0	0	3	3.0	75	25	0	100	3
4	BTE-207A	Principles of Biostatistics	3	0	0	3	3.0	75	25	0	100	3
5	HM-921A	Organizational Behavior	3	0	0	3	3.0	75	25	0	100	3
6	BTE-209LA	Cell Biology & Genetics Lab	0	0	3	3	1.5	0	40	60	100	3
7	BTE-211LA	Microbiology Lab	0	0	3	3	1.5	0	40	60	100	3
8	BTE-213LA	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-215A	Industrial Training-I	2	0	0	2	-	-	100	-	100	-
10	*MC-902A	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-902A is a mandatory credit less course in which the student will be required to get passing marks in the major test

Bachelor of Technology (Biotechnology)
Credit-Based
SCHEME OF STUDIES/EXAMINATIONS (Modified)
Semester – IV (w.e.f. the session 2019-20)

S.N	Course No.	Course Title	Teaching Schedule				Credits	Allotment of Marks				Duration of Exam (Hrs.)
			L	T	P	Hours/Week		Major Test	Minor Test	Practical	Total	
1	BTE-202A	Molecular Biology	3	0	0	3	3.0	75	25	0	100	3
2	BTE-204A	Bio-analytical Techniques	3	0	0	3	3.0	75	25	0	100	3
3	BTE-206A	Immunology	3	0	0	3	3.0	75	25	0	100	3
4	BTE-208A	Industrial Biotechnology	3	0	0	3	3.0	75	25	0	100	3
5	BS-202A	Basics of Thermodynamics and Organic Chemistry	3	0	0	3	3.0	75	25	0	100	3
6	BTE-212LA	Molecular Biology Lab	0	0	3	3	1.5	0	40	60	100	3
7	BTE-214LA	Bio-analytical Techniques Lab	0	0	3	3	1.5	0	40	60	100	3
8	BTE-216LA	Industrial Microbiology Lab	0	0	3	3	1.5	0	40	60	100	3
9	BTE-218LA	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-901A*	Environmental Sciences*	3	0	0	3		75	25	0	100	3

*MC-901A 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 Sem.

BTE-201A	Cell Biology and Genetics			(B.Tech. Biotechnology) Semester-III			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3hrs
Purpose	To familiarize the students with the basic of cell biology and genetics.						
Course outcome							
CO1	Student to learn the fluidity and structural organization of bio membrane and cytoskeleton						
CO2	To learn the fundamentals of inheritance via both qualitative and quantitative patterns.						
CO3	Able to understand the basic concept of evolution and genetic basis of variations.						
CO4	Student will learn about the genome mapping by different techniques ranging from bacteria to human beings.						

UNIT-1

Bio membrane-Physical and chemical properties, Structural organization, Cell signaling (Different Pathways), cell recognition and membrane transport, Membrane receptor for macromolecules and regulation of receptor expression and function. Receptors for neurotransmitters

Structural organization and functions -Microtubule, Microfilament and Inter-mediatery filaments.

UNIT-II

Mendelism – History of Mendel, Monohybrid, Di- hybrid and Tri-hybrid cross, Gene interaction, Concept of dominance - incomplete ,complete and co-dominance(Blood group system in human beings),Multiple alleles(Skin color in rabbit),Concept of lethality and pedigree analysis. Sex linked, sex influenced and sex limited inheritance.

Quantitative inheritance-History, Yule experiment, Nelsson-Ehle experiment, skin color in human beings, Basis of genetic variation. Numerical problems on quantitative inheritance.

UNIT-III

Population Genetics- Concept of Random Mating and controlled mating and Inbreeding. Hardy Weinberg Law- Allele frequency, Genotype frequency, Causes of variations (Mutation, Migration, Random genetic drift, and Natural selection).

Mutation-Classification, application, detection, site directed mutagenesis and DNA repair Mechanism-(Mismatch repair, Photo-reactivation, tolerance, retrieval system.

UNIT-IV

Genome mapping-Difference between cytological, physical and molecular mapping. Recombination, Linkage, Gene mapping based on Two point cross in Neurospora and Three point test cross in wheat. History and development of human genome project.

Muscle contraction-Types of muscles, Structural proteins of muscles , regulation and energetic of muscle contraction.

Nerve Transmission- structure and function of neurons. Action and resting potential, Mechanism of nerve transmission, Neuromuscular junction.

Text /ReferenceBooks
1. Cell Biology: Organelle structure and function, Sadava, D.E.(2004) Panima Pub., New Delhi.
2. Fundamentals of Genetics, Singh, B.D., Kalyani Publishers, New Delhi.
3. Basic Genetics. (2000) Miglani, G.S., Narosa Publishing House, New Delhi.
Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-203A	Microbiology				(B.Tech. Biotechnology) Semester- III			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3.0	75	25	100	3hrs
Purpose	To familiarize the students with the basic of Microbiology						
Course outcome							
CO1	To learn the history and classification of microbiology						
CO2	To learn microbial nutrition and various microbiological techniques						
CO3	Able to understand microbial growth and genetics						
CO4	Student will learn about various microbial diseases and drugs						

UNIT - I

1. **History and scope of Microbiology**: Development of Microbiology, various branches of microbiology and applications of microbiology.
2. Classification of Microorganisms: Microbial Taxonomy- criteria used including molecular approaches. Microbial phylogeny and current classification of bacteria.

UNIT - II

3. **Microbial Diversity**: Morphology and cell structure of major groups of microorganisms e.g. bacteria. fungi, algae, protozoa and viruses.
4. **Cultivation and microbial nutrition of Microorganism**: Methods of isolation, purification and preservation. Pure culture technique and sterilization methods. Requirement for C, N, S and growth factors. Nutritional categories of microorganisms.

UNIT - III

5. **Microbial Growth and Metabolism**: Growth curve (normal and biphasic) and generation time. Measurement of growth. Synchronous, batch and continuous cultures. Microbial fermentation and its types.
6. **Microbial Genetics**: Bacterial plasmids. Bacterial recombination: transformation, transduction and conjugation. Formation of endospores and mechanism of sporulation.

UNIT - IV

7. **Environmental Microbiology**: Normal and contaminating microflora of water, soil and air. Methods to study water and air pollution.
8. **Medical Microbiology**: Antibacterial, Antiviral, Antifungal and Antiprotozoan drugs, Major water, air and soil borne microbial diseases.

Text Book:

1. Microbiology 5th Edition. Prescott, L.M.; Harley, J.P. and Klein, D.A.(2003) McGraw Hill, USA.

2. Microbiology. Pelczar Jr., M.J.; Chan, E.C.S. and Krieg, N.R. (1993) Tata McGraw Hill, New Delhi.

References Books:

3. Modern Food Microbiology. Jay, J.M. (1996) CBS Publishers and Distributors, New Delhi.

4. Food Microbiology 2nd ed, Adam, M. R. and Moss (2003) Panima Pub, New Delhi.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-205A	Biochemistry				(B.Tech Biotechnology) Semester-III		
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Purpose	To introduce the students with basics of Biochemistry						

Course Outcomes	
CO1	The students will be able to learn the structure and functions of carbohydrates and proteins
CO2	The students will be able to learn structure and functions of lipid and nucleic acids along with basic concepts of enzymes.
CO3	The students will be able to write major pathways of carbohydrates and lipid metabolism
CO4	To make the students learn synthesis and degradation of pyrimidine nucleotides

UNIT-I

1. **Amino acids & Proteins –**Structure and properties of amino acids. Peptide bonds.
   Proteins classification based on their biological roles. Forces stabilizing protein structure and shape. Different levels of structural organization of proteins. Ramachandran plot, alpha helix, beta plated sheets, domain motif and fold.
2. **Carbohydrates-Structure and functions:** Structures and properties of glucose and fructose, distinguishing features of different disaccharides. Ring structure and mutarotation. Structure and brief introduction of starch, glycogen and cellulose.

UNIT – II

3. **Lipids-Structure and functions:** Classification of lipids based on their biological roles and their general functions. Membrane lipids and brief discussion on fatty acids.
4. **Nucleic Acids-Structure and functions:** Structure and properties of purine and pyrimidine bases.A brief introduction of ATP, GTP, CTP AND UTP.
5. **Enzymes:** Classification of Enzymes according to enzyme commission report. Activation energy and rate of reaction. Rate constant, reaction order. A brief introduction of mechanism of enzyme catalysis. Enzyme inhibition and concept of allostery. Michaelis-Menten equation.

UNIT-III

6 **Carbohydrate Metabolism:** Glycolysis and TCA cycle. Pentose phosphate pathway and its significance. Gluconeogenesis pathway. Biosynthesis of lactose, sucrose and starch. Glycogenolysis, glycogenesis and control of glycogen metabolism.

7.**Lipid Metabolism:** Beta -oxidation of saturated fatty acids, Degradation of triacylglycerols by lipases. Biosynthesis of saturated fatty acids. Biosynthesis of triacylglycerols, phospholipids.

UNIT -IV

8 **Amino Acid Metabolism:** General reactions of amino acids metabolism- transamination, oxidative andnon-oxidative deamination and decarboxylation. Urea cycle and its regulations.

9. **Nucleic Acid Metabolism:** Catabolism,*de novo*-biosynthesis and salvage pathway.

10. **Mitochondrial oxidative phosphorylation:** Mitochondrial electron transport chain. Hypotheses ofmitochondrial oxidative phosphorylation.

Text

1. Biochemistry, concepts and connections, 1st edition, by Dean R. Appling, Spencer J. Anthony-Cahill and Christopher K. Matthews (2015). Pearson Education, Inc.
2. Biochemistry, 4th edition, by L. Stryer (1995). W.H. Freeman & Co. NY
3. Lehninger: Principles of Biochemistry, 3rd edition, by David L. Nelson and M.M. Cox (2000) Maxmillan/ Worth publishers

References Books:

1. Biochemistry, 4th edition, by G. Zubay (1998). Wm.C. Brown Publishers.
2. Biochemistry, 2nd edition, by Laurence A. Moran, K.G. Scrimgeour, H. R. Horton, R.S. Ochs and J. David Rawn (1994), Neil Patterson Publishers Prentice Hall.
3. Biochemistry, 2nd edition, by R.H. Garrett and C.M. Grisham (1999) . Saunders college Publishing, NY. Sons, NY.
4. Fundamentals of Biochemistry by Donald Voet and Judith G Voet (1999) , John Wiley & Sons, NY
5. Harper's Biochemistry, 25th edition, by R.K. Murray, P.A. Hayes, D.K. Granner, P.A. Mayes and V.W. Rodwell (2000). Prentice Hall International.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-207A	Principles of Biostatistics			(B.Tech Biotechnology) Semester-III			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3
Purpose	To Introduce statistical concept for biological data interpretation						
Course Outcomes							
CO1	To develop basic understanding about statistics						
CO2	To develop basic knowledge of probability and different tests.						
CO3	To derive numerical approach between data correlation and their variations.						
CO4	To understand the numbers and errors						

UNIT-1

Introduction: Basic concept of statistics, Difference between statistics and mathematics, Samples and variables, Frequency distribution curve and basic quantitative method: Mean median, mode, standard deviation and variance.

UNIT-II

Probability distribution: Basic concept of probability, binomial distribution, Poisson distribution and normal distribution.

Hypothesis testing: Students T-test, estimation of null hypothesis, confidence limit of variance and chi-square test.

UNIT-III

Analysis of Variance:F-test, Two way ANOVA and Three way ANOVA

Correlation and Regression: Analysis of correlation and their different types, analysis of covariance and multiple regressions.

UNIT-IV

Approximation and error: Introduction, Accuracy of numbers: approximate number, significant number, rounding off. Different types of error.

Role of computer in solving biostatical problem: Genetic Algorithm, Application of statistical methods in biotechnology.

Text Books:

1. Statistical Methods. S.P.Gupta. Sultan chand and sons, New delhi

Reference Books:

1.Introduction to Biostatistics. Glover T. and Mitchell K. (2002). MacGraw Hill, New York.

2. Fundamentals of Biostatistics. Rosner Bernard. (1999), Duxbury Press.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

HM-921A	Organizational Behavior			(B.Tech. Biotechnology) Semester-III			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3
Purpose	To make the students conversant with the basics concepts of organizational culture and behavior for nurturing their managerial skills						
COURSE OUTCOMES							
CO1	An overview about organizational behavior as a discipline and understanding the oncept of individual behavior						
CO2	Understand the concept and importance of personality ,emotions and its importance in decision making and effective leadership						
CO3	Enabling the students to know about the importance of effective motivation and its contribution in group dynamics and resolving conflicts						
CO4	Understand how to overcome organizational stress by maintaining proper organizational culture and effective communication						

UNIT -I

Introduction to Organizational Behavior*:* Concept and importance of Organizational Behavior, Role of Managers in OB, Foundations or Approaches to Organizational Behavior, Challenges and Opportunities for OB
Foundation of individual behavior: Biographical characteristics, concept of Abilities and Learning , Learning and Learning Cycle, Components of Learning, concept of values and attitude, types of attitude, attitude and workforce diversity

UNIT-II

Introduction to Personality and Emotions: Definition and Meaning of Personality, Determinants of Personality, Personality Traits Influencing OB, Nature and Meaning of Emotions, Emotions dimensions, concept of Emotional intelligence
Perception and individual decision making*:* Meaning of perception, factors influencing perception, Rational decision making process, concept of bounded rationality. Leadership- Trait approaches, Behavioral approaches, Situational approaches, and emerging approaches to leadership.

UNIT-III

Motivation: concept and theories of Motivation, theories of motivation-Maslow, Two Factor theory, Theory X and Y,ERG Theory, McClelland's Theory of needs, goal setting theory, Application of theories in Organizational Scenario, linkage between MBO and goal setting theory, employee recognition and involvement program
Foundations of Group Behavior and conflict management:Defining and classifying of Groups, stages of group development, Informal and Formal Groups - Group Dynamics, Managing Conflict and Negotiation , a contemporary perspective of intergroup conflict, causes of group conflicts, Managing intergroup conflict through Resolution.

UNIT-IV

Introduction to Organizational Communication: Meaning and Importance of Communication process, importance of Organizational Communication, Effective Communication, Organizational Stress: Definition and Meaning Sources and Types of Stress, Impact of Stress on Organizations, Stress Management Techniques
Introduction to Organization Culture- Meaning and Nature of Organization Culture, Types of Culture, Managing Cultural Diversity, Managing Change and Innovation - Change at work, Resistance to change, A model for managing organizational change.

Text Books
1. Colquitt, Jason A., Jeffery A. LePine, and Michael Wesson. *Organizational Behavior: Improving Performance and Commitment in the Workplace*. 5th ed. New York: McGraw-Hill Education, 2017.
2. Hitt, Michael A., C. Chet Miller, and Adrienne Colella. *Organizational Behavior*. 4th ed. Hoboken, NJ: John Wiley, 2015.
3. Robbins, Stephen P., and Timothy Judge. *Organizational Behavior*. 17th ed. Harlow, UK: Pearson Education, 2017.
4. Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 11th edition, 2008.

Reference Books
1. *Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley.*
2. *Udai Pareek, Understanding Organisational Behaviour, Oxford Higher Education.*
3. *Mc Shane & Von Glinov, Organisational Behaviour, Tata Mc Graw Hill.*

4. *Aswathappa, K., Organisational Behaviour– Text and Problem, Himalaya Publication*

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-209LA	Cell Bio and Genetics Lab			(B.Tech. Biotechnology)		Semester –III	
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
-	-	3	1.5	40	60	100	3 Hrs
Purpose	To learn working of instruments and their principles to study basic concepts.						
Course Outcomes							
CO1	Students will be able to learn basic instruments need to study all types of cellular structures.						
CO2	Preparation of permanent slides to study histology of different organ systems..						
CO3	Students will come to know about the procedure of division of cells in both somatic and gametic cells.						
CO4	Students will learn Techniques of DNA extraction and its application in fingerprinting.						

LABORATORY EXPERIMENTS

1. Study of different types of microscopes.
2. Microscopy: Structure of Prokaryotic and eukaryotic cell.
3. Microtomy. Histology of various organ systems (Nervous, digestion, reproductive, respiratory and circulatory system).
4. Cell division in onion root tip.
5. Cell division in insect gonads/flower bud.
6. Isolation of Chloroplasts/ Mitochondria from Plants.
7. Fluorescence labeling of cellular organelles.
8. Isolation of DNA and study of its denaturation spectrophotometrically & viscometrically.

Reference books:
1. Principles and techniques of Practical Biochemistry: K. Wilson and J. Walker (1994), Cambridge University Press, Cambridge.
2. Introductory practical Biochemistry by S.K. Sawhney and Randhir Singh (2000), Narosa Publishing House, New Delhi.
3. An introduction to Practical Biochemistry by David T. Plummer (1988), McGraw- Hill, Book Company, UK.

BTE-211 LA	MICROBIOLOGY LAB			(B.Tech. Biotechnology Semester III)			
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
-	-	3	1.5	40	60	100	3 Hrs
Purpose	To learn the practical aspects of Microbiology						
Course Outcomes							
CO1	Students will be able to know about the instruments and their working principles.						
CO2	Learning of Culture Media Preparation for Microbial Growth.						
CO3	Students will learn Pure Culture Techniques for isolation and preservation of microbes.						
CO4	Students will learn about staining methods for identification of microbes and effect of different factors on growth of microbes.						

LABORATORY EXPERIMENTS

1. Rule and Regulations of working in the laboratory.
2. To know about the instruments and equipments used in the laboratory
3. Preparation of culture media for culturing microbes.
5. Collection of samples from different sources and serial dilution method.
6. Culture techniques- Pour plate and spread plate.
7. Isolation of pure colonies by streaking method.
8. Gram Staining method to differentiate between gram positive and gram negative bacteria.
8. To analyze the waste water samples for presence of microbes.
9. Measurements of growth and study of effect of various factors on growth of microorganisms-temperature, pH, salt concentration,
10. Milk Microbiology- Testing the quality of milk.

Text and References Books:

1. Experiments in Microbiology, Plant Pathology and Biotechnology. 4th Edition. Aneja, K.R. (2003)New Age International Publishers, New Delhi.
2. Microbiology- a laboratory manual. 4th edition. Cappuccino J. and Sheeman N. (2000) Addison Wesley, California.
3. Environmental Microbiology – A Laboratory Manual Pepper. I.L.; Gerba, C.P. and Brendecke, J.W.(1995) Academic Press, New York.

BTE-213LA	BIOCHEMISTRY LAB			(B.Tech. Biotechnology) Semester-III			
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
-	-	3	1.5	40	60	100	3 Hrs
Purpose	To learn the practical aspects of Biochemistry						
Course Outcomes							
CO1	Students will be able to learn qualitative and quantitative estimation of biomolecules						
CO2	Students will be able to learn procedure to perform enzyme assay of any common enzyme.						
CO3	Students will learn effect of environmental factors on enzyme activity						
CO4	Students will be able to calculate Km and Vmax of any common enzyme						
LABORATORY EXPERIMENTS							

1. Qualitative tests for amino acids, proteins, Lipids and carbohydrates.
2. Quantitative estimation of proteins by Lowry method.
3. Determination of reducing sugar by Nelson-Somogyi's method
4. Assay of any commonly occurring enzyme.
5. Effect of pH, temperature, enzyme concentration and protein denaturation on an enzyme activity.
6. Determination of Km and Vmax of any commonly occurring enzyme.

Text/ Reference Books:

1. Principles and techniques of Practical Biochemistry: K. Wilson and J. Walker (1994), Cambridge University Press, Cambridge.
2. Introductory practical Biochemistry by S.K. Sawhney and Randhir Singh (2000), Narosa Publishing House, New Delhi.
3. An introduction to Practical Biochemistry by David T. Plummer (1988), McGraw- Hill, Book Company, UK.

MC-902A	Constitution of India			(B.Tech. Biotechnology) Semester- III			
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time	
3	-	-	75	25	100	3 Hrs.	
Purpose	To know the basic features of Constitution of India						
Course Outcomes							
CO1	The students will be able to know about salient features of the Constitution of India.						
CO2	To know about fundamental duties and federal structure of Constitution of India.						
CO3	To know about emergency provisions in Constitution of India.						
CO4	To know about fundamental rights under constitution of India.						

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
  1. Constitution of India. Prof. Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
  1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.
Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-202A	Molecular Biology			(B.Tech. Biotechnology) Semester -IV			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Purpose	To familiarize the students with basic concepts of molecular biology.						
Course Outcomes							
CO1	The students will be able to learn the Basic structure of DNA RNA.						
CO2	To learn the process of DNA replication and regulation.						
CO3	The students will be able to understand the process of Transcription of DNA in Prokaryotes and Eukaryotes.						
CO4	The students will be able to explain the process of Translation.						

UNIT- I

1.Genes : DNA/RNA as the genetic material. Double helical structure of DNA.Types of DNA. Super coiling and periodicity of DNA.Linking number of DNA.Nature of multiple alleles, Cis- acting sites and Trans–acting molecules.Euchromatin and heterochromatin.Nucleosomes.Organelle DNA- Mitochondrial and chloroplast DNA.

2. From Genes to Genomes : exons and introns, repetitive and non –repetitive DNA, C-value paradox.

3. DNA Replication : Origin of DNA replication. Bacterial and eukaryotic replicons.DNA polymerases.Mechanism and regulation of DNA replication in prokaryotes and eukaryotes.

UNIT - II

4. Transcription: Various RNA species and their properties- tRNA as an adapter and turnover of mRNA.

a) **Transcription in Prokaryotes:** RNA polymerases. Mechanism of transcription- initiation, elongation and termination.Role of sigma factor in transcription.

b) **Transcription in Eukaryotes:** RNA Polymerases. Downstream and upstream promoters. Techniques to define promoters- foot printing experiment. Mechanism of transcription.Interaction of upstream factors with basal apparatus.Role of enhancers.Post-transcriptional modifications of various RNA species.Transcription in mitochondria and chloroplast.

c) **The Operon:** Positive and negative control of transcription, repressor-inducer complex, catabolite repression and attenuation.

d) **Regulation of Transcription:** DNA binding domains- zinc finger motif, helix loop helix, leucine zippers and homeodomains. Demethylation and gene regulation.

UNIT -III

5. Genetic Code: Evidence for triplet code. Properties of genetic code, Wobble hypothesis.Mitochondrial genetic code. Suppressor tRNAs.

6. Protein Synthesis : Structure of prokaryotic and eukaryotic ribosomes and their role in protein synthesis. Mechanism of initiation, elongation and termination of protein synthesis.Regulation of translation in prokaryotes and eukaryotes. Post translational modifications of proteins.

7. Protein folding : Role of molecular chaperones.

UNIT -IV

8. Nuclear Splicing : Lariat formation, Sn RNAs, cis-splicing and trans-splicing reactions. Catalytic RNA- Ribozymes-Ribonuclease P, small RNAs, group I &II introns.

Text/Reference Books :

1. Genes XI Lewin, Benjamin(2013)OUP, Oxford.

2. Genomes,2nded, Brown, T. A.(2002) John Wiley and sons ,Oxford

3. Molecular biology of cell 4thed Alberts, Bruce; Watson,J D(2002) Garland Science Publishing, New York.

4. Molecular cell biology 4thedLodish, Harvey and. Baltimore,D(2000) W.H. Freeman and Co., New York

5. Cell and Molecular Biology 8thed, Robertis, EDP De &Robertis, EMF De(2002) lippincott Williams & Wilkins international student edition, Philadelphia.

6. Essentials of Molecular Biology 4thed, Malacinski, G. M. (2003) Jones &Bartlet Publishers, Boston

7. Cell and Molecular Biology: concepts and experiments 3rded Karp, Gerald(2002) John Wiley and sons, New York.

8. The Cell-a molecular approach, 3rded Cooper, G M&Hausman, R E(2004) ASM Press, Washington D C

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-204A	Bioanalytical Techniques			(B.Tech. Biotechnology) Semester- IV			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Purpose	To acclimatize students about different bioanalytical techniques.						
Course Outcomes							
CO1	The students will be able to understand the principle of microscopy.						
CO2	The students will be able to understand the principle and applications chromatography techniques.						
CO3	The students will be able to learn underlying principle and applications of spectroscopy.						
CO4	The students will be able to learn process of detection and measurement of radioactivity.						

UNIT- I

1. **Principles of Microscopy:** Light, electron (scanning and transmission), fluorescence microscopy, marker enzymes.
2. **Centrifugation: Basic concepts and** applications, differential centrifugation, high speed and ultracentrifugation techniques.

UNIT- II

3. **Electrophoresis**: basic principle and applications of Paper and gel electrophoresis, isoelectric focussing, two-dimensional electrophoresis.
4. **Principles of Chromatography**: Ion-exchange, gel filtration, affinity, gas chromatography, High Pressure Liquid Chromatography (HPLC), FPLC and Hydrophobic Interaction Chromatography.

UNIT- III

5. **Principle and applications of Spectroscopy:** UV/visible, IR, NMR, ESR, fluorescence, Raman.
6. **Mass spectroscopy**: LC-MS, X-ray diffraction (molecular crystals), CD.

UNIT- IV

7. **Radioisotope Techniques**: Nature of radioactivity, properties of α, β and γ-rays, detection and measurement of radioactivity, use of radioisotopes in research, autoradiography, radio-immunoassay.

Text/ References Books:
1. Physical Biochemistry, 2nd edition, by D Friefelder (1983). W.H. Freeman & Co., U.S.A.
2. 4. Analytical Chemistry for technicians: John Kenkel (1994), Lewis Publishers. Boca Raton.
3. Principles and techniques of Practical Biochemistry: K. Wilson and J. Walker (1994), Cambridge University Press, Cambridge.
4. Biophysical Chemistry: Principles and Techniques, 2nd edition by A. Upadhyay, K. Upadhyay and N. Nath. (1998). Himalaya Publishing House, Delhi.
5. Physical Biochemistry, 2nd edition, by K. E. VanHolde (1985), Prentice Hall Inc, New Jersey.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-206A	IMMUNOLOGY			(B.Tech Biotechnology) semester-IV			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Purpose	To learn the role of various components of immune system and their response against various diseases						
Course Outcomes							
CO1	The students will be able to learn the basic concepts of cells and organs related to immune system.						
CO2	Able to learn the formation, maturation and functions of B cells and T cells.						
CO3	To learn the concepts of various Immunological techniques and understanding various effector responses of body against an infection.						
CO4	To learn the immunological reasons behind various diseases.						

UNIT – I

1. **Introduction to immune system**: Innate and acquired immunity, cells and organs of immune System- B-Lymphocytes and T-Lymphocytes, primary and secondary lymphoid organs, humoral and cell mediated immune response.

2. Immune System: Antigens. Immunoglobulins- structure and function, antigenic Determinants (isotype, allotype, idiotype).

UNIT –II

3. Generation of B-Cell and T-Cell Responses: Major histocompatibility complex. Antigen Processing and presentation.

4. Cell mediated immunity: T-cell receptor, T-cell maturation, activation and differentiation.

UNIT –III

5 Immunological techniques: Immunoprecipitin reactions, agglutination reactions, ELISA, RIA, Immunofluorescence.

6. Immune effector responses: Cytokines. Complement system.

UNIT – IV

7. Immune System in Health and Disease: Hypersensitive reactions. Auto immunity and immune response to infectious diseases. Immune response to transplants. Vaccines.

Text Book:
1. Kuby's Immunology, 5th ed. Goldsby, R A. Kindt, T.J, Osborne, B.A.(2003) W. H. Freeman and company, New York

Reference Books
1. Essential Immunology, 10th ed Roitt, Ivon; Delves, Peter (2001) Blackwell Scientific Publications Oxford.
2. Fundamentals of Immunology: Paul W.E. (Eds.) Raven Press, New York.
3. Immunology by Presscot.
Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-208A	INDUSTRIAL BIOTECHNOLOGY			(B.Tech. Biotechnology) Semester -IV			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Purpose	To learn the various aspects of Industrial Biotechnology						
Course Outcomes							
CO1	To learn basic concepts of Fermentation Bioechnology						
CO2	To learn the theoretical aspects of Process Technology for the production of various products						
CO3	To learn the concepts of biopesticides, biofuels and biofertilizers.						
CO4	To understand the concept of integrated strain improvement program.						

UNIT-I

1. Industrial Biotechnologyy: Introduction, objectives and scope**.**

2. Fermentation Technology:. Biochemistry of fermentation. Ttaditional and modern biotechnology-A brief survey of organisms, processes and products. Basic concepts of upstream and downstream processing in fermentation technology

UNIT - II

3. Production of Primary metabolites and alcoholic beverages Organic acids, dextran, amino acids (Glutamic acid, L-Lysine) and alcohols and alcoholic beverages (wine and beer.

4. Production of Industrial Enzymes- Amylase, protease, lipase, xylanase, lignocellulase**.** production of acrylamide, adipic acid and 1,2-Propanediol.

UNIT-III

5. Production of Biopesticides and Biofertilizers: Characteristics of biopesticides. Important biopesticides- Bt-toxin, Kasugamycin, Beauverin, Devine and Collego. Beneficial Soil Microorganisms. Biofertilizers.

6. Production of Biofuels: Basic concepts and important types of biofuels. Fuel from biomass, production and economics of biofuels, biogas, biorefineries, Microbial Enhanced Oil Recovery (MEOR).

7. Production of other industrial bioproducts- Single Cell Protein & Mushroom Culture, Biopreservatives Nisin), Cheese, Biopolymers (Xanthan gum, PHB). Biosynthetic Technology. Bioflavours and biopigments: microbial production of flavours and fragrances. Microbial pigments in textile and food industries.

UNIT-IV

8. Strain Improvement Strategies- Improvement of industrially important microorganisms, selection of mutants, use of rDNA technology. Integrated Strain Improvement Program (Precision Engineering Technology)

9. **Microbial Production of Pharmaceuticals**. Antibiotics (penicillin, streptomycin and tetracycline), Enzyme Inhibitors. Production of Vitamin E, K, B_2 and B_{12}, Genetic engineering of microorganisms for production of non-ribosomoal peptides (NRPS) and polyketides (PKS), antiacancer drugs.

Text

1.   A Textbook of Basic and Applied Microbiology. Aneja, K. R., Jain, P. and Aneja, R. (2008). New Age International Publishers, New Delhi

Reference Books:

1. Industrial Microbiology.Casida Jr., L.E. (1968) New Age International (P)Ltd. New Delhi.

2. Prescott & Dunn's Industrial Microbiology. Ed. E.G. Reed (1987).CBS Publishers, New Delhi.

3. Biotechnology: A Textbook of Industrial Microbiology 2nd Edition. Crueger, W. and Crueger, A. (2000) Panima Publishing Corporation, New Delhi.

4. Enzymes: Biochemistry, Biotechnology, Clinical chemistry. Palmer, T. (2000) Horwood publishing Colphon.

5. Process engineering in biotechnology. Jackson, A.T. (1991) Prentice Hall.

6. Manual of Industrial Microbiology and Biotechnology 2nd Edition. Ed. Arnold L. Demain and Julian E. Davies (1999) ASM Press Washington D.C.

   Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BS-202A	Basics of Thermodynamic and Organic Chemistry						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs
Purpose	To familiarize the students with basic concepts of thermodynamic and organic chemistry.						

Course Outcomes	
CO1	The students will be able to know the basic concepts of naming of organic compounds and general organic reactions.
CO2	Able to know about spatial arrangement of molecules and their bonding.
CO3	Able to know about basic concepts of thermodynamics.
CO4	Able to know about concept of free energy in biomolecules and binding used in biochemical reactions.

UNIT-I

IUPAC Nomenclature: Systematic IUPAC nomenclature of alkenes, alkynes, cycloalkanes, aromatics, bicyclic and polyfunctional organic compounds. Bond line notation.Types of Organic Reactions: Substitution, Addition, Elimination reactions. Wanger-Meerwin rearrangement reaction. Hyperconjugation : concept and consequences, mole concepts.

UNIT-II

Bonding: Hydrogen bonding- Nature, type, stability and its importance in organic compounds. Tautomerism-Concept, Ring-chain tautomerism, Ring-chain isomerism, properties and reactions of keto-enol tautomers.

Stereo Chemistry: Classification of stereomers, diastereomers, separation of enantiomers, absolute configuration (R & S), projection formulae, stereochemistry of compounds containing two asymmetric C- atoms, stereochemistry of biphenyls. Geometrical isomerism-concept, E & Z nomenclature and aldol condensation

UNIT –III

Thermodynamic parameters –internal energy, enthalpy; their relationship and their significance. First law of thermodynamics. Kirchoff's Equation. Heat capacity at constant pressure and volume and their relationship.

Concepts of Entropy, Second law of thermodynamics. Entropy changes for reversible   and irreversible processes. Entropy of mixing.

Third Law of Thermodynamics. Numerical problems on Laws of Thermodynamics.

UNIT-IV

Basic concept of Equilibrium and steady state conditions, Free energy and its relation with equilibrium constant, Chemical potential, Gibbs-Duhem equation and their application, Standard biochemical state and standard free energy changes. Thermodynamic basis of Biochemical reactions, solvent extraction for purification of compounds. Binding – Non-cooperative binding, Co-operative binding and its biological significance

Text/Reference Books:
 1. Organic Chemistry V1:6th ed. Finar,I L(2003) Pearson Education, Delhi
 2. Organic Chemistry V2:5th ed. Finar,I L(2003) Pearson Education, Delhi.
 3. Organic Chemistry 6th ed. Morrison,R & Boyd,T.(2003) Pearson Education, Delhi.
 4. Organic Chemistry. Paula Yurkanis Bruice; Pearson Education, Delhi.
 5. Principle of Organic Synthesis. Richard Norman and James M Coxon.
 6. Organic Chemistry:Reactions & Reagents,37th ed. Aggarwal (2003) Goel Publishing House,Meerut.
 7. Organic Analytical Chemistry. Jagmohan (2003) Narosa pub. New Delhi.
     Kinetics and Thermodynamics in Biochemistry : Bray & White.
 8.   Biophysical chemistry Vol. I : Edsall and Wyman
 9. Non Equilibrium Thermodynamics in Biophysics : Katchalasky and Curran; Harvard University Press.
10. Principles of Physical Biochemistry : Kensel. E.Van Holde, W. Curtis Johnson, P. Shing Ho (2005) 2 nd edition, Prentice Hall
 11.   Physical basis of biochemistry: Foundations of molecular biophysics, Bergethan, P.R.(2000) Springer.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BTE-212LA		Molecular Biology Lab		(B.Tech. Biotechnology Semester IV)			
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	3	1.5	60	40	100	3 Hrs.
Purpose		To familiarize the students with basic concepts of molecu.					
		Course Outcomes					
CO1		Students will be able to learn Isolation of DNA from Prokaryotic and Eukaryotic Cells					
CO2		Learning of Gel Electrophoresis for separation of DNA, RNA and Proteins					
CO3		Students will learn the technique of PCR Amplification of Nucleic Acids					
CO4		Students will learn Restriction Mapping of Plasmid DNA					

LABORATORY EXPERIMENTS

1. Isolation of genomic DNA from eukaryotic cells.

2. Isolation of RNA from eukaryotic cells.

3. Isolation of proteins from eukaryotic cells.

4. Isolation of genomic DNA from prokaryotic cells.

5. Isolation of plasmid DNA from Prokaryotic cells.

6. Restriction mapping of plasmid DNA:This experiment involves single and double digestion of the plasmid with restriction enzymes.

7. Gel electrophoretic separation of DNA and molecular wt. determination.

8. Gel electrophoretic separation of RNA.

9. Gel electrophoretic separation of proteins.

10. Transblot analysis of DNA.

11. Gel Extraction of DNA.

12. PCR amplification of DNA: Visualization by gel electrophoresis.

Reference Book:

Molecular Cloning – A laboratory manual: 3rd Edition Vol. 1-3. Sambrook J and Russell D.W. (2001). Cold Spring Harbor laboratory Press, New York.

BTE-214LA	Bioanalytical Techniques Lab			(B.Tech. Biotechnology) Semester- IV				
Lecture	Tutorial	Practical	Credit	Practical		Minor Test	Total	Time
-	-	3	1.5	60		40	100	3 Hrs
Purpose	To learn the Bioanalytical Techniques used in the field of Biotechnology							
Course Outcomes								
CO1	Students will learn about working of spectrophotometer.							
CO2	Students will be able to learn about technique of paper chromatography.							
CO3	Students will be able to learn about technique of electrophoresis.							
CO4	Students will be able to estimate DNA and RNA in any sample.							

LABORATORY EXPERIMENTS

1. To verify the validity of Beer-Lambert's law and determine the molar extinction coefficient of NADH/NAD
2. Separation of amino acids/ sugars by paper chromatography.
3. Extraction and estimation of total lipid content in a given sample of oil seed.
4. Partial purification of an enzyme by ammonium sulphate fractionation,
5. Native gel electrophoresis of proteins.
6. To demonstrate the working of HPLC.
7. Quantitative determination of DNA and RNA by spectrophotometric method.

Reference Books:
1. Principles and techniques of Practical Biochemistry: K. Wilson and J. Walker (1994), Cambridge University Press, Cambridge.
2. Introductory practical Biochemistry by S.K. Sawhney and Randhir Singh (2000), Narosa Publishing House, New Delhi.
3. An introduction to Practical Biochemistry by David T. Plummer (1988), McGraw- Hill, Book Company, UK.

BTE-216LA	Industrial Microbiology Lab			(B.Tech. Biotechnology) Semester -IV			
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
-	-	3	1.5	40	60	100	3 Hrs
Purpose	To learn the Practical Aspects of Industrial Microbiology						
Course Outcomes							
CO1	Learning of Sterilization Techniques used in Microbiology Lab						
CO2	Learning of Identification of industrially important microorganisms						
CO3	Students will learn production of antibiotics and enzymes from microbes						
CO4	Students will learn determination of microbial cell growth						

LABORATORY EXPERIMENTS

1. Sterilization Techniques (Media, air & water)
2. Construction of various fermenters (bioreactors)
3. Identification of industrially important microorganisms e.g. molds, yeasts and bacteria.
4. Production of various products in the lab. Alcohol, wine, cellulase, protease and bread.
5. Isolation of antibiotic producing microorganisms from the soil.
6. Penicillin production and testing of antimicrobial activity.
7. Isolation of streptomycin-resistant mutants by replica plating method.
8. Isolation of UV induced auxotrophic mutants.
9.Determination of cell growth.
10.Production of organic acids (Citric and lactic) by microorganisms.
11. Production of industrially important enzymes (protease, amylase) by microorganisms.

Reference Books:
1. Experiments in Microbiology, Plant Pathology and Biotechnology. Aneja, K.R.(2003) 4th Edition. New Age International Publishers, New Delhi.
2. Fermentations & Biochemical Hand Book: Principles, Process Design and Equipment. HC Vogel and Noyes(1983).
3. Microbiology Labortary Manual. Cappuccino, J. and Sheeman, N.(2000), 4th Edition, Addison Wesley, California.
4. Manual of Industrial Microbiology and Biotechnology. 2nd Edition. Ed. Arnold L. Demain and Julian E. Davies (1999) ASM Press Washington D.C.

BT-218LA	Immunology Lab			(B.Tech. Biotechnology) Semester -IV			
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
-	-	3	1.5	40	60	100	3 Hrs
Purpose	To learn the practical aspects of Immunology						
Course Outcomes							
CO1	Students will be able to learn basic techniques in handling laboratory animals.						
CO2	Learning of techniques for purification of immunoglobulins.						
CO3	Students will learn the technique of Immunoprecipitation and Agglutination.						
CO4	Students will learn the principles of ELISA.						

LABORATORY EXPERIMENTS

1. Routine techniques in handling laboratory animals: feeding, cleaning and bleeding procedure for mice and rabbit.
2. ABO blood group typing
3. Estimation of heamoglobin in blood sample
4. Detection of antigen/antibody from test sample
5. Purification of immunoglobulins.
6. Immunoprecipitation techniques
7. Agglutination techniques
8. ELISA

Reference Books:
1. Using Antibodies: A Laboratory Manual. Harlow & Lane(1998) Cold Spring Harbor Lab Press.
2. Immunological Techniques Made Easy. Cochet, et al.(1998)Wiley Publishers,Canada.

MC-901A				Environmental Sciences			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

Bachelor of Technology (CIVIL Engineering), KUK

SCHEME OF STUDIES/EXAMINATIONS (Modified)
(Semester -III) Credit-Based (w.e.f. 2019-20)

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of exam (Hours)
						Major Test	Minor Test	Practical	Total	
1	HM-251A	Introduction to Civil Engineering	2:0:0	2	2	75	25	0	100	3
2	BS-204A	Higher Engineering Mathematics	3:0:0	3	3	75	25	0	100	3
3	CE-201A	Introduction to Solid Mechanics	3:0:0	3	3	75	25	0	100	3
4	CE-203A	Introduction to Fluid Mechanics	2:1:0	3	3	75	25	0	100	3
5	CE-205A	Surveying & Geomatics	3:0:0	3	3	75	25	0	100	3
6	CE-207A	Building Construction Practice	3:0:0	3	3	75	25	0	100	3
7	CE-213LA	Fluid Mechanics Lab	0:0:2	2	1	-	40	60	100	3
8	CE-215LA	Surveying & Geomatics Lab	0:0:2	2	1	-	40	60	100	3
9	CE-217LA	Computer-aided Civil Engineering Drawing	0:0:2	2	1	-	40	60	100	3
10	MC-901A**	Environmental Sciences	2:0:0	2	0	75	25	0	100	3
11	SIM-201A*	Seminar on Summer Internship*	2:0:0	2	0	--	50	0	50	
		Total	20:1:6	27	20	450	270	180	900	

Note: *Note: SIM-201A* 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.
MC-901A is a mandatory credit less course in which the student will be required to get passing marks in the major test.**

Bachelor of Technology (CIVIL Engineering), KUK
SCHEME OF STUDIES/EXAMINATIONS (Modified)
(Semester -IV) Credit-Based (w.e.f. 2019-20)

S. No.	Course No./ Code	Subject	L:T:P	Hours/ Week	Credits	Major Test	Minor Test	Practical	Total	Duration of exam (Hours)
						Examination Schedule (Marks)				
1	HM-252A	Civil Engineering - Societal & Global Impact	2:0:0	2	2	75	25	0	100	3
2	ES-205A	Engineering Mechanics	3:0:0	3	3	75	25	0	100	3
3	CE-202A	Structural Analysis-I	3:1:0	4	4	75	25	0	100	3
4	CE-204A	Design of Steel Structure-I	4:0:0	4	4	75	25	0	100	3
5	CE-206A	Soil Mechanics	3:0:0	3	3	75	25	0	100	3
6	CE-208A	Hydraulic Engineering	3:0:0	3	3	75	25	0	100	3
7	CE-212LA	Structural Analysis-I Lab	0:0:2	2	1	-	40	60	100	3
8	CE-216LA	Soil Mechanics Lab	0:0:2	2	1	--	40	60	100	3
9	CE-218LA	Hydraulic Engineering Lab	0:0:2	2	1	--	40	60	100	3
		Total	18:1:6	25	22	450	270	180	900	

B. Tech (3rd Semester) Civil Engineering							
HM-251A				Introduction to Civil Engineering			
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
2	0	0	2	75	25	100	3

UNIT-I

Basic Understanding: What is Civil Engineering/ Infrastructure? Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career, Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers.

Structural Engineering:

Types of buildings; tall structures; various types of bridges; Water retaining structures; Other structural systems; Experimental Stress Analysis; Wind tunnel studies;

UNIT-II

Overview of National Planning for Construction and Infrastructure Development;

Position of construction industry vis-à-vis other industries, five year plan outlays for construction; current budgets for infrastructure works;

Surveying & Geomatics: Traditional surveying techniques, Total Stations, Development of Digital Terrain Models; GPS, LIDAR;

UNIT-III

Fundamentals of Building Materials: Stones, bricks, mortars, Plain, Reinforced & Prestressed Concrete, Construction Chemicals; Structural Steel, High Tensile Steel, Carbon Composites; Plastics in Construction; 3D printing; Recycling of Construction & Demolition wastes.

Basics of Construction Management & Contracts Management:

Temporary Structures in Construction; Construction Methods for various types of Structures; Major Construction equipment; Automation & Robotics in Construction; Modern Project management Systems; Advent of Lean Construction; Importance of Contracts Management

UNIT-IV

Environmental Engineering & Sustainability:

Water treatment systems; Effluent treatment systems; Solid waste management; Sustainability in Construction.

Hydraulics, Hydrology &Water Resources Engineering:

Fundamentals of fluid flow, basics of water supply systems; Underground Structures;

Underground Structures Multipurpose reservoir projects

Text/Reference Books:

1. Basic Civil and Mechanical Engineering, G. Shanmugam & M.S. Palanichamy, McGeraw

Hill Education(India) Private Limited, Chennai.

2. Basic Civil and Mechanical Engineering, Shamugasundaram, Cengage New Delhi.

3. Basic Civil and Mechanical Engineering, by Dhale Shrikrishna A. & Tajne Kiran , S. Chand's Publication New Delhi.

Note: The examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BS-204A	HIGHER ENGINEERING MATHEMATICS						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 h
Purpose	The objective of this course is to familiarize the prospective Engineers with Laplace Transform, partial differential equations which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						
Course Outcomes							
CO 1	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.						
CO 2	To introduce the Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.						
CO 3	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.						
CO 4	To familiar with essential tool of Numerical differentiation and Integration needed in approximate solutions for the ordinary differential equations.						

UNIT-1

Laplace Transform
Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-2

Partial Differential Equations
Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-3

Numerical Methods-1
Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

UNIT-4

Numerical Methods-2
Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules, Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations.

Textbooks/References:
1. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993. AICTE Model Curriculum in Mathematics.
2. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall, 1998.
3. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
4. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
8. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
9. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
10. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
11. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

B. Tech (3rd Semester) Civil Engineering							
CE-201A	Introduction to Solid Mechanics						
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
3	0	0	3	75	25	100	3

UNIT-I

Analysis of stresses and strains:

Analysis of simple states of stresses and strains, elastic constraints, bending stresses, theory of simple bending, flexure formula, combined stresses in beams, shear stresses, Mohr's circle, Principle stresses and strains, torsion in shafts and closed thin walled sections, stresses and strains in cylindrical shells and spheres under internal pressure.

Theory of Columns:

Slenderness ratio, end connections, short columns, Euler's critical buckling loads, eccentrically loaded short columns, cylinder columns subjected to axial and eccentric loading.

UNIT-II

Bending moment and shear force in determinate beams and frames:

Definitions and sign conventions, axial force, shear force and bending moment diagrams.

Three hinged arches:

Horizontal thrust, shear force and bending moment diagrams.

UNIT-III

Deflections in beams:

Introduction, slope and deflections in beams by differential equations, moment area method and conjugate beam method, unit load method, principle of virtual work, Maxwell's Law of Reciprocal Deflections, Williot's Mohr diagram.

UNIT-IV

Analysis of statically determinate trusses:

Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

Text Books

1) Structural Analysis-I, Bhavikatti S.S.,Vikas Pub.House, N.Delhi.
2) Strength of Materials, Dr. Sadhu Singh, Khanna Publishers
3) Fundamentals of Structural Analysis, M.K.Pant,S.K.Kataria & Sons, N.Delhi

Reference Books

1) Strength of Materials Part-I, S.Timoshenko, Affiliated East-West Press, New . Delhi
2) Mechanics of Solids, Prasad, V. S. Gakgotia Pub., New Delhi.
3) Elementary Structural Analysis, Jain, A. K., Nem Chand & Bros, Roorkee.
4) Elementary Structural Analysis, Wibur & Nooris, McGraw Hill Book Co., Newyork.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

B. Tech (3rd Semester) Civil Engineering							
CE-203A		Introduction to Fluid Mechanics					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
2	1	0	3	75	25	100	3

UNIT-I

Introduction:

Fluid properties, mass density, specific weight, specific volume and specific volume and specific gravity, surface tension, capillarity, pressure inside a droplet and bubble due to surface tension, compressibility viscosity, Newtonian and Non-Newtonian fluids, real and ideal fluids.

Kinematics of Fluid Flow:

Steady & unsteady, uniform and non-uniform, laminar & turbulent flows, one, two & three dimensional. flows, stream lines, streak lines and path lines, continuity equation in differential form, rotation and circulation, elementary explanation of stream function and velocity potential, rotational and irrotational flows, graphical and experimental methods of drawing flow nets.

UNIT-II

Fluid Statics:

Pressure-density-height relationship, gauge and absolute pressure, simple differential and sensitive manometers, two liquid manometers, pressure on plane and curved surfaces, center of pressure, Buoyancy, stability of immersed and floating bodies, determination of metacentric height, fluid masses subjected to uniform acceleration, free and forced vortex.

UNIT-III

Dynamic of Fluid Flow:

Euler's equation of motion along a streamline and its integration, limitation of Bernoulli's equation, Pitot tubes, venture meter, Orifice meter, flow through orifices & mouth pieces, sharp crested weirs and notches, aeration of nappe.

UNIT-IV

Boundary layer analysis:

Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, turbulent boundary layer, laminar sub-layer, smooth and rough boundaries, local and average friction coefficient, separation and its control.

Dimensional Analysis and Hydraulic Similitude:

Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling, similar and distorted models.

Text Books

1) Hydraulic and Fluid Mechanics by P.N.Modi & S.M.Seth

2. Fluid Mechanics and Hydraulic Machines, Sukumar Pati, McGeraw Hill Education (India) Private Limited, New Delhi.

2) Fluid Mechanics and Hydraulic Machines,Dr. R.K.Bansal, Luxmi Publication

Reference Books

1.Introduction to Fluid Mechanics by Robert W.Fox & Alan T.McDonald

2. Introduction to Fluid Mechanics and Hydraulic Machines, S.K.Som, G. Biswas & S. Chakraborty, McGeraw Hill Education (India) Private Limited.

2) Fluid Mechanics Through Problems by R.J.Garde

3) Engineering Fluid Mechanics by R.J.Garde & A.G.Mirajgaoker

Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech. (3rd Semester) Civil Engineering							
CE-205A	**Survey and Geomatics**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**0**	**0**	**3**	**75**	**25**	**100**	**3**

<div align="center">Unit I</div>

Introduction to Surveying

Fundamental Principles of Surveying, Survey Stations, Survey Lines – Ranging, Methods of traversing, instruments for measurement of angles-prismatic and surveyor's compass, bearing of lines, local attraction, examples

Triangulation and Trilateration

Theodolites Survey: Instruments, temporary adjustment of theodolite, measurement of angles, repetition and reiteration method, traverse surveying with theodolite, checks in traversing, adjustment of closed traverse, examples. Intervisibilty of Height and Distances: Trigonometric Levelling, Axis Signal Corrections

<div align="center">Unit II</div>

Levelling:

Definition of terms used in levelling, types of levels and staff, temporary adjustment of levels, principles of leveling, reduction of levels, booking of staff readings, examples

Contours:

Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, uses of contours maps.

Plane Table Surveying:

Plane table, methods of plane table surveying, radiation, intersection, traversing and resection, two point and three point problems.

<div align="center">Unit III</div>

Curves:

Classification of curves, elements of simple circular curve, location of tangent points-chain and tape methods, instrumental methods, examples of simple curves. Transition Curves-Length and types of transition curves, length of combined curve, examples. Vertical Curves: Necessity and types of vertical curves.

Modern Field Survey Systems:

Principal of Electronic Distance Measurement, Modulation, Types of EDM Instruments.

Working principle and survey with total station.

<div align="center">Unit IV</div>

Elements of Photogrammetry:

Introduction: types of photographs, types of aerial photographs, aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning,

Introduction of remote sensing and its systems:

Concept of G.I.S and G.P.S. -Basic Components, data input, storage & output.

Text Books

1. Surveying Vol.I & II by B.C.Punmia
2. Surveying Vol.I & II by S.K.Duggal, TMH Publication

Reference Books

1. 1. Surveying Vol.I by T.P.Kanitkar

B. Tech (3rd Semester) Civil Engineering							
CE-207A	Building Construction Practice						
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs.)
3	0	0	4	75	25	100	3

UNIT-I

Masonry Construction:

Introduction, various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, structural brick work-cavity and hollow walls, reinforced brick work, Defects in brick masonry, composite stone and brick masonry, glass block masonry.

Cavity and Partition Walls:

Advantages, position of cavity, types of non-bearing partitions, constructional details and precautions, construction of masonry cavity wall.

Foundation:

Functions, types of shallow foundations, sub-surface investigations, geophysical methods, general feature of shallow foundation, foundations in water logged areas, design of masonry wall foundation, introduction to deep foundations i.e. pile and pier foundations.

UNIT-II

Damp-Proofing and Water-Proofing:

Defects and causes of dampness, prevention of dampness, materials used, damp-proofing treatment in buildings, water proofing treatment of roofs including pitched roofs.

Roofs and Floors:

Types of roofs, various terms used, roof trusses-king post truss, queen post truss etc. Floor structures, ground, basement and upper floors, various types of floorings.

Doors and Windows:

Locations, sizes, types of doors and windows, fixures and fastners for doors and windows.

UNIT-III

Brick and Tiles:

Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks. Tiles: Terra-cotta, manufacturing of tiles and terra-cotta, types of terra-cotta, uses of terra-cotta.

Limes, Cement and Mortars:

Classification of lime, manufacturing, artificial hydraulic lime, pozzolona, testing of lime, storage of lime, cements composition, types of cement, manufacturing of ordinary Portland cement, testing of cement, special types of cement, storage of cement.

Mortars: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.

UNIT-IV

Stones:

Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

Timber:

Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fiberboard, masonite and its manufacturing, important Indian timbers.

Paints and Varnishes:

Basic constituents of paints, types of paints, painting of wood, constituents of varnishes, characteristics and types of varnishes.

Text Books

1. Building Construction and Material, Gurcharan Singh, Standard Book House

2. Building Material and Construction, G.C.Sahu & Joygopal Jena, McGeraw Hill Education(India) Private Limited, Chennai.

3. Building Construction, Dr. B.C.Punmia, Luxmi Publication

4. Building Construction, Sushil Kumar, Standard Pub., N. Delhi

Reference Books

1. Building Material, Rangawala

2. Construction Engineering, Y.S. Sane
3. Building Construction, Gurcharan Singh, Standard Pub., N. Delhi
Note: The paper setter will set the paper as per the question paper templates provided.

CE-213 LA	B. Tech (3rd Semester) Civil Engineering							
	Fluid Mechanics Lab							
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Practical	Total	Time (Hrs)
0	0	2	1	0	40	60	100	3

List of experiments
1. To determine metacentric height of the ship model.
2. To verify the Bernoulli's theorem.
3. To determine coefficient of discharge for an Orifice meter.
4 To determine coefficient of discharge of a venturimeter.
5 To determine the various hydraulic coefficients of an Orifice (Cd, Cc, Cv).
6 To determine coefficient of discharge for an Orifice under variable head.
7 To calibrate a given notch.
8 To determine coefficient of discharge for a mouth piece.
9 Drawing of a flow net by Viscous Analogy Model and Sand Box Model.
10 To study development of boundary layer over a flat plate.
11 To study velocity distribution in a rectangular open channel.
12 Velocity measurements by current meter, float, and double float (demonstration only)
13 Experiment on Vortex formation (demonstration only).

B. Tech (3rd Semester) Civil Engineering								
CE-215 LA	Surveying & Geomatics Lab							
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Practical	Total	Time (Hrs.)
0	0	2	1	0	40	60	100	3

List of Experiments:

1. To plot a traverse of a given area by chain surveying & also locate offsets
2. To plot a traverse of a given area with the help of a compass and a chain.
3. To work out relative elevations of various points on the grounds by performing profile or by fly leveling
4. To plot a longitudinal section and cross section of given alignment.
5. To determine the difference in elevations of two points by reciprocal leveling.
6. To plot a contour map of given area.
7. To determine the position of station occupied by plane table using three point problem.
8. To determine the position of station occupied by plane table using two point problem.
9. Use of a tangent clinometer with plane table.

	B. Tech (3rd Semester) Civil Engineering							
CE-217 LA	**Computer-aided Civil Engineering Drawing**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time (Hrs.)**
0	**0**	**2**	**--**	**--**	**40**	**60**	**100**	**3**

LIST OF EXPERIMENTS
Typical drawings of:
Bonds in brick work
Grillage foundation
Preparation of building drawing mentioning its salient features including the following details:
Ground floor plan
Two Sectional Elevations
Front and Side Elevations
Plan and Sectional Elevation of stair case, doors/ windows/ ventilators, floor and roof.
 Footings: Isolated footings**,** combined footings, rectangular, trapezoidal, strip, strap, raft footings
RCC Flat slabs
 Masonary columns, bearing walls, retaining walls.

MC-901A	Environmental Sciences						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.
(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.

- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

	B.Tech. (4th Semester) Civil Engineering						
HM-252A	**Civil Engineering- Societial & Global Impact**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
2	**0**	**0**	**2**	**75**	**25**	**100**	**3**

UNIT-I

Introduction to Course and Overview; Understanding the past to look into the future: Pre-industrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections, Ecosystems in Society and in Nature; the steady erosion in Sustainability; Global warming, its impact and possible causes; Evaluating future requirements for various resources; GIS and applications for monitoring systems; Human Development Index and Ecological Footprint of India Vs other countries and analysis.

UNIT-II

Understanding the importance of Civil Engineering in shaping and impacting the world:- The ancient and modern Marvels and Wonders in the field of Civil Engineering; Future Vision for Civil Engineering

Infrastructure :- Habitats, Megacities, Smart Cities, futuristic visions; Transportation (Roads, Railways & Metros, Airports, Seaports, River ways, Sea canals, Tunnels (below ground, under water); Futuristic systems (ex, Hyper Loop)); Energy generation (Hydro, Solar (Photovoltaic, Solar Chimney), Wind, Wave, Tidal, Geothermal, Thermal energy); Water provisioning; Telecommunication needs (towers, above-ground and underground cabling); Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability;

UNIT-III

Environment, Traditional & futuristic methods:- Solid waste management, Water purification, Wastewater treatment & Recycling, Hazardous waste treatment; Flood control (Dams, Canals, River interlinking), Multi-purpose water projects, Atmospheric pollution; Global warming phenomena and Pollution Mitigation measures, Stationarity and nonstationarity; Environmental Metrics & Monitoring; Other Sustainability measures; Innovations and methodologies for ensuring Sustainability.

Built environment: – Facilities management, Climate control; Energy efficient built environments and LEED ratings, Recycling, Temperature/ Sound control in built environment, Security systems; Intelligent/ Smart Buildings; Aesthetics of built environment, Role of Urban Arts Commissions; Conservation, Repairs & Rehabilitation of Structures & Heritage structures; Innovations and methodologies for ensuring Sustainability

UNIT-IV

Civil Engineering Projects – Environmental Impact Analysis procedures; Waste (materials, manpower, equipment) avoidance/ Efficiency increase; Advanced construction techniques for better sustainability; Techniques for reduction of Green House Gas emissions in various aspects of Civil Engineering Projects; New Project Management paradigms & Systems (Ex. Lean Construction), contribution of Civil Engineering to GDP, Contribution to employment(projects, facilities management), Quality of products, Health & Safety aspects for stakeholders; Innovations and methodologies for ensuring Sustainability during Project developmen.

Text/Reference Books:

1. Žiga Turk (2014), Global Challenges and the Role of Civil Engineering, Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society. Geotechnical, Geological and Earthquake Engineering, Vol. 32. Springer, Dordrecht
2. Brito, Ciampi, Vasconcelos, Amarol, Barros (2013) Engineering impacting Social, Economical and Working Environment, 120th ASEE Annual Conference and Exposition
3. NAE Grand Challenges for Engineering (2006), Engineering for the Developing World, The Bridge, Vol 34, No.2, Summer 2004.
4. Allen M. (2008) Cleansing the city. Ohio University Press. Athens Ohio.
5. Ashley R., Stovin V., Moore S., Hurley L., Lewis L., Saul A. (2010). London Tideway Tunnels Programme – Thames Tunnel Project Needs Report – Potential source control and SUDS applications: Land use and retrofit options
6. http://www.thamestunnelconsultation.co.uk/consultation-documents.aspx

Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech (4th Semester) Civil Engineering							
ES-205A		Engineering Mechanics					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
3	0	0	3	75	25	100	3

UNIT-I

Introduction to Engineering Mechanics Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static In-determinancy.

Friction:- Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack.

UNIT-II

Basic Structural Analysis:- Equilibrium in three dimensions; Method of Sections; Method of Joints; How to determine if a member is in tension or compression; Simple Trusses; Zero force members; Beams & types of beams; Frames & Machines;

Centroid and Centre of Gravity:- Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook.

UNIT-III

Virtual Work and Energy Method- Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium.Applications of energy method for equilibrium. Stability of equilibrium.

Review of particle dynamics- Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy.Impulse momentum (linear, angular); Impact (Direct and oblique).

UNIT-IV

Introduction to Kinetics of Rigid Bodies:- Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation.

Text/Reference Books:

1.A.K. Dhiman, P. Dhiman & D.C.Dhiman (2015), Engineering Mechanics, McGeraw Hill Education(India) Private Limited, Chennai.

2. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics,
   Vol II, – Dynamics, 9th Ed, Tata McGraw Hill

3. R. C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics,
   Pearson Press.

4. Andy Ruina and Rudra Pratap (2011), Introduction to Statics and Dynamics, Oxford
   University Press

5. Shanes and Rao (2006), Engineering Mechanics, Pearson Education,

6. Hibler and Gupta (2010),Engineering Mechanics (Statics, Dynamics) by Pearson
   Education

7. Reddy Vijaykumar K. and K. Suresh Kumar(2010), Singer's Engineering Mechanics
8. Bansal R.K.(2010), A Text Book of Engineering Mechanics, Laxmi Publications
9. Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.
10. Tayal A.K. (2010), Engineering Mechanics, Umesh Publications

Note: The paper setter will set the paper as per the question paper templates provided.

	B.Tech. (4th Semester) Civil Engineering						
CE-204A	**Design of Steel Structure-I**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time(Hrs)**
3	**1**	**0**	**4**	**75**	**25**	**100**	**3**

UNIT-I

Introduction:
Loads, structural steels and their specifications, structural elements, steel vs. concrete and timber, design specifications as per IS: 800, structural layout, strength and stiffness considerations, efficiency of cross-section, safety and serviceability considerations.

Riveted/Bolted Connections:
Riveting and bolting, their types, failure of riveted joint, efficiency of a joint, design of riveted joint, concentric riveted joints, advantages and disadvantages of bolted connections, stresses in bolts.

Welded Connections:
Types of welded joints, design of welded joint subjected to axial loads, welded joints subjected to eccentric loads, simple, semi-rigid and rigid connections.

Design of Tension Members:
Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

UNIT-II

Design of Compression Members:
Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and battened columns including the design of lacing and battens, design of eccentrically loaded compression members.

Column Bases and Footings:
Introduction, types of column bases, design of slab base and gussested base, design of gussested base subjected to eccentrically loading, design of grillage foundations.

UNIT-III

Design of Beams:
Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

UNIT-IV

Gantry Girders:
Introduction, various loads, specifications, design of gantry girder.

Plate Girder:
Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (brief introduction), Curtailment of flange plates, design beam to column connections: Introduction, design of framed and seat connection.

DRAWINGS (For Practice Purpose only)
1. Structural drawings of various types of welded connections (simple and eccentric)
2. Beam to column connections (framed & seat connections)
3. Column bases- slab base, gusseted base and grillage foundation.
4. Plate girder.
5. Roof truss.

Text Books
1) Design of steel structures, S.K.Duggal, TMH Pub., New Delhi
2) Design of steel structures, Dr.B.C.Punmia, Luxmi Publication

3) Design of steel structures-I, Dr. Ram Chandra, Scientific Publisher, Jodhpur

Reference Books

1) Design of steel structures, A.S.Arya & J.L.Ajmani, Nem chand & Bros., Roorkee.
2) Design of steel structures, M.Raghupati, TMH Pub., New Delhi.
3) Design of steel structures, S.M.A.Kazmi & S.K.Jindal, Prentice Hall, New Delhi.

Note: The paper setter will set the paper as per the question paper templates provided.

	B.Tech. (4th Semester) Civil Engineering						
CE-202A	**Structural Analysis-I**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**1**	**0**	**4**	**75**	**25**	**100**	**3**

UNIT-I

Statically Indeterminate Structures:

Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano's 2nd theorem.

UNIT-II

Slope deflection and moment Distribution Methods:

Analysis of continuous beams & portal frames, Portal frames with inclined members.

UNIT-III

Column Analogy Method:

Elastic centre, Properties of analogous column, Applications to beam & frames.

Analysis of Two hinged Arches:

Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Rib shortening, Axial thrust and Radial Shear force diagrams.

UNIT-IV

Unsymmetrical Bending

Introduction Centroidal principal axes of sections, Bending stresses in beam subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.

Cable and suspension Bridges:

Introduction, uniformly loaded cables, Temperature stresses, three hinged stiffening Girder and two hinged stiffening Girder.

Text Books

4) Structural Analysis-II, Bhavikatti S.S.,Vikas Pub.House, N.Delhi.
5) Theory of Structures, S.Ramamrutham, DPR publishing Company
6) Theory of Structures, B.C.Punmia, Luxmi Publication

Reference Books

1) Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New York.
2) Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
3) Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
4) Theory of Structures, Vol. I, S.P. Gupta & G.S.Pandit, Tata McGraw Hill, New Delhi

Note: The paper setter will set the paper as per the question paper templates provided.

CE-206A	B.Tech. (4th Semester) Civil Engineering						
	Soil Mechanics						
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time(Hrs)
3	0	0	3	25	75	100	3

UNIT-I

Soil Formation and Composition

Introduction, soil and rock, Soil Mechanics and Foundation Engineering, origin of soils, weathering, soil formation, major soil deposits of India, particle size, particle shape, interparticle forces, soil structure, principal clay minerals.

Basic Soil Properties

Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis, sedimentation analysis, grain size distribution curves, consistency of soils, consistency limits and their determination, activity of clays, relative density of sands.

Classification of soils

Purpose of classification, classification on the basis of grain size, classification on the basis of plasticity, plasticity chart, Indian Standard Classification System.

Permeability of Soils

Introduction, Darcy's law and its validity, discharge velocity and seepage velocity, factors affecting permeability, laboratory determination of coefficient of permeability, determination of field permeability, permeability of stratified deposits.

UNIT-II

Effective Stress Concept

Principle of effective stress, effective stress under hydrostatic conditions, capillary rise in soils, effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, quick condition, critical hydraulic gradient, two dimensional flow, Laplace's equation, properties and utilities of flownet, graphical method of construction of flownets, piping, protective filter.

Compaction

Introduction, role of moisture and compactive effect in compaction, laboratory determination of optimum moisture content, moisture density relationship, compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction.

UNIT-III

Vertical Stress below Applied Loads

Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas, Newmark's influence chart, approximate stress distribution methods for loaded areas, Westergaard's analysis, contact pressure.

Compressibility and Consolidation

Introduction, components of total settlement, consolidation process, one-dimensional consolidation test, typical void ratiopressure relationships for sands and clays, normally consolidated and over consolidated clays, Casagrande's graphical method of estimating pre-consolidation pressure, Terzaghi's theory of one-dimensional primary consolidation, determination of coefficients of consolidation, consolidation settlement, Construction period settlement, secondary consolidation.

UNIT-IV

Shear Strength

Introduction, Mohr stress circle, Mohr-Coulomb failure-criterion, relationship between principal stresses at failure, shear tests, direct shear test, unconfined compression test, triaxial compression tests, drainage conditions and strength parameters, Vane shear test, shear strength characteristics of sands, normally consolidated clays, over-consolidated clays and partially saturated soils, sensitivity and thixotropy.

Earth Pressure

Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium, Rankine's earth pressure theory Coulomb's earth pressure theory, Culmann's graphical construction, Rebhann's construction.

Text Books

1. Soil Mechanics and Foundation Engineering by Dr. K.R.Arora
2. Soil Mechanics and Foundations, Dr.B.C.Punmia, Luxmi Publication
3. Basic and Applied Soil Mechanics by Gopal Ranjan, ASR Rao, New Age International(P)Ltd. Pub.N.Delhi

Reference Books

1. Soil Engg. in Theory and Practice, Vol .I, Fundamentals and General Principles by Alam Singh, CBS Pub.,N.Delhi.
2. Engg.Properties of Soils by S.K.Gulati, Tata-Mcgraw Hill N Delhi.
3. Geotechnical Engg. by P.Purshotam Raj,Tata Mcgraw Hill.
4. Principles of Geotechnical Engineering by B.M.Das, PWS KENT, Boston.

Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech (4th Semester) Civil Engineering							
CE-208A	**Hydraulic Engineering**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs)**
3	**0**	**0**	**3**	**75**	**25**	**100**	**3**

UNIT-I

Laminar Flow:

Navier Stoke's equation, Laminar flow between parallel plates, Couette flow, laminar flow through pipes-Hagen Poiseuille law, laminar flow around a sphere-Stokes'law.

Flow through pipes:

Types of flows-Reynold's experiment, shear stress on turbulent flow, boundary layer in pipes-Establishment of flow, velocity distribution for turbulent flow in smooth and rough pipes, resistance to flow of fluid in smooth and rough pipes, Stanton and Moody's diagram. Darcy's weisbach equation, other energy losses in pipes, loss due to sudden expansion, hydraulic gradient and total energy lines, pipes in series and in parallel, equivalent pipe, branched pipe, pipe networks, Hardy Cross method, water hammer.

UNIT-II

Drag and Lift:

Types of drag, drag on a sphere, flat plate, cylinder and airfoil, development of lift on immersed bodies like circular cylinder and airfoil.

Open Channel Flow:

Type of flow in open channels, geometric parameters of channel section, uniform flow, most economical section (rectangular and trapezoidal), specific energy and critical depth, momentum in open channel, specific force, critical flow in rectangular channel, applications of specific energy and discharge diagrams to channel transition, metering flumes, hydraulic jump in rectangular channel, surges in open channels, positive and negative surges, gradually varied flow equation and its integration, surface profiles.

UNIT-III

Compressible flow:

Basic relationship of thermodynamics continuity, momentum and energy equations, propagation of elastic waves due to compression of fluid, Mach number and its significance, subsonic and supersonic flows, propagation of elastic wave due to disturbance in fluid mach cone, stagnation pressure.

UNIT-IV

Pumps and Turbines:

Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working, types, heads of a pump-statics and manometric heads,. Force executed by fluid jet on stationary and moving flat vanes, Turbines-classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis turbines, cavitation and setting of turbines.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Text Books

1. Hydraulic and Fluid Mechanics by P.N.Modi & S.M.Seth

2. Fluid Mechanics and Hydraulic Machines,Dr. R.K.Bansal, Luxmi Publication

Reference Books
1. Flow in Open Channels by S.Subraminayam
2. Introduction to Fluid Mechanics by Robert N.Fox & Alan T.Macnold

	B.Tech. (4th Semester) Civil Engineering							
CE-212LA	**Structural Analysis-I Lab**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time**
0	**0**	**2**	**1**	**0**	**40**	**60**	**100**	**2**

LIST OF EXPERIMENTS
1. Verification of reciprocal theorem of deflection using a simply supported beam.
2. Verification of moment area theorem for slopes and deflections of the beam.
3. Deflections of a truss- horizontal deflection & vertical deflection of various joints of a pin- jointed truss.
4. Elastic displacements (vertical & horizontal) of curved members.
5. Experimental and analytical study of 3 hinged arch and influence line for horizontal thrust.
6. Experimental and analytical study of behavior of struts with various end conditions.
7. To determine elastic properties of a beam.
8. Uniaxial tension test for steel (plain & deformed bars)
9. Uniaxial compression test on concrete & bricks specimens.

	B.Tech. (4th Semester) Civil Engineering							
CE-216LA	**Soil Mechanics Lab**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time**
0	**0**	**2**	**1**	**0**	**40**	**60**	**100**	**2**

List of Experiments:
1. Visual Soil Classification and water content determination.
2. Determination of specific gravity of soil solids.
3. Grain size analysis-sieve analysis.
4. Liquid limit and plastic limit determination.
5. Field density by:
Sand replacement method
Core cutter method
6. Proctor's compaction test.
7. Coefficient of permeability of soils.
8. Unconfined compressive strength test.
9. Direct shear test on granular soil sample.
10. Unconsolidated undrained (UU) triaxial shear test of fine grained soil sample.
Note: At least ten experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

	B. Tech. (4th Semester) Civil Engineering						
CE-218A	**Hydraulics Engineering lab**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**0**	**0**	**3**	**75**	**25**	**100**	**3**

1 To determine the coefficient of drag by Stoke's law for spherical bodies.

2 To study the phenomenon of cavitation in pipe flow.

3 To determine the critical Reynold's number for flow through commercial pipes.

4 To determine the coefficient of discharge for flow over a broad crested weir.

5 To study the characteristics of a hydraulic jump on a horizontal floor and sloping glacis including friction blocks.

6 To study the scouring phenomenon around a bridge pier model.

7 To study the scouring phenomenon for flow past a spur.

8 To determine the characteristics of a centrifugal pump.

9 To study the momentum characteristics of a given jet.

10 To determine head loss due to various pipe fittings.

Bachelor of Technology (Computer Science and Engineering)
Credit Based Scheme of Studies/Examination(Modified)
Semester III (w.e.f Session 2019-2020)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Major Test	Minor Test	Practical	Total	Duration of Exam (Hrs)
						Examination Schedule (Marks)				
1	ES-227A	Principles of Programming Languages	3:0:0	3	3	75	25	0	100	3
2	PC-CS-201A	Data Structure and Algorithms	3:0:0	3	3	75	25	0	100	3
3	ES-207A	Digital Electronics	3:0:0	3	3	75	25	0	100	3
4	PC-CS-203A	Object Oriented Programming	3:0:0	3	3	75	25	0	100	3
5	BS-205 A	Mathematics-III	3:0:0	3	3	75	25	0	100	3
6	HM-902A	Business Intelligence and Entrepreneurship	3:0:0	3	3	75	25	0	100	3
7	PC-CS-205AL	Data Structure and Algorithms Lab	0:0:4	4	2	0	40	60	100	3
8	ES-209AL	Digital Electronics Lab	0:0:4	4	2	0	40	60	100	3
9	PC-CS-205AL	Object Oriented Programming Lab	0:0:4	4	2	0	40	60	100	3
		Total		30	24	450	270	180	900	
10	SIM-201A*	Seminar on Summer Internship	2:0:0	2		0	50	0	50	

Note: SIM-201A 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 and Engineering)
Credit Based Scheme of Studies/Examination(Modified)
Semester IV (w.e.f Session 2019-2020)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	PC-CS-202A	Discrete Mathematics	3:0:0	3	3	75	25	0	100	3
2	PC-CS-204A	Internet Technology and Management	3:0:0	3	3	75	25	0	100	3
3	PC-CS-206A	Operating Systems	3:0:0	3	3	75	25	0	100	3
4	PC-CS-208A	Design and Analysis of Algorithms	3:0:0	3	3	75	25	0	100	3
5	HM-921A	Organizational Behaviour	3:0:0	3	3	75	25	0	100	3
6	PC-CS-210AL	Internet Technology and Management Lab	0:0:4	4	2	0	40	60	100	3
7	PC-CS-212AL	Operating Systems Lab	0:0:4	4	2	0	40	60	100	3
8	PC-CS-214AL	Design and Analysis of Algorithms Lab	0:0:4	4	2	0	40	60	100	3
		Total		27	21	375	245	180	800	

| 9 | MC-901A* | Environmental Sciences | 3:0:0 | 3 | 0 | 75 | 25 | 0 | 100 | 3 |

*MC-901A is a mandatory credit-less course and student has to get passing marks in order to qualify for the award of B.Tech. Degree.

ES-227A	Principles of Programming Languages						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3 Hour
Purpose	To introduce the principles and paradigms of programming languages for design and implement the software intensive systems.						
Course Outcomes (CO)							
CO 1	To introduce the basic concepts of programming language, the general problems and methods related to syntax and semantics.						
CO 2	To introduce the structured data objects, subprograms and programmer defined data types.						
CO 3	To outline the sequence control and data control.						
CO 4	To introduce the concepts of storage management using programming languages.						

Unit-I: Introduction, Syntax and Semantics

Introduction: A brief history, Characteristics of a good programming language, Programming language translators- compiler and interpreters, Elementary data types – data objects, variable and constants, data types. Specification and implementation of elementary data types, Declarations, type checking and type conversions, Assignment and initialization, Numeric data types, enumerations, Booleans and characters.

Syntax and Semantics: Introduction, general problem of describing syntax, Formal method of describing Syntax, attribute grammar dynamic semantic.

Unit-II: Structured data objects, Subprograms and Programmer Defined Data Types

Structured data objects: Structured data objects and data types, specification and implementation of structured data types, Declaration and type checking of data structure, vector and arrays, records Character strings, variable size data structures, Union, pointer and programmer defined data objects, sets, files.

Subprograms and Programmer Defined Data Types: Evolution of data type concept abstraction, encapsulation and information hiding, Subprograms, type definitions, abstract data types, over loaded subprograms, generic subprograms.

Unit–III: Sequence Control and Data Control

Sequence Control: Implicit and explicit sequence control, sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return, recursive subprograms, Exception and exception handlers, co routines, sequence control. Concurrency – subprogram level concurrency, synchronization through semaphores, monitors and message passing

Data Control: Names and referencing environment, static and dynamic scope, block structure, Local data and local referencing environment, Shared data: dynamic and static scope, Parameter and parameter transmission schemes.

Unit-IV: Storage Management and Programming Languages

Storage Management: Major run time elements requiring storage, programmer and system controlled storage management and phases, Static storage management, Stack based storage management, Heap storage management, variable and fixed size elements.

Programming Languages: Introduction to procedural, non-procedural, structured, logical, functional and object oriented programming language, Comparison of C and C++ programming languages.

Suggested Books:
- Terrence W. Pratt, Marvin V. Zelkowitz, Programming Languages Design and Implementation, Pearson.
- Allen Tucker and Robert Noonan, Programming Languages–Principles and Paradigms, Tata McGraw-Hill, 2009.
- Ellis Horowitz, Fundamentals of Programming Languages, Galgotia Publications, 2010.
- C. Ghezzi, Programming Languages Concepts, Wiley Publications, 2010.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS201A	Data Structure and Algorithms						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3 Hour
Purpose	To introduce the principles and paradigms of Data Structures for design and implement the software systems logically and physically.						
Course Outcomes (CO)							
CO 1	To introduce the basic concepts of Data structure , basic data types ,searching and sorting based on array data types.						
CO 2	To introduce the structured data types like Stacks and Queue and its basic operations's implementation.						
CO 3	To introduce dynamic implementation of linked list.						
CO 4	To introduce the concepts of Tree and graph and implementation of traversal algorithms.						

Unit-1

Introduction to Data Structures, Data Types, Built in and User Defined Data Structures, Applications of Data Structure, Algorithm Analysis, Worst, Best and Average Case Analysis, Notations of Space and Time Complexity, Basics of Recursion.
Arrays, One Dimensional Arrays, Two Dimensional Arrays and Multi-Dimensional Arrays, Sparse Matrices,
Searching from array using Linear and Binary Searching Algorithm, Sorting of array using Selection, Insertion, Bubble, Radix Algorithm

Unit-2

Stacks: Definition, Implementation of Stacks and Its Operations, Evaluation of Infix, prefix and Postfix Expression, Inter-conversion of Infix, Prefix and Post-Fix Expression, Implementation of Merge Sort and Quick Sort Algorithm.
Queues: Definition, Sequential Implementation of Linear Queues and Its Operations, Circular Queue and Its Implementation, Priority Queues and Its Implementation, Applications of queues.

Unit-3

Linked Lists: Need of Dynamic Data Structures, Single Link List and Its Dynamic Implementation, Traversing, Insertion, Deletion Operations on Single Link Lists. Comparison between Static and Dynamic, Implementation of Linked List.
Circular Link Lists and Doubly Link List, Dynamic Implementation of Primitive Operations on Doubly Linked Lists and Circular Link List. Dynamic Implementation of Stacks and Queues.

Unit-4

Trees: Definition, Basic Terminology, Binary Tree, External and Internal Nodes, Static and Dynamic Implementation of a Binary Tree, Primitive Operations on Binary Trees, Binary Tree Traversals: Pre-Order, In-Order and Post-Order Traversals. Representation of Infix, Post-Fix and Prefix Expressions using Trees.

Introduction to Binary Search Trees: B+ trees, AVL Trees, Threaded Binary trees, Balanced Multi-way search trees, Implementation of Heap Sort Algorithm.

Graphs: Basic Terminology, Definition of Undirected and Directed Graphs, Memory Representation of Graphs, Minimum-Spanning Trees, Warshal Algorithm, Graph Traversals Algorithms: Breadth First and Depth First.

Suggested Books:
- Theory and Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline, TMH.
- Data Structures and Algorithms by PAI, TMH.
- Fundamentals of Data structures by Ellis Horowitz and Sartaj Sahni, Pub, 1983, AW.
- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- Data Structures and Program Design in C by Robert Kruse, PHI,
- Shukla, Data Structures using C++, Wiley India
- Introduction to Computers Science -An Algorithms Approach, Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

ES-207A	Digital Electronics						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3 Hour
Purpose	To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.						
Course Outcomes (CO)							
CO1	To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions						
CO2	To introduce the methods for simplifying Boolean expressions						
CO3	To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits						
CO4	To introduce the concept of memories and programmable logic devices.						

UNIT I MINIMIZATION TECHNIQUES AND LOGIC GATES

Binary Digits, Logic Levels, and Digital Waveforms, Logic Systems-Positive and negative, Logic Operations,Logical Operators, Logic Gates-AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR, Active high and Active low concepts, Universal Gates and realization of other gates using universal gates, Gate Performance Characteristics and Parameters.Boolean Algebra: Rules and laws of Boolean algebra, Demorgan's Theorems, Boolean Expressions and Truth Tables, Standard SOP and POS forms; Minterm and Maxterms, Canaonical representation of Boolean expressions, Duality Theorem, Simplification of Boolean Expressions, Minimization Techniques for Boolean Expressions using Karnaugh Map and Quine McCluskey Tabular method.introduction of TTL and CMOS Logic and their characteristics, Tristate gates.

UNIT II COMBINATIONAL CIRCUITS

Introduction to combinational Circuits, Adders-Half-Adder and Full-Adder, Subtractors- Half and Full Subtractor; Parallel adder and Subtractor; Look-Ahead Carry Adders. BCD adder, BCD subtractor, Parity Checker/Generator, Multiplexer, Demultiplexer, Encoder, Priority Encoder; Decoder ,BCD to Seven segment Display Decoder/Driver, LCD Display, and Comparators.

UNIT III SEQUENTIAL CIRCUITS

Introduction to Sequential Circuits, Flip-Flops: Types of Flip Flops -RS, T, D, JK; Edge triggering, Level Triggering; Flip Flop conversions; Master-Salve JK.

Introduction to shift registers, Basic Shift Register Operations, types of shift registers, Bidirectional Shift Registers, Shift Register Counters. Introduction to counters, Types of Counters-Asynchronous and synchronous counters, Up/Down Synchronous Counters, Modulo-n Counter , State table, excitation table concepts, Design of asynchronous and synchronous counters, Ring Counter, Applications of counters.

UNIT IV CONVERTER and MEMORY DEVICES

Digital to Analog Converter, Weighed Register: R-2R Ladder Network: Analog to Digital Conversion, Successive Approximation Type, Dual Slope Type.

Classification of memories - ROM: ROM organization, PROM, EPROM, EEPROM, EAPROM, RAM: - RAM organization - Write operation, Read operation, Memory cycle, Timing wave forms, memory expansion, Static RAM Cell, MOSFET RAM cell structure, Dynamic RAM cell structure, Programmable Logic Devices - Programmable Logic Array (PLA), Programmable Array Logic (PAL), Implementation of PLA, PAL using ROM.

Suggested Books:
- Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 8th Edition, TMH, 2003.M.
- Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
- ALI, Digital Switching Systems, , TMH
- A.K. Maini, Digital Electronics, Wiley India
- John F. Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006
- John. M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.
- S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3rd Edition., Vikas Publishing House Pvt. Ltd, New Delhi, 2006
- William H. Gothmann, Digital Electronics, 2nd Edition, PHI, 1982.
- Thomas L. Floyd, Digital Fundamentals, 8th Edition, Pearson Education Inc, New Delhi, 2003
- Donald D. Givone, Digital Principles and Design, TMH, 2003.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS203A	Object Oriented Programming						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3 Hour
Purpose	To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System.						
Course Outcomes (CO)							
CO1	To introduce the basic concepts of object oriented programming language and the its representation.						
CO2	To allocate dynamic memory, access private members of class and the behavior of inheritance and its implementation.						
CO3	To introduce polymorphism, interface design and overloading of operator.						
CO4	To handle backup system using file, general purpose template and handling of raised exception during programming.						

Unit–1

Introduction to C++, C++ Standard Library, Illustrative Simple C++ Programs. Header Files, Namespaces, Application of object oriented programming.

Object Oriented Concepts, Introduction to Objects and Object Oriented Programming, Encapsulation, Polymorphism, Overloading, Inheritance, Abstract Classes, Accessifier (public/ protected/ private), Class Scope and Accessing Class Members, Controlling Access Function, Constant, Class Member, Structure and Class

Unit-2

Friend Function and Friend Classes, This Pointer, Dynamic Memory Allocation and Deallocation (New and Delete), Static Class Members, Constructors, parameter Constructors and Copy Constructors, Deconstructors,
Introduction of inheritance, Types of Inheritance, Overriding Base Class Members in a Derived Class, Public, Protected and Private Inheritance, Effect of Constructors and Deconstructors of Base Class in Derived Classes.

Unit-3

Polymorphism, Pointer to Derived class, Virtual Functions, Pure Virtual Function, Abstract Base Classes, Static and Dynamic Binding, Virtual Deconstructors.

Fundamentals of Operator Overloading, Rules for Operators Overloading, Implementation of Operator Overloading Like <<,>> Unary Operators, Binary Operators.

Unit-4

Text Streams and binary stream, Sequential and Random Access File, Stream Input/ Output Classes, Stream Manipulators.

Basics of C++ Exception Handling, Try, Throw, Catch, multiple catch, Re-throwing an Exception, Exception specifications.
Templates: Function Templates, Overloading Template Functions, Class Template, Class Templates and Non- Type Template arguments.

Suggested Books:
● The complete reference C ++ by Herbert shieldt Tata McGraw Hill.
● Object Oriented Programming in Turbo C++ by Robert Lafore, 1994, The WAITE Group Press.
● Shukla, Object Oriented Programming in c++, Wiley India.
● C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall.
● Programming with C++ By D Ravichandran, 2003, T.M.H.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BS-205A			Mathematics-III				
Lecture	Tutorial	Practical	Credit	Theory	Sessional	Total	Time
3	0	0	3.0	75	25	100	3 Hour
Purpose	To familiarize the prospective engineers with techniques in sequence and series, multivariable calculus, and ordinary differential equations.						
Course Outcomes (CO)							
CO1	To develop the tool of sequence, series and Fourier series for learning advanced Engineering Mathematics.						
CO2	To introduce effective mathematical tools for the solutions of differential equations that model physical processes.						
CO3	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.						
CO4	To familiarize the student with calculus of vector functions that is essential in most branches of engineering.						

UNIT-I

Sequence and Series: Convergence of sequence and series, tests for convergence (Comparison test, D'Alembert's Ratio test, Logarithmic test, Cauchy root test, Raabe's test).
Fourier series: Introduction, Fourier-Euler Formula, Dirichlet's conditions, Change of intervals, Fourier series for even and odd functions, Half range sine and cosine series.

UNIT-II

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.
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-III

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-IV

Vector Calculus: Introduction, Scalar and Vector point functions, Gradient, divergence and Curl and their properties, Directional derivative. Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

Suggested Books:
- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
- N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
- S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
- E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
- E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
- G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

HM-902A	Business Intelligence and Entrepreneurship						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3
Purpose	To make the students conversant with the basics concepts in management thereby leading to nurturing their managerial skills.						
Course Outcomes (CO)							
CO1	Students will be able understand who the entrepreneurs are and what competences needed to become an Entrepreneur.						
CO2	Students will be able understand insights into the management, opportunity search, identification of a Product; market feasibility studies; project finalization etc. required for small business enterprises.						
CO3	Students can be able to write a report and do oral presentation on the topics such as product identification, business idea, export marketing etc.						
CO4	Students will be able to know the different financial and other assistance available for the small industrial units.						

Unit –I

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, Entrepreneurial challenges.

Unit   -II

Opportunity / Identification and Product Selection: Entrepreneurial Opportunity Search and Identification; Criteria to Select a Product; Conducting Feasibility Studies; Sources of business ideas, Marketing Plan : Conducting of Marketing Research, Industry Analysis, Competitor analysis, market segmentation and positioning, building a marketing plan, marketing mix, 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.

Unit –IV

Role of Support Institutions and Management of Small Business : 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.
 Special Issues for Entrepreneurs: Legal issues – Forming business entity, requirements for formation of a Private/Public Limited Company, Entrepreneurship and Intellectual Property Rights: IPR and their importance. (Patent, Copy Right, Trademarks) , Case Studies-At least one in whole course.

Note:
• Case studies of Entrepreneurs – successful, failed, turnaround ventures should be discussed in the class.
• 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:
● "Entrepreneurship development small business enterprises", Pearson, Poornima M Charantimath,2013.
● Roy Rajiv, "Entrepreneurship", Oxford University Press, 2011.
● "Innovation and Entrepreneurship",Harper business- Drucker.F, Peter, 2006.
● "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
● Enterpreneurship Development- S.Chand and Co.,Delhi- S.S.Khanka 1999
● Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi –Vasant Desai 2003.
● Entrepreneurship Management -Cynthia, Kaulgud, Aruna, Vikas Publishing House, Delhi, 2003.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS205AL	Data Structure and Algorithms Lab						
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3
Purpose	To introduce the principles and paradigms of Data Structures for design and implement the software systems logically and physically.						
Course Outcomes (CO)							
CO1	To introduce the basic concepts of Data structure, basic data types, searching and sorting based on array data types.						
CO2	To introduce the structured data types like Stacks and Queue and its basic operation's implementation.						
CO3	To introduce dynamic implementation of linked list.						
CO4	To introduce the concepts of Tree and graph and implementation of traversal algorithms.						

1. Write a program for Binary search methods.
2. Write a program for insertion sort, selection sort and bubble sort.
3. Write a program to implement Stack and its operation.
4. Write a program for quick sort.
5. Write a program for merge sort.
6. Write a program to implement Queue and its operation.
7. Write a program to implement Circular Queue and its operation.
8. Write a program to implement singly linked list for the following operations: Create, Display, searching, traversing and deletion.
9. Write a program to implement doubly linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.
10 Write a program to implement circular linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.
11. Write a program to implement insertion, deletion and traversing in B tree

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ES-209AL	Digital Electronics Lab						
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3
Purpose	To learn the basic methods for the design of digital circuits and systems.						
Course Outcomes (CO)							
CO1	To Familiarization with Digital Trainer Kit and associated equipment.						
CO2	To Study and design of TTL gates						
CO3	To learn the formal procedures for the analysis and design of combinational circuits.						
CO4	To learn the formal procedures for the analysis and design of sequential circuits						

LIST OF EXPERIMENTS:

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
3. Design and realize a given function using K-Maps and verify its performance.
4. To verify the operation of Multiplexer and De-multiplexer.
5. To verify the operation of Comparator.
6. To verify the truth table of S-R, J-K, T, D Flip-flops.
7. To verify the operation of Bi-directional shift register.
8. To design and verify the operation of 3-bit asynchronous counter.
9. To design and verify the operation of asynchronous Up/down counter using J-K FFs.
10. To design and verify the operation of asynchronous Decade counter.
11. Study of TTL logic family characteristics.
12. Study of Encoder and Decoder.
13. Study of BCD to 7 segment Decoder.

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

PC-CS205AL	Object Oriented Programming Lab						
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3 Hour
Purpose	To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System.						
Course Outcomes (CO)							
CO1	To introduce the basic concepts of object oriented programming language and the its representation.						
CO2	To allocate dynamic memory, access private members of class and the behavior of inheritance and its implementation.						
CO3	To introduce polymorphism, interface design and overloading of operator.						
CO4	To handle backup system using file, general purpose template and handling of raised exception during programming.						

Q1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.

Q2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates. Write a program that uses a structure called point to model a point. Define three points, and have the user input values to two of them. Then set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:

Enter coordinates for P1: 3 4

Enter coordinates for P2: 5 7

Coordinates of P1 + P2 are : 8, 11

Q3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.

Enter first number, operator, and second number: 10/ 3

Answer = 3.333333

Do another (Y/ N)? Y

Enter first number, operator, second number 12 + 100

Answer = 112

Do another (Y/ N) ? N

Q4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure phone. Create two structure variables of type phone. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:

- Enter your area code, exchange, and number: 415 555 1212
- My number is (212) 767-8900
- Your number is (415) 555-1212

Q5. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results maybe a DM object or DB objects, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and cenitmetres depending on the object on display.

Q6. Create a class rational which represents a numerical value by two double values- NUMERATOR and DENOMINATOR. Include the following public member Functions:

• constructor with no arguments (default).

• constructor with two arguments.

• void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.

• Overload + operator to add two rational number.

• Overload >> operator to enable input through cin.

• Overload << operator to enable output through cout.

Write a main ( ) to test all the functions in the class.

Q7. Consider the following class definition

class father {

protected : int age;

public;

```
father (int x) {age = x;}
virtual void iam ( )
{ cout < < "I AM THE FATHER, my age is : "<< age<< end1:}                    PC-CS205AL..................
};
```

Derive the two classes son and daughter from the above class and for each, define iam ( ) to write our similar but appropriate messages. You should also define suitable constructors for these classes. Now, write a main ( ) that creates objects of the three classes and then calls iam ( ) for them. Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam ( ) through the pointer to demonstrate polymorphism in action.

Q8. Write a program that creates a binary file by reading the data for the students from the terminal. The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.

Q9. A hospital wants to create a database regarding its indoor patients. The information to store include

    a) Name of the patient
    b) Date of admission
    c) Disease
    d) Date of discharge

Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients. List the information about all the to store the age of the patients. List the information about all the pediatric patients (less than twelve years in age).

Q10. Make a class **Employee** with a name and salary. Make a class **Manager** inherit from **Employee**. Add an instance variable, named department, of type string. Supply a method to **to String** that prints the manager's name, department and salary. Make a class **Executive** inherits from **Manager**. Supply a method **to String** that prints the string **"Executive"** followed by the information stored in the **Manager** superclass object. Supply a test program that tests these classes and methods.

Q11. Imagine a tollbooth with a class called toll Booth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar ( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar ( ), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals. Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC kay should cause the program to print out the total cars and total cash and then exit.

Q12. Write a function called reversit ( ) that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to reversit ( ) as an argument. Write a program to exercise reversit ( ). The program should get a string from the user, call reversit ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba)".

Q13. Create some objects of the string class, and put them in a Deque-some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach ( ) function and a user written display function. Then search the Deque for a particular string, using the first That ( ) function and display any strings that match. Finally remove all the items from the Deque using the getLeft ( ) function and display each item. Notice the order in which the items are displayed: Using getLeft ( ), those inserted on the left (head) of the Deque are removed in "last in first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if getRight ( ) were used.

Q14. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

    a) Accept deposit from a customer and update the balance.
    b) Display the balance.
    c) Compute and deposit interest.
    d) Permit withdrawal and update the balance.
    e) Check for the minimum balance, impose penalty, necessary and update the balance.
    f) Do not use any constructors. Use member functions to initialize the class members.

Q15. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data( ) to initialize baseclass data members and another member function display_area( ) to compute and display the area of figures. Make display_area ( ) as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:

Area of rectangle = x * y
Area of triangle = ½ * x * y

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining
       three experiments may either be performed from the above list or designed & set by the concerned institution as per the

scope of the syllabus.

PC-CS202A	Discrete Mathematics						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3
Purpose	To provide the conceptual knowledge of Discrete structure.						
Course Outcomes (CO)							
CO1	To study various fundamental concepts of Set Theory and Logics.						
CO2	To study and understand the Relations, diagraphs and lattices.						
CO3	To study the Functions and Combinatorics.						
CO4	To study the Algebraic Structures.						

Unit 1 Set Theory and Logic

Fundamentals - Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets and Products, Partition of sets, The Principle of Inclusion- Exclusion.
Logic : Propositions and Logical operations, Truth tables, Equivalence, Implications, Laws of Logic, Normal forms, Predicates and quantifiers, Mathematical Induction.

Unit 2: Relations, diagraphs and lattices

Product sets and partitions, relations and diagraphs, paths in relations and diagraphs, properties of relations, equivalence and partially ordered relations, computer representation of relations and diagraphs, manipulation of relations, Transitive closure and Warshall's algorithm, Posets and Hasse Diagrams, Lattice.

Unit 3 Functions and Combinatorics

Definitions and types of functions: injective, subjective and bijective, Composition, identity and inverse, Review of Permutation and combination-Mathematical Induction, Pigeon hole principle, Principle of inclusion and exclusion, Generating function-Recurrence relations.

Unit 4: Algebraic Structures

Algebraic structures with one binary operation - semi groups, monoids and groups, Product and quotient of algebraic structures, Isomorphism, homomorphism, automorphism, Cyclic groups, Normal sub group, codes and group codes, Ring homomorphism and Isomorphism.

Suggested Books:
- Elements of Discrete Mathematics C.L Liu, 1985, Reprinted 2000, McGraw Hill
- Discrete Mathematics - Revised (SIE) (Schaum's Outline Series), LIPSCHUTZ , TMH
- Discrete mathematical structures by B Kolman RC Busby, S Ross PHI Pvt. Ltd.
- Discrete Mathematical Structures with Applications to Computer Science , by Tremblay J.P, and Manohar R., McGraw Hill Book Company, 1975, International Edition, 1987.
- Discrete and Combinatorial mathematics ", Ralph P., Grimaldi, Addison-Wesley Publishing Company, Reprinted in 1985.
- Discrete Mathematics and its Applications ", Kenneth H.Rosen, McGraw Hill Book Company, 1999. Sections: 7.1 to 7.5.
- Discrete Mathematics for computer scientists and Mathematicians, Joe L. Mott, Abraham

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS204A	Internet Technology and Management						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3
Purpose	To provide the conceptual knowledge of Internet and methodologies used in web and secure internet communication and networking.						
Course Outcomes (CO)							
CO1	To study various fundamental concepts of Internetworking techniques with their characteristics.						
CO2	To study and understand the requirements for world-wide-web formats and techniques.						
CO3	To study the E-mail functioning and basics of HTML, XML and DHTML languages.						
CO4	To study the functioning of Servers and Privacy and Security related mechanisms.						

UNIT-1 : THE INTERNET

Introduction to networks and internet, history, Internet, Intranet and Extranet, Working of Internet, Internet Congestion, internet culture, business culture on internet. Collaborative computing and the internet. Modes of Connecting to Internet, Internet Service Providers(ISPs), Internet address, standard address, domain name, DNS, IP.v6.Modems, Speed and time continuum, communications software; internet tools.

UNIT-II : WORLD WIDW WEB

Introduction, Miscellaneous Web Browser details, searching the www: Directories search engines and meta search engines, search fundamentals, search strategies, working of the search engines, Telnet and FTP, HTTP, Gophar Commands, TCP/IP. Introduction to Browser, Coast-to-coast surfing, hypertext markup language, Web page installation, Web page setup, Basics of HTML and formatting and hyperlink creation.Using FrontPage Express, Plug-ins.

UNIT-III : INTERNET PLATEFORM AND MAILING SYSTEMS

Introduction, advantages and disadvantages, User Ids, Pass words, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, MIME types, Newsgroups, mailing lists, chat rooms, secure-mails, SMTP, PICO, Pine, Library cards catalog, online ref. works.
Languages: Basic and advanced HTML, Basics of scripting languages – XML, DHTML, Java Script.

UNIT-IV : SERVERS

Introduction to Web Servers: PWS, IIS, Apache; Microsoft Personal Web Server. Accessing and using these servers.
Privacy and security topics: Introduction, Software Complexity, Attacks, security and privacy levels, security policy, accessibility and risk analysis, Encryption schemes, Secure Web document, Digital Signatures, Firewalls, Intrusion detection systems

Suggested Books:
•   Internet and World Wide Programming, Deitel,Deitel and Nieto, 2012, Pearson Education
•   Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp, TMH- 2012
•   Inline/Online: Fundamentals of The Internet And The World Wide Web, GREENLAW, TMH
•   Complete idiots guide to java script,. Aron Weiss, QUE, 2013
•   Network firewalls, Kironjeet syan -New Rider Pub.2014
•   Networking Essentials – Firewall Media.Latest-2015
•   www.secinf.com
•   www.hackers.com
•   Alfred Glkossbrenner-Internet 101 Computing MGH, 2013

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS-206A	OPERATING SYSTEMS						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3
Purpose	To familiarize the students with the basics of Operating Systems.						
Course Outcomes (CO)							
CO1	To understand the structure and functions of Operating system.						
CO2	To learn about processes, threads and scheduling algorithms.						
CO3	To understand the principle of concurrency.						
CO4	To understand the concept of deadlocks.						
CO5	To learn various memory management schemes.						
CO6	To study I/O management and file systems.						
CO7	To study the concept of protection and security.						

UNIT 1

Introduction: Introduction to OS. Operating system functions, Different types of O.S.: batch process, multi-programmed, time-sharing, real-time, distributed, parallel.

System Structure: Computer system operation, I/O structure, storage structure, storage hierarchy, different types of protections, operating system structure (simple, layered, virtual machine), O/S services, system calls.

UNIT II

CPU scheduling: scheduling criteria, preemptive and non-preemptive scheduling, scheduling algorithms, algorithm evaluation, multi-processor scheduling.

Threads: overview, benefits of threads, user and kernel threads.

Process Management: Concept of processes, process states, process control, co-operating processes, inter-process communication.

Process Synchronization: background, critical section problem, critical region, synchronization hardware, Classical problems of synchronization, semaphores.

UNIT III

Deadlocks: Concept of deadlock, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

Memory Management: background, logical vs. physical address space, contiguous memory allocation, paging, segmentation, segmentation with paging. Concept of fragmentation.

Virtual Memory: background, demand paging, concept of page replacement, page replacement algorithms , allocation of frames, thrashing.

UNIT IV

File Systems: file concept, file organization and access methods, allocation methods, directory structure, free-space management

I/O Management: I/O hardware, polling, interrupts, DMA, kernel I/O subsystem (scheduling, buffering, caching, spooling and device reservation)

Disk Management: disk structure, disk scheduling (FCFS, SSTF, SCAN,C-SCAN) , disk reliability, disk

Performance parameters

Protection and Security:

Goals of protection and security, security attacks, authentication, program threats, system threats, threat monitoring.

Case studies: UNIX file system, Windows file system

Suggested Books:
- Operating System Concepts", Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, Wiley
- Operating systems: a concept based approach", Dhananjay M. Dhamdhere, McGraw Hill .
- Operating Systems : Internals and Design Principles, William Stallings, Pearson
- Operating Systems Design and Implementation" ,(Prentice Hall Software Series) Andrew S Tanenbaum and Albert S Woodhull.
- Taub and Schilling, Principles of Communication Systems, TMH.
- Mithal G K, Radio Engineering, Khanna Pub.
- Sirnon Haykin, Communication Systems, John Wiley.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS208A	Design and Analysis of Algorithms						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3 Hrs.
Purpose	To introduce advanced data structures and algorithms concepts involving their implementation for solving complex applications.						
Course Outcomes (CO)							
CO1	To introduce the basic concepts of Data Structures and their analysis.						
CO2	To study the concept of Dynamic Programming and various advanced Data Structures.						
CO3	To introduce various Graph algorithms and concepts of Computational complexities.						
CO4	To study various Flow and Sorting Networks						

Unit 1: Introduction

Review:- Elementary Data Structures, Algorithms and its complexity(Time and Space), Analysing Algorithms, Asymptotic Notations, Priority Queue, Quick Sort.

Recurrence relation:- Methods for solving recurrence(Substitution , Recursion tree, Master theorem), Strassen multiplication.

Unit 2: Advanced Design and analysis Techniques

Dynamic programming:- Elements, Matrix-chain multiplication, longest common subsequence,
Greedy algorithms:- Elements , Activity- Selection problem, Huffman codes, Task scheduling problem, Travelling Salesman Problem.

Advanced data Structures:- Binomial heaps, Fibonacci heaps, Splay Trees, Red-Black Trees.

Unit 3: Graph Algorithms

Review of graph algorithms:-Traversal Methods(Depth first and Breadth first search),Topological sort, Strongly connected components, Minimum spanning trees- Kruskal and Prims, Single source shortest paths, Relaxation, Dijkstras Algorithm, Bellman- Ford algorithm, Single source shortest paths for directed acyclic graphs, All pairs shortest paths- shortest paths and matrix multiplication, Floyd-Warshall algorithm.

Computational Complexity:-Basic Concepts, Polynomial Vs Non-Polynomial Complexity, NP- hard and NP-complete classes.

Unit 4: Network and Sorting Algorithms

Flow and Sorting Networks Flow networks, Ford- Fulkerson method, Maximum Bipartite matching, Sorting Networks, Comparison network, The zero- One principle, Bitonic sorting network, Merging networks

Suggested Books :
* Corman, Leiserson and Rivest : Introduction to Algorithms, 2/e, PHI
* Das Gupta :Algorithms, TMH.
* Horowitz, Ellis and Sahni, Sartaj: Fundamentals of Computer Algorithms. Galgotia Publications
* Aho, Hopcroft and Ullman: The Design and Analyses of Computer Algorithms. Addison Wesley.
* R.B.Patel: Expert Data Structures with C, Khanna Publications , Delhi, India, 2nd Edition 2004, ISBN 81-87325-07-0.
* R.B.Patel and M.M.S Rauthan: Expert Data Structures with C++, Khana Publications, Delhi , India, 2nd Edition 2004,ISBN 87522-03-8

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

HM-921A	Organizational Behavior						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3.0	75	25	100	3
Purpose	To make the students conversant with the basics concepts of organizational culture and behavior for nurturing their managerial skills.						
Course Outcomes (CO)							
CO1	An overview about organizational behavior as a discipline and understanding the concept of individual behavior.						
CO2	Understand the concept and importance of personality ,emotions and its importance in decision making and effective leadership.						
CO3	Enabling the students to know about the importance of effective motivation and its contribution in group dynamics and resolving conflicts.						
CO4	Understand how to overcome organizational stress by maintaining proper organizational culture and effective communication.						

Unit 1

Introduction to Organizational Behavior*:* Concept and importance of Organizational Behavior, Role of Managers in OB, Foundations or Approaches to Organizational Behavior, Challenges and Opportunities for OB.
Foundation of individual behavior: Biographical characteristics, concept of Abilities and Learning , Learning and Learning Cycle, Components of Learning, concept of values and attitude, types of attitude, attitude and workforce diversity.

Unit 2

Introduction to Personality and Emotions: Definition and Meaning of Personality, Determinants of Personality, Personality Traits Influencing OB, Nature and Meaning of Emotions, Emotions dimensions, concept of Emotional intelligence
Perception and individual decision making*:* Meaning of perception, factors influencing perception, Rational decision making process, concept of bounded rationality. Leadership- Trait approaches, Behavioral approaches, Situational approaches, and emerging approaches to leadership.

Unit-3

Motivation: concept and theories of Motivation, theories of motivation-Maslow, Two Factor theory, Theory X and Y,ERG Theory, McClelland's Theory of needs, goal setting theory, Application of theories in Organizational Scenario, linkage between MBO and goal setting theory, employee recognition and involvement program.
Foundations of Group Behavior and conflict management :Defining and classifying of Groups, stages of group development, Informal and Formal Groups – Group Dynamics, Managing Conflict and Negotiation , a contemporary perspective of intergroup conflict, causes of group conflicts, Managing intergroup conflict through Resolution.

Unit-4:

Introduction to Organizational Communication: Meaning and Importance of Communication process, importance of Organizational Communication, Effective Communication, Organizational Stress: Definition and Meaning , Sources and Types of Stress, Impact of Stress on Organizations, Stress Management Techniques.
Introduction to Organization Culture- Meaning and Nature of Organization Culture, Types of Culture, Managing Cultural Diversity, Managing Change and Innovation – Change at work, Resistance to change, A model for managing organizational change.

Suggested Books
- Colquitt, Jason A., Jeffery A. LePine, and Michael Wesson. Organizational Behavior: Improving Performance and Commitment in the Workplace. 5th ed. New York: McGraw-Hill Education, 2017.
- Hitt, Michael A., C. Chet Miller, and Adrienne Colella. Organizational Behavior. 4th ed. Hoboken, NJ: John Wiley, 2015.
- Robbins, Stephen P., and Timothy Judge. Organizational Behavior. 17th ed. Harlow, UK: Pearson Education, 2017.
- Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 11th edition, 2008.
- Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley.
- UdaiPareek, Understanding OrganisationalBehaviour, Oxford Higher Education.
- Mc Shane and Von Glinov, OrganisationalBehaviour, Tata Mc Graw Hill.
- Aswathappa, K., OrganisationalBehaviour– Text and Problem, Himalaya Publication

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CS210AL	Internet Technology and Management Lab						
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3 Hour
Purpose	Learn the internet and design different web pages using HTML .						
Course Outcomes (CO)							
CO1	Understanding different PC software and their applications.						
CO2	To be able to learn HTML.						
CO3	To be able to write Web pages using HTML.						
CO4	To be able to install modems and understand the e-mail systems.						

PC Software: Application of basics of MS Word 2000, MS Excel 2000, MS Power Point 2000, MS Access 2000, HTML
1. To prepare the Your Bio Data using MS Word
2. To prepare the list of marks obtained by students in different subjects and show with the help of chart/graph the average, min and max marks in each subject.
3. Prepare a presentation explaining the facilities/infrastructure available in your college/institute.
4. Design Web pages containing information of the Deptt.

HTML Lists:
1. Create a new document that takes the format of a business letter. Combine <P> and <BR> tags to properly separate the different parts of the documents. Such as the address, greeting, content and signature. What works best for each?
2. Create a document that uses multiple <BR> and <P> tags, and put returns between <PRE> tags to add blank lines to your document see if your browser senders them differently.
3. Create a document using the <PRE>tags to work as an invoice or bill of sale, complete with aligned dollar values and a total. Remember not to use the Tab key, and avoid using emphasis tags like <B> or <EM> within your list.
4. Create a seven-item ordered list using Roman numerals. After the fifth item, increase the next list value by 5.
5. Beginning with an ordered list, create a list that nests both an unordered list and a definition list.
6. Use the ALIGN attribute of an <IMG> tags to align another image to the top of the first image.. play with this feature, aligning images to TOP, MIDDLE and BOTTOM.
7. Create a 'table of contents' style page (using regular and section links) that loads a different document for each chapter or section of the document.

Internet:
1. Instilling internet and external modems, NIC and assign IP address.
2. Study of E-mail system.
3. Create your own mail-id in yahoo and indiatimes.com.
4. Add names (mail-id's) in your address book, compose and search an element.

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

PC-CS212AL	Operating Systems Lab						
Lecture	**Tutorial**	**Practical**	**Credit**	**Sessional**	**Practical**	**Total**	**Time**
0	**0**	**4**	**2.0**	**40**	**60**	**100**	**3**
Purpose	To familiarize the students with the basics of Operating Systems.						
Course Outcomes (CO)							
CO1	To understand the CPU scheduling.						
CO2	To learn about memory management.						
CO3	To understand system calls.						
CO4	To understand the concept of file operations.						
CO5	To learn various classical problems.						

1. Simulation of the CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
2. Program for paging techniques of memory management.
3. Program for page replacement algorithms
4. Simulation of Bankers Deadlock Avoidance and Prevention algorithms.
5. Program for Implementation of System Calls.
6. Program for File Permissions
7. Program for File Operations.
8. Program for File Copy and Move.
9. Program for Dining Philosophers Problem.
10. Program For Producer – Consumer Problem concept.
11. Program for disk scheduling algorithms.

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

PC-CS214AL		Design and Analysis of algorithms Lab					
Lecture	Tutorial	Practical	Credit	Minor Test	Practical	Total	Time
0	0	4	2.0	40	60	100	3
Purpose	The student should be made to Learn the algorithm analysis techniques, become familiar with the different algorithm design techniques and Understand the limitations of Algorithm power.						
Course Outcomes (CO)							
CO1	The student should be able to Design algorithms for various computing problems.						
CO2	The student should be able to Analyze the time and space complexity of algorithms.						
CO3	The student should be able to Critically analyze the different algorithm design techniques for a given problem.						
CO4	The student should be able to Modify existing algorithms to improve efficiency.						

1. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the llst to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
2. Using Open, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
3. a. Obtain the Topological ordering of vertices in a given digraph.
   b. Compute the transitive closure of a given directed graph using Warshall's algorithm.
4. Implement 0/1 Knapsack problem using Dynamic Programming.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
6. Find Minimum Cost Spanning Tree of a given undirected graph using Kristal's algorithm.
7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
   b. Check whether a given graph is connected or not using DFS method.
8. Find a subset of a given set S = {sl,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}.A suitable message is to be displayed if the given problem instance doesn't have a solution.
9. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.
10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
11. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm, implement it using Open and determine the speed-up achieved.
12. Implement N Queen's problem using Back Tracking.
13. Use divides and conquers method to recursively implement Binary Search

NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

MC-901A	Environmental Sciences						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, 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 using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

Bachelor of Technology (Electronics Engineering) (Credit Based)
KURUKSHETRA UNIVERSITY KURUKSHETRA
Scheme of Studies/Examination(Modified)
Semester III (common with ECE & w.e.f. session 2019-2020)

Sr. No.	Course No.	Subject	L:T:P	Hours/Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	BS-201A	Optics & Waves	3:0:0	3	3	75	25	0	100	3
2	EC-201A	Electronic Devices	3:0:0	3	3	75	25	0	100	3
3	EC-203LA	Electronic Devices Lab	0:0:2	2	1	-	40	60	100	3
4	EC-205A	Digital Electronics	3:0:0	3	3	75	25	0	100	3
5	EC-207LA	Digital Electronics Lab	0:0:2	2	1	-	40	60	100	3
6	EC-209A	Signals & Systems	3:0:0	3	3	75	25	0	100	3
7	EC-211LA	Signals & Systems Lab	0:0:2	2	1	-	40	60	100	3
8	EC-213A	Network Theory	3:0:0	3	3	75	25	0	100	3
9	ES-219A	Essentials of Information Technology	3:0:0	3	3	75	25	0	100	3
10	*EC-215A	Industrial Training-I	2:0:0	2	-	-	100	-	100	3
11	**MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3
		Total		**26**	**21**	**450**	**270**	**180**	**900**	

*EC-215A is a mandatory credit-less 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 qualify.

**MC-901A is a mandatory credit-less course in which the students will be required to get passing grade.

Bachelor of Technology (Electronics Engineering) (Credit Based)
KURUKSHETRA UNIVERSITY KURUKSHETRA
Scheme of Studies/Examination(Modified)
Semester IV (common with ECE & w.e.f. session 2019-2020)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Major Test	Minor Test	Practical	Total	Duration of Exam (Hrs)
						Examination Schedule (Marks)				
1	BS-207A	Applied and Computational Mathematics	3:0:0	3	3	75	25	0	100	3
2	EC- 202A	Digital Communication	3:0:0	3	3	75	25	0	100	3
3	EC-204LA	Communication Lab	0:0:2	2	1	-	40	60	100	3
4	EC-206A	Analog Circuits	3:0:0	3	3	75	25	0	100	3
5	EC-208LA	Analog Circuits Lab	0:0:2	2	1	-	40	60	100	3
6	EC-210A	Microprocessors & Microcontrollers	3:0:0	3	3	75	25	0	100	3
7	EC-212LA	Microprocessors & Microcontrollers Lab	0:0:2	2	1	0	40	60	100	3
8	EC-214A	Electromagnetic Field Theory	3:0:0	3	3	75	25	0	100	3
9	ES-208A	Basics of Analog Communication	3:0:0	3	3	75	25	0	100	3
10	*MC-902A	Constitution of India	3:0:0	3	-	75	25	0	100	3
		Total		**27**	**21**	**450**	**270**	**180**	**900**	

*MC-902A is a mandatory credit-less course in which the students will be required to get passing grade.

Note: All the students have to undergo 4 to 6 weeks Industrial Training after 4th semester which will be evaluated in 5th semester

BS – 201A	Optics and Waves						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the fundamentals of wave and optics for the applications in Engineering field.						
Course Outcomes							
CO 1	Familiarize with basic phenomenon used in propagation of waves.						
CO 2	Introduce the fundamentals of interference, diffraction, polarization and their applications.						
CO 3	To make the students aware to the importance of Laser in technology.						

Unit - I

Waves: Travelling waves, Characteristics of waves, Mathematical representation of travelling waves, General wave equation, Phase velocity, Light source emit wave packets, Wave packet and Bandwidth, Group velocity and real light waves.

Propagation of light waves: Maxwell's equations, Electromagnetic waves and constitutive relations, Wave equation for free-space, Uniform plane waves, Wave polarization, Energy density, the pointing vector and intensity, Radiation pressure and momentum, Light waves at boundaries, Wave incident normally on boundary, Wave incident obliquely on boundary: law of reflection, Snell's law and reflection coefficients.

Unit - II

Interference: Principle of Superposition, Conditions for Sustained interference, Young's double slit experiment, Division of wave-front: Fresnel's Biprism and its applications, Division of amplitude: Interference due to reflected and transmitted light, Wedge-shaped thin film, Newton's rings and its applications, Michelson Interferometer and its applications.

Unit – III

Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit, Plane transmission diffraction grating: theory, secondary maxima and secondary minima, width of principal maxima, absent spectra, overlapping of spectral lines, determination of wavelength; Dispersive power and resolving power of diffraction grating.

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, Biquartz polarimeter.

Unit – IV

Laser: Stimulated Absorption, Spontaneous and Stimulated Emission; Einstein's Coefficients and its derivation, Population Inversion, Direct and Indirect pumping, Pumping schemes, Main components of Laser, Gas lasers (He-Ne, CO_2), Solid state lasers (Ruby, Neodymium, semiconductor), Dye laser, Characteristics of Laser, Applications of Laser.

Text/Reference Books:

1. P.K. Diwan, Applied Physics for Engineers, *Wiley India Pvt. Ltd*., *India*
2. N. Subrahmanyam, B. Lal, M.N. Avadhanulu, A Textbook of Optics, *S. Chand & Company Ltd*., *India.*
3. A. Ghatak, Optics, *McGraw Hill Education (India) Pvt. Ltd., India*.
4. E. Hecht, A.R. Ganesan, Optics, *Pearson India Education Services Pvt. Lt., India.*

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

EC-201A	Electronic Devices						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	To understand the concept of carrier transport phenomena in semiconductors and diodes such as p-n junction diode and tunnel diode.						
CO2	To understand the detailed operation of BJT and calculation of its parameters using transistor models.						
CO3	To understand the operation, characteristics & parameters of FET and MOSFET.						
CO4	To understand the concept of different types of regulated power supplies and Op-Amp based voltage regulators						

UNIT-I

Charge Carriers Transport : Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; Generation and recombination of carriers; Continuity equation, PN Junction: Basic Structure, small signal equivalent circuit of p-n diode, derivation of barrier potential and diode current equation, Simple diode circuits: clipping, clamping and rectifiers, Zener diode and its application as voltage regulator.

UNIT-II

Bipolar Junction Transistor: Basic principle of operation, Current gains : derivation of α,β, ɣ and their relationship. Various modes of operation of BJT, Base Width Modulation, Transistor hybrid model, h-parameter equivalent circuit of transistor, Analysis of transistor amplifier using h-parameters, calculation of input impedance, output impedance and voltage gain.

UNIT-III

Field Effect Devices: JFET : basic Operation and characteristics, drain and transfer characteristics, pinch off voltage, parameters of JFET: Transconductance (g_m), ac drain resistance (r_d), amplification factor(μ) ,Small Signal Model & Frequency Limitations. MOSFET: basic operation, depletion and enhancement type, pinch-off voltage, Shockley equation and Small Signal Model of MOSFET, MOS capacitor.

UNIT-IV

Regulated Power Supplies: Voltage Regulation, block diagram of DC regulated power supply, Zener diode voltage regulators: transistor series voltage regulator, Transistor shunt voltage regulator, Controlled Transistor Voltage Regulator, Op-Amp Series and shunt voltage regulator.

Text Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.
Reference Books:
1. B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.
2. E S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.
4. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-203LA				Electronic Devices Lab			
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
	Course Outcomes (CO)						
CO1	To teach the students how to experimentally plot the VI characteristics of various diodes such as p-n diode, zener diode etc. find the threshold voltage and zener breakdown voltage from the VI curve.						
CO2	To teach the students how to experimentally find the values of various parameters of Transistor such as voltage gain, current gain etc.						
CO3	To teach the students how to plot the input and output characteristics of FET and MOSFET by experimental method.						
CO4	To experimentally teach the students the concept of different configurations of regulated power supplies using Zener diodes and Op-Amp.						

List of experiments:

1. To study the VI characteristics of p-n diode in forward and reverse bias and find the threshold voltage from the VI curve.
2. To study the operation of Zener diode as a voltage regulator.
3. To study the operation of half-wave and full wave rectifiers and calculate their ripple factor values.
4. To study the operation of series and parallel Clippers using P-N junction diodes.
5. To study the operation of clampers using P-N junction diodes.
6. To experimentally plot the input and output characteristics of a given BJT transistor in CE configuration and calculate its various parameters.
7. To experimentally plot the input and output characteristics of a given BJT transistor in CB configuration and calculate its various parameters.
8. To study the transfer and drain characteristics of JFET and calculate its various parameters.
9. To study the transfer and drain characteristics of MOSFET and calculate its various parameters.
10. To study the different types of negative feedback in two stage amplifier and to observe its effects upon the amplifier parameters.
11. To study the Zener diode as a transistor series voltage regulator.
12. To study the Zener diode as a transistor shunt voltage regulator.
Reference Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.
Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-205A	Digital Electronics						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	Students will be able to understand the basic logic gates and will be able to apply minimization techniques for reducing a function upto six variables.						
CO2	Students will be able to design combinational circuits and applications related to them.						
CO3	Students will be able to write the truth table, excitation table, characteristic equations of various flip flops and to design the sequential circuits using Flip flops.						
CO4	Students will be able to familiarize with varied memory types and various A/D, D/A Converters and their characteristics.						

UNIT-I

Fundamentals of Digital Systems and Techniques: Digital signals, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, number systems: binary, signed binary, octal, hexadecimal number, binary arithmetic,one's and two's complements arithmetic, Codes:BCD codes, Excess-3, Gray codes, Error detecting and correcting codes: parity check codes and Hamming code

Minimization Techniques: Basic postulates and fundamental theorems of Boolean algebra: Standard representation of logic functions: SOP and POS forms, Simplification of switching functions using K-map and Quine-McCluskey tabular methods,Don't care conditions, Digital logic families: TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-statelogic.

UNIT-II

Combinational DigitalCircuits:Design procedure: Half adder, Full Adder, Half subtractor, Full subtractor , Parallel binary adder, parallel binary Subtractor, Carry Look Ahead adder, Serial Adder/Subtractor, BCD adder, Binary Multiplier, Binary Divider, Multiplexer/ De-multiplexer, decoder, encoder, parity checker, parity generators, code converters, Magnitude Comparator.

UNIT-III

Sequential circuits: A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K, T and D types flip flops, applications of flip flops: shift registers, serial to parallel converter, parallel to serial converter, Synchronous and Asynchronous mod counter,FSM, sequence generator and detector.

UNIT-IV

A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/Aconverter, specifications for D/A converters, analog to digital converters: quantization and encoding, parallel comparator A/Dconverter, successive approximation A/D converter, specifications for A/D converters

Semiconductor Memories and Programmable Logic Devices: Characteristics of memories, read only memory (ROM), read and write memory (RAM), Programmable logic array, Programmable array logic, Introduction to Field Programmable Gate Array (FPGA)

Text Books:
1. M. M. Mano, "Digital design", Pearson Education India, 2016.
2. Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 8th Edition, TMH, 2003.
3. Taub Schilling, Digital Integrated Electronics, TMH
Reference Books:
1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. A.K. Maini, Digital Electronics, Wiley India
3. R P Jain, Modern digital electronics, TMH

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-207LA	Digital Electronics Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	Students will be able to verify truth tables of basic logic gates and design various gates using universal gates.						
CO2	Students will be able to design various combinational circuits and verify their operation.						
CO3	Students will be able to design different sequential circuits by using flip flops and verify their operation.						
CO4	Students will be to study and design various encoders and decoders.						

List of experiments:

1. Familiarization with Digital Trainer Kit and associated equipment.

2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

3. Design and realize a given function using K-Maps and verify its performance.

4. To verify the operation of Multiplexer and De-multiplexer.

5. To verify the operation of Comparator.

6. To verify the truth table of S-R, J-K, T, D Flip-flops.

7. To verify the operation of Bi-directional shift register.

8. To design and verify the operation of 3-bit asynchronous counter.

9. To design and verify the operation of asynchronous Up/down counter.

10. To design and verify the operation of asynchronous Decade counter.

11. Study of Encoder and Decoder.

12. Study of BCD to 7 segment Decoder

Text Books:

1. M. M. Mano, "Digital design", Pearson Education India, 2016.
2. Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 8th Edition, TMH, 2003.

Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-209A				Signals and Systems			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO) At the end of this course, students will demonstrate the ability to							
CO1	Analyze different types of signals.						
CO2	Represent continuous and discrete systems in time and frequency domain using different transforms.						
CO3	Understand sampling theorem and its implications.						

UNIT-I

Introduction to Signals: Continuous and discrete time signals, deterministic and stochastic signals, periodic and a periodic signals, even and odd signals, energy and power signals, exponential and sinusoidal signals and singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation

Introduction to Systems: Linear and non-linear systems, time invariant and time varying systems, lumped and distributed systems, deterministic and stochastic systems, casual and non-causal systems, analog and discrete/digital memory and memory less systems.

UNIT-II

Random Variables: Introduction to Random Variables, pdf, cdf, moments, distributions, correlation functions.

Linear Time Invariant Systems: Introduction to linear time invariant (LTI) systems, properties of LTI systems, convolution integral, convolution sum, causal LTI systems described by differential and difference equations, Concept of impulse response.

UNIT-III

Discretization of Analog Signals: Introduction to sampling, sampling theorem and its proof, effect of undersampling, reconstruction of a signal from sampled signal.

Fourier Series : Continuous time Fourier series (CTFS), Properties of CTFS, Convergence of Fourier series, Discrete time Fourier Series (DTFS), Properties of DTFS **,** Fourier series and LTI system, Filtering.

UNIT-IV

Fourier Transform: Continuous Time Fourier Transform (CTFT), Properties of CTFT, Systems characterized by linear constant- coefficient differential equations, Discrete time fourier transform (DTFT), Properties of DTFT, Duality, Systems characterized by Linear constant coefficient difference equations.

Laplace Transform: Introduction to Laplace transform, Region of convergence for laplace transform, Inverse laplace transform, Properties oflaplace transform, Analysis and characterization of LTI systems using laplace transform, System function algebra and block diagram representations,Unilateral laplace transform.

Text Books:
1. Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab, Signals and Systems, Prentice Hall
India, 2nd Edition, 2009
Reference Books:
1. Simon Haykins – "Signal & Systems", Wiley Eastern
2. Tarun Kumar Rawat , Signals and Systems , Oxford University Press.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. M. J. Robert "Fundamentals of Signals and Systems", McGraw Hill Education, 2007.
5. B. P. Lathi, "Linear Systems and Signals", Oxford University Press, 2009.

Note: Question paper template will be provided to the paper setter.

ECE-211LA	Signals & Systems Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To understand the basic concepts of software.						
CO2	To explore properties of various types of signals and systems.						
CO3	To explore different properties of signals and systems.						
CO4	To understand the concept of sampling in time and frequency domain.						

List of experiments:

1. Introduction of the MATLAB/SciLab/Octave software.
2. To demonstrate some simple signal.
3. To explore the effect of transformation of signal parameters (amplitude-scaling, time-scaling and time- shifting).
4. To visualize the complex exponential signal and real sinusoids.
5. To identify a given system as linear or non-linear.
6. To explore the time variance and time invariance property of a given system.
7. To explore causality and non-causality property of a system.
8. To determine Fourier transform of a signal.
9. To determine Laplace transform of a signal.
10. To demonstrate the time domain sampling of bandlimited signals (Nyquist theorem).
11. To demonstrate the sampling in frequency domain (Discrete Fourier Transform).
12. To demonstrate the convolution and correlation of two continuous-time signals.
13. To demonstrate the convolution and correlation of two discrete-time signals.

Reference Books:

1. B. P. Lathi, "Linear Systems and Signals", Oxford University Press, 2009.

2. Signals and Systems using Scilab, www.scilab.in.

3. Signals and Systems using Octave, www.octave.org

Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-213A	Network Theory						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	To understand the concept of network topologies and the network analysis in the time domain for solving simple and complex circuits.						
CO2	Describe the circuit element models, network analysis using Laplace transform and time domain behavior from the pole-zero plots.						
CO3	Describe the characteristics & parameters of two port networks.						
CO4	To understand the concept of filters and synthesis of one port networks.						

UNIT I

INTRODUCTION: - Principles of network topology, graph matrices, Network Analysis (Time-Domain): Singularity Functions, Source-Free RC, RL, Series RLC, Parallel RLC circuits, Initial & Final Conditions, Impulse & Step Response of RC, RL, Series RLC, Parallel RLC circuits.

UNIT 2

NETWORK ANALYSIS (using Laplace Transform): - Circuit Element Models, Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

NETWORK FUNCTIONS: - Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions.

UNIT 3

CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS: - Relationship of two-port variables, short-circuit admittance parameters, open circuit impedance parameters, transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4

TYPES OF FILTERS AND THEIR CHARACTERISTICS: - Filter fundamentals, constant-k and m-derived low-pass and high-pass filters.

NETWORK SYNTHESIS: - Causality & Stability, Hurwitz Polynomials, Positive real functions, Synthesis of one port networks with two kind of elements.

TEXT BOOKS:
1.   Fundamentals of Electric Circuits: Charles K. Alexander, Matthew N. O. Sadiku, McGraw Hill Education
2.   Network Analysis: M.E. Van Valkenburg, PHI

REFERENCE BOOKS:
1.   Network Analysis & Synthesis: F. F. Kuo, John Wiley.
2.   Circuits & Networks: Sukhija & Nagsarkar, Oxford Higher Education.
3.   Basic Circuit Theory: DasoerKuh, McGraw Hill Education.
4.   Circuit Analysis: G.K. Mithal, Khanna Publication.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

ES-219A				Essentials of Information Technology			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	Develop basic computational thinking. Learn how to reason with variables, state transitions, conditionals, and iteration						
CO2	Understand the notion of data types, and higher order data structures such as lists, tuples, and dictionaries.						
CO3	Develop a basic understanding of computer systems -architecture, OS, mobile and cloud computing.						
CO4	Learn basic SQL programming						

UNIT-I

Python Programming: Familiarization with the basics of Python programming, process of writing a program, running it, and print statements; simple data-types: integer, float, string. The notion of a variable, and methods to manipulate it, Knowledge of data types and operators: accepting input from the console, assignment statement, expressions, operators and their precedence. Conditional statements: if, if-else, if-elsif-else; Notion of iterative computation and control flow: for, while, flowcharts, decision trees and pseudo code

UNIT-II

Idea of debugging: errors and exceptions; debugging: pdb, break points. Sequence datatype: Lists, tuples and dictionary, Introduce the notion of accessing elements in a collection using numbers and names. Sorting algorithm: bubble and insertion sort; count the number of operations while sorting. Strings: Strings in Python : compare, concat, substring. **Data visualization using Pyplot:** line chart, pie chart, and bar chart.

UNIT-III

Computer Systems and Organisation: description of a computer system and mobile system, CPU, memory, hard disk, I/O, battery, power. Types of software:Types of Software – System Software, Utility Software and Application Software, how an operating system runs a program, operating system as a resource manager. **Cloud Computing**: Concept of cloud computers, cloud storage (public/private),and brief introduction to parallel computing.

UNIT-IV

Relational databases: idea of a database and the need for it, relations, keys, primary key, foreign key; use SQL commands to create a table, foreign keys; insert/delete an entry, delete a table. SQL commands: select, project, and join; indexes. Basics of NoSQL databases: Mongo DB

Text Books:
1. Python Programming: A modular approach by Sheetal Taneja and Naveen Kumar Pearson
Reference Books:
1. Python Programming - Using Problem Solving Approach by Reema Thareja Oxford Publication.
2. Database Management System a Practical Approach by Rajiv Chopra by S. Chand

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

MC-901A				Environmental Sciences				
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**	
3	0	0	0	75	25	100	3 Hrs.	
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.							
Course Outcomes (CO)								
CO1	The students will be able to learn the importance of natural resources.							
CO2	To learn the theoretical and practical aspects of eco system.							
CO3	Will be able to learn the basic concepts of conservation of biodiversity.							
CO4	The students will be able to understand the basic concept of sustainable development.							

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

BS-207A	APPLIED AND COMPUTATIONAL MATHEMATICS						
LECTURE	TUTORIAL	PRACTICAL	CREDIT	MAJOR TEST	MINOR TEST	TOTAL	TIME
3	-	-	3	75	25	100	3 H
Purpose	The objective of this course is to familiarize the prospective Engineers with ordinary and partial differential equations, Laplace Transform which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						
Course Outcomes							
CO 1	To introduce the Ordinary & Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.						
CO 2	To study some extended topics in calculus essential for computations w.r.t. parameter variations ,vectors and field theory.						
CO 3	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.						
CO 4	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.						

UNIT-1

ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS

ODE: 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.

Second order linear differential equations with constant coefficients.

PDE: Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-2

ADVANCE CALCULUS

Multivariable Calculus: Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar and) Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere .

Vector Calculus: Gradient, divergence and Curl and their properties, Directional derivative. Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

UNIT-3

LAPLACE TRANSFORM

Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-4

NUMERICAL TECHNIQUES

Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Lagrange's formulae.

Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule, Taylor's series, Runge-Kutta method for solving first and second order equations.

Textbooks/References:

1. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.
2. W. E. Boyce and R. C. Di Prima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India,
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
6. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall.
7. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
8. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
9. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
10. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
11. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
12. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
13. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
14. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Note: The Examiner will be given the question paper template to set the questions.

EC-202A	Digital Communication						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**-**	**-**	**3**	**75**	**25**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	To learn digitization of analog signal by pulse modulation system and analyze their system performance						
CO2	To analyze different baseband transmission schemes and their performance.						
CO3	To learn and understand different digital modulation schemes and compute the bit error performance						
CO4	To analyze different modulation tradeoffs and different equalization techniques.						

UNIT-I

Pulse modulation.Sampling process. Pulse Amplitude and Pulse code modulation (PCM),Differential pulse code modulation. Delta modulation, Noise considerations in PCM, Time Division multiplexing.Quantization noise in delta modulation, The O/P signal to quantization noise ratio in delta modulation, O/P signal to noise ratio in delta modulation, varients of DM.

UNIT-II

Base Band Pulse Transmission: Matched filter and its properties, average probability of symbol error in binary enclosed PCM receiver, Intersymbol interference, Nyquist criterion for distortionless base band binary transmission, ideal Nyquist channel raised cosine spectrum, correlative level coding Duo binary signalling, tapped delay line equalization, adaptive equalization, LMS algorithm, Eye pattern.

UNIT-III

Elements of Detection Theory, Optimum detection of signals in noise,Coherent communication with waveforms- Probability of Error evaluations.

Pass band Digital Modulation schemes- ASK, Phase Shift Keying, Frequency Shift Keying,Quadrature Amplitude Modulation, Continuous Phase Modulation and Minimum Shift Keying. Signal space diagram and spectra of the above systems, effect of intersymbol interference, bit symbol error probabilities, synchronization.

UNIT-IV

Digital Modulation tradeoffs.Optimum demodulation of digital signals over band-limited channels- Maximum likelihood sequence detection (Viterbi receiver).Equalization Techniques.Synchronization and Carrier Recovery for Digital modulation.

Text Books:
> **1.**Haykin S., "Communications Systems", John Wiley and Sons, 2001.
> **2.**Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.
> **3.** Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.

Reference Books:
> **1.**Proakis J.G., ``Digital Communications", 4th Edition, McGraw Hill, 2000.
> **2.**Lathi B.P., " Modern Digital and Analog Communication", 4th edition, Oxford university Press, 2010

EC-204LA				COMMUNICATION LAB			
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
Upon completion of the course, students will be able to							
CO1	Generate and analyze Analog Modulated and demodulated Signals.						
CO2	Test & observe the outputs of different types of analog detectors.						
CO3	Generate and analyze digital Modulated and demodulated Signals.						
CO4	Test & observe the outputs of different types of digital detectors.						

List of experiments:

1: To study and Perform Amplitude Modulation & Demodulation.
2: To study and Perform Frequency Modulation and Demodulation.
3: To study and Perform Pulse Amplitude Modulation and Demodulation.
4: To study and Perform Pulse Width Modulation and Demodulation.
5: To study and Perform Pulse Position Modulation and Demodulation.
6: To study and Perform Pulse Code Modulation and Demodulation.
7: To study and Perform Time Division Multiplexing (TDM) system.
8: To study and Perform Amplitude Shift Keying (ASK) Modulation and De- Modulation.
9: To study and Perform Frequency Shift Keying (FSK) Modulation and De-Modulation.
10: To study and Perform Phase Shift Keying (PSK) Modulation and De-Modulation.
11: To study and Perform Quadrature Phase Shift Keying (QPSK) Modulation and De-Modulation.
12: To study and perform Adaptive Delta Modulation and demodulation.
13. To study Base Band Transmission and calculate bit error rate.

Note: At least ten (10) experiments from the above list are mandatory to perform for the students.

Reference Books:

1. Taub & Schilling, Principles of Communication Systems, McGraw Hill Publications, (1998) 2nd ed.
2. Simon Haykin, Communication Systems, John Wiley Publication, 3rd ed.
3. Sklar, Digital Communications, Prentice Hall-PTR, (2001) 2nd ed.
4. Lathi B. P., Modern Analog and Digital Communication, , Oxford University Press, (1998) 3rd

EC-206A				Analog Circuits			
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**-**	**-**	**3**	**75**	**25**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	To make the students understand the analysis of various BJT and FET amplifiers using small signal models.						
CO2	To teach the students the concept of describe the frequency response of multistage amplifiers and the detailed concept of feedback topologies.						
CO3	To make the students learn various oscillator circuits using both Op-Amp and BJT.						
CO4	To teach the students the various application circuits of Op-Amp and designing for a given specification.						

UNIT-I

Amplifier Models: Amplifier types: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier, comparison based on input impedance and output impedance. Small signal analysis of BJT amplifiers: CE, CB and CC amplifiers using r_e model, small signal analysis of the CS JFET amplifiers, estimation of voltage gain, input resistance, output resistance etc, design procedure for particular specifications of amplifiers.

UNIT-II

Transistor Frequency Response: Class A, class B, class C amplifiers: calculation of maximum efficiency. Frequency response of the amplifiers: low frequency, mid-frequency and high frequency region. Effect of cascading of amplifiers on the frequency response, cut-off frequencies, Bandwidth and voltage gain. Miller effect, Feedback in amplifiers: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth, input impedance, output impedance.

UNIT-III

Oscillators: Barkhausen criterion for oscillators, types of Oscillators: RC phase shift oscillator, Wien bridge oscillator, LC oscillators : Hartley oscillator, Collpit oscillator, derivation of frequency of oscillation for BJT and Op-amp configurations, 555 timer: operation as astable and monostable multivibrator.

UNIT-IV

Op-Amp Applications: Simple op-amp circuits: adder, subtractor, Schmitt trigger, Differential amplifier: calculation of differential gain, common mode gain, CMRR, OP-AMP design: design of differential amplifier for a given specification, design of gain stages and output stages.

Text Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.

Reference Books:
1. B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.
2. E S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.
4. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-208LA				Analog Circuits Lab			
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To design and calculate the gain , frequency response etc. of the various configuration of transistor amplifier.						
CO2	To make students Design various RC oscillators using Op-Amp 741 for a given frequency of oscillation.						
CO3	To make students Design various RC oscillators using BJT for a given frequency of oscillation.						
CO4	To teach the students the design of various Op-Amp circuits such as adder, subtractor etc.						

List of experiments:

1. To design a simple common emitter (CE) amplifier circuit using BJT and find its gain and frequency response. To design a differential amplifier using BJT and calculate its gain and frequency response.
2. To design a BJT emitter follower and determine is gain, input and output impedances.
3. To design and test the performance of Phase shift Oscillator using Op-Amp 741.
4. To design and test the performance of Wien bridge oscillator using Op-Amp 741.
5. To design and test the performance of BJT - RC Phase shift Oscillator for $f0 \leq 10$ KHz.
6. To design and test the performance of BJT – Hartley Oscillators for RF range $f0 \geq 100$KHz.
7. To design and test the performance of BJT – Colpitt Oscillators for RF range $f0 \geq 100$KHz.
8. To design an astable multivibrator using 555 timer.
9. To design a monostable multivibrator using 555 timer.
10. To design Schmitt trigger using Op-amp and verify its operational characteristics.
11. To design an adder circuit using Op-Amp to add three dc voltages.
12. To design a subtractor using Op-Amp to subtract DC voltages v1 and v2.

Reference Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.
3. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.
Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-210A				MICROPROCESSORS AND MICROCONTROLLER			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	Acquired knowledge about the architecture of Microprocessors and Microcontrollers.						
CO2	Acquired knowledge about instruction set and programming concept of Microprocessors and Microcontrollers in assembly and C language.						
CO3	To understand peripheral interfacing with Microprocessors and Microcontrollers.						
CO4	To design the systems /models based on Microprocessors and Microcontrollers						

UNIT-I

Evolution of Microprocessor, Introduction to 8-bit Microprocessor 8085 architecture, Pin Details 8085 Microprocessor, 8086 Architecture description of data registers, address registers; pointer and index registers, PSW, Queue, BIU and EU, 8086 Pin diagram descriptions. Generating 8086 CLK and reset signals using 8284. WAIT state generation. Microprocessor BUS types and buffering techniques, 8086 minimum mode and maximum mode CPU module, 8086 CPU Read/Write timing diagrams in minimum mode and maximum mode.   **UNIT-II**

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, 8051 addressing modes.

UNIT-III

8086 Instruction format, addressing modes, Data transfer instructions, string instructions, logical instructions, arithmetic instructions, transfer of control instructions; process control instructions. 8051 Data transfer instructions, arithmetic and logical instructions, Jump and Call instructions, I/O port, Timer and Counter programming, Serial port and Interrupt programming, Assembly language programs.

UNIT-IV

Memory devices, Address decoding techniques, Interfacing SRAMS; ROMS/PROMS, 8086 Interrupt mechanism; interrupt types and interrupt vector table. Intel's 8255 - description and interfacing with 8086, ADCs and DACs, - types operation and interfacing with 8086.

Interfacing of Matrix Keyboards, ADC, DAC, Temperature Sensor, Stepper Motor with 8051.

Text Books:

1. D.V. Hall, Microprocessors and Interfacing, McGraw Hill 2nd ed.
2. Kenneth Ayala," The 8051 Microcontroller" 3rd ed. CENGAGE Learning.
3. M.A. Mazidi, J.G. Mazidi, R. D. McKinlay," The 8051 Microcontroller and Embedded systems using assembly and C" -2nd Ed, Pearson Education.
4. Liu, Gibson, "Microcomputer Systems: The 8086/88 Family", 2nd Edition, PHI,2005.
5. Barry B. Brey, "The Intel Microprocessor8086/8088, 80186", Pearson Education, Eighth Edition, 2009.
6. Uffenback, "The 8086 Family Design" PHI, 2nd Edition.

Reference Books:

1. Mke Predko, "Programming and Customizing the 8051 Microcontroller", TMH.
2. Manish K Patel,"Microcontroller based embedded system", McGraw Hill Education.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-212LA	MICROPROCESSORS AND MICROCONTROLLER LAB						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To familiarization with 8085, 8086 Microprocessors and 8051 Microcontrollers.						
CO2	Ability to write an assembly language program for 8086 Microprocessors as well as C language program for 8051 Microcontroller.						
CO3	Ability to interfacing the various Peripheral to 8086 Microprocessors and 8051 Microcontrollers.						
CO4	Ability to design the systems based on 8051 Microcontrollers.						

List of experiments to be performed using 8086 and 8051 Microcontrollers

For 8086 Microprocessor write an Assembly Language Program to

1 Add / Sub two 16 bit numbers.
2 Multiply two 16 bit unsigned/ signed numbers.
3 Divide two unsigned/ signed numbers (32/16 , 16/8, 16/16, 8/8)
4 Find smallest/ largest number from array of n numbers.
5 Arrange numbers in array in ascending/ descending order.
6 Convert Hex to Decimal, Decimal to Hex.
7 Compare two strings using string instructions / without using string instructions.
8 Display string in reverse order, string length, Concatenation of two strings.
9 To find 1's and 2's complement of a number.
10 To find the Fibonacci Series.
11 To find Log of a given number using look up table.
12 To find Factorial of a number.
13 To write an ALP using 8051 Microcontrollers to perform addition, subtraction, multiplication and division of two eight bit numbers.
14 To write an ALP using 8051 Microcontrollers to perform logical operation i.e., AND, OR, XOR and Complement of two eight bit numbers.
15 To write an ALP using 8051 Microcontrollers to perform multi byte addition and subtraction of unsigned number.
16 To write an embedded C program using 8051 Microcontrollers for interfacing LCD to display message "LCD Display" on LCD screen.
17 To write an embedded C program using 8051 Microcontrollers for interfacing keypad to port P0 .Whenever a key is pressed; it should be displayed on LCD.
18 To write an embedded C program using 8051 Microcontrollers 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.
19 To write an embedded C program using 8051 Microcontrollers for interfacing stepper motor to rotate clockwise and anticlockwise directions.
20 To write an embedded C program using 8051 Microcontrollers for interfacing relay and buzzer.

Reference 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.

Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-214A				ELECTROMAGNETIC FIELD THEORY			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.

UNIT I

Review: vector analysis in all the three coordinate system, line, surface & volume integrals, gradient, divergence & curl of a vector & their physical significance, Gauss Divergence theorem, Stokes theorem. Gauss law in electrostatics & its applications, uniform line, surface & volume charge distributions, concepts of electric field & electric potentials, electric field & potential due to a linear dipole, method of images.

UNIT II

Biot Savart's law, Amperes circuital law & its applications. Boundary conditions for both the electric & magnetic fields at the interface of various types of media. Laplace, Poisson's equation & continuity equation. Faraday's & Lenz's laws, How Maxwell fixed Ampere's law, Maxwell's equations in differential & integral forms & their physical significance in circuit theory, retarded potentials.

UNIT III

Plane & uniform plane waves and their properties, waves equations in various media. . Polarisation & its types. Intrinsic impedance, propagation constant. Reflection & refraction of uniform plane waves at the interface of conductor- dielectric & dielectric - dielectric (both normal and oblique incidence). Relaxation time ,skin effect, skin depth & surface impedance, Poynting vector theorem & its physical significance.

.UNIT IV

Distributed parameters, circuit parameters, concepts of voltage & current flow on a transmission line, Transmission line equations, characteristic impedance. Reflection of transmission line, maxima & minima, standing wave ratio of a transmission line. Impedance matching, Smith's chart & its computational applications.

Concept of Wave Guide and TE, TM and TEM modes in rectangular and circular wave guide. Cut off and guide wave length.

References:
1. Fields and Waves by D.K. Cheng. (Pearson Education)
2. Electomagnetics by J.D. Krauss(TMGH)
3. Principles of Electomagnetics by Sadiku (Oxford Univ. Press)

ES -208A				BASICS OF ANALOG COMMUNICATION			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.

Course Outcomes (CO):Upon completion of the course, students will be able to

CO1	Describe different types of noise and predict its effect on various analog communication systems.
CO2	Understand and analyze various Amplitude modulation and demodulation methods.
CO3	Understand and analyze Angle modulation and demodulation methods.
CO4	Understand the concepts of Transmitters and Receivers and their circuits.

Unit-I

Communication system and Noise: Constituents of communication system, Modulation, Bandwidth requirement, Noise, Classification of noise, Resistor noise, Multiple resistor noise sources, Noise Temperature, Noise bandwidth, Noise figure, its calculation and measurement, Bandpass noise representation, Noise calculation in Communication Systems: Noise in Amplitude Modulated System, Noise in angle modulated systems.

Analog Modulation Techniques: Theory of amplitude modulation, AM power calculations, AM modulation with a complex wave, Concepts of angle modulation, Theory of frequency modulation, Mathematical analysis of FM, Spectra of FM signals, Narrow band FM, Wide band FM, Phase modulation, Phase modulation obtained from frequency modulation, Comparison of AM, FM & PM.

Unit-II

AM Transmission: Generation of Amplitude Modulation, Low level and high level modulation, Basic principle of AM generation, Square law modulation, Vander bijl modulation, Suppressed carrier AM generation (Balanced Modulator) ring Modulator.

AM Reception: Tuned Ratio Frequency (TRF) Receiver, Super heterodyne Receiver, RF Amplifier, Image Frequency Rejection, Cascade RF Amplifier, Frequency Conversion and Mixers, Tracking & and Alignment, IF Amplifier, AM detectors, Distortion in diode detectors, AM receiver characteristics.

Unit-III

FM Transmission: FM allocation standards, Generation of FM by direct method, Varactor diode Modulator, Indirect generation of FM, The Armstrong method RC phase shift method, Frequency stabilized reactance FM transmitter, FM stereo transmitter, Noise triangle.

FM Reception: Direct methods of Frequency demodulation, Frequency discrimination (Balanced slope detector), Foster seelay of phase discriminator, Ratio detector, Indirect method of FM demodulation, FM detector using PLL, Pre-emphasis / de-emphasis, FM receiver, FM stereo receiver.

Unit-IV

SSB Transmission: Introduction, Advantages of SSB Transmission, Generation of SSB, The Filter method The Phase Shift Method, The Third Method, Pilot Carrier SSB, Vestigial Side-band Modulation (VSB), VSB-SC, Application of AM and FM in TV transmission.

SSB Reception: SSB Product Demodulator, Balanced Modulator as SSB Demodulator, Pilot Carrier SSB Receiver, Modern Communication Receiver.

Analog Pulse Modulation: Introduction, Pulse amplitude modulation (PAM), PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation (PTM): Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), PWM and PPM Demodulator,

Text Books

1. Kennedy, G., Electronic Communication Systems, McGraw-Hill (2008) 4th ed.

2. Lathi.B.P.,Modern Digital and Analog Communications Systems 3rd ed.

Reference Books:

1.Taub, H., Principles of Communication Systems, McGraw-Hill (2008) 3rd ed.

2. Haykin, S., Communication Systems, John Willey (2009) 4th ed.

3. Proakis, J. G. and Salehi, M., Fundamentals of Communication Systems, Dorling Kindersley (2008) 2nd ed.

4. Mithal G K, Radio Engineering, Khanna Pub.

5. Singh & Sapre—Communication Systems: 2/e, TMH

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based)
KURUKSHETRA UNIVERSITY KURUKSHETRA
Scheme of Studies/Examination(Modified)
Semester III (w.e.f. session 2019-2020)

Sr. No.	Course No.	Subject	L:T:P	Hours/Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	BS-201A	Optics & Waves	3:0:0	3	3	75	25	0	100	3
2	EC-201A	Electronic Devices	3:0:0	3	3	75	25	0	100	3
3	EC-203LA	Electronic Devices Lab	0:0:2	2	1	-	40	60	100	3
4	EC-205A	Digital Electronics	3:0:0	3	3	75	25	0	100	3
5	EC-207LA	Digital Electronics Lab	0:0:2	2	1	-	40	60	100	3
6	EC-209A	Signals & Systems	3:0:0	3	3	75	25	0	100	3
7	EC-211LA	Signals & Systems Lab	0:0:2	2	1	-	40	60	100	3
8	EC-213A	Network Theory	3:0:0	3	3	75	25	0	100	3
9	ES-219A	Essentials of Information Technology	3:0:0	3	3	75	25	0	100	3
10	*EC-215A	Industrial Training-I	2:0:0	2	-	-	100	-	100	3
11	**MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3
		Total		26	21	450	270	180	900	

*EC-215A is a mandatory credit-less 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 qualify.

**MC-901A is a mandatory credit-less course in which the students will be required to get passing grade.

Bachelor of Technology (Electronics & Communication Engineering) (Credit Based)
KURUKSHETRA UNIVERSITY KURUKSHETRA
Scheme of Studies/Examination(Modified)
Semester IV (w.e.f. session 2019-2020)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	BS-207A	Applied and Computational Mathematics	3:0:0	3	3	75	25	0	100	3
2	EC- 202A	Digital Communication	3:0:0	3	3	75	25	0	100	3
3	EC-204LA	Communication Lab	0:0:2	2	1	-	40	60	100	3
4	EC-206A	Analog Circuits	3:0:0	3	3	75	25	0	100	3
5	EC-208LA	Analog Circuits Lab	0:0:2	2	1	-	40	60	100	3
6	EC-210A	Microprocessors & Microcontrollers	3:0:0	3	3	75	25	0	100	3
7	EC-212LA	Microprocessors & Microcontrollers Lab	0:0:2	2	1	0	40	60	100	3
8	EC-214A	Electromagnetic Field Theory	3:0:0	3	3	75	25	0	100	3
9	ES-208A	Basics of Analog Communication	3:0:0	3	3	75	25	0	100	3
10	*MC-902A	Constitution of India	3:0:0	3	-	75	25	0	100	3
		Total		**27**	**21**	**450**	**270**	**180**	**900**	

*MC-902A is a mandatory credit-less course in which the students will be required to get passing grade.

Note: All the students have to undergo 4 to 6 weeks Industrial Training after 4th semester which will be evaluated in 5th semester

BS – 201A	Optics and Waves						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the fundamentals of wave and optics for the applications in Engineering field.						
Course Outcomes							
CO 1	Familiarize with basic phenomenon used in propagation of waves.						
CO 2	Introduce the fundamentals of interference, diffraction, polarization and their applications.						
CO 3	To make the students aware to the importance of Laser in technology.						

Unit - I

Waves: Travelling waves, Characteristics of waves, Mathematical representation of travelling waves, General wave equation, Phase velocity, Light source emit wave packets, Wave packet and Bandwidth, Group velocity and real light waves.

Propagation of light waves: Maxwell's equations, Electromagnetic waves and constitutive relations, Wave equation for free-space, Uniform plane waves, Wave polarization, Energy density, the pointing vector and intensity, Radiation pressure and momentum, Light waves at boundaries, Wave incident normally on boundary, Wave incident obliquely on boundary: law of reflection, Snell's law and reflection coefficients.

Unit - II

Interference: Principle of Superposition, Conditions for Sustained interference, Young's double slit experiment, Division of wave-front: Fresnel's Biprism and its applications, Division of amplitude: Interference due to reflected and transmitted light, Wedge-shaped thin film, Newton's rings and its applications, Michelson Interferometer and its applications.

Unit – III

Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit, Plane transmission diffraction grating: theory, secondary maxima and secondary minima, width of principal maxima, absent spectra, overlapping of spectral lines, determination of wavelength; Dispersive power and resolving power of diffraction grating.

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, Biquartz polarimeter.

Unit – IV

Laser: Stimulated Absorption, Spontaneous and Stimulated Emission; Einstein's Coefficients and its derivation, Population Inversion, Direct and Indirect pumping, Pumping schemes, Main components of Laser, Gas lasers (He-Ne, CO_2), Solid state lasers (Ruby, Neodymium, semiconductor), Dye laser, Characteristics of Laser, Applications of Laser.

Text/Reference Books:

1. P.K. Diwan, Applied Physics for Engineers, *Wiley India Pvt. Ltd*., *India*
2. N. Subrahmanyam, B. Lal, M.N. Avadhanulu, A Textbook of Optics, *S. Chand & Company Ltd*., *India.*
3. A. Ghatak, Optics, *McGraw Hill Education (India) Pvt. Ltd., India*.
4. E. Hecht, A.R. Ganesan, Optics, *Pearson India Education Services Pvt. Lt., India.*

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

EC-201A	Electronic Devices						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	To understand the concept of carrier transport phenomena in semiconductors and diodes such as p-n junction diode and tunnel diode.						
CO2	To understand the detailed operation of BJT and calculation of its parameters using transistor models.						
CO3	To understand the operation, characteristics & parameters of FET and MOSFET.						
CO4	To understand the concept of different types of regulated power supplies and Op-Amp based voltage regulators						

UNIT-I

Charge Carriers Transport : Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; Generation and recombination of carriers; Continuity equation, PN Junction: Basic Structure, small signal equivalent circuit of p-n diode, derivation of barrier potential and diode current equation, Simple diode circuits: clipping, clamping and rectifiers, Zener diode and its application as voltage regulator.

UNIT-II

Bipolar Junction Transistor: Basic principle of operation, Current gains : derivation of α,β, ϒ and their relationship. Various modes of operation of BJT, Base Width Modulation, Transistor hybrid model, h-parameter equivalent circuit of transistor, Analysis of transistor amplifier using h-parameters, calculation of input impedance, output impedance and voltage gain.

UNIT-III

Field Effect Devices: JFET : basic Operation and characteristics, drain and transfer characteristics, pinch off voltage, parameters of JFET: Transconductance (g_m), ac drain resistance (r_d), amplification factor(μ) ,Small Signal Model & Frequency Limitations. MOSFET: basic operation, depletion and enhancement type, pinch-off voltage, Shockley equation and Small Signal Model of MOSFET, MOS capacitor.

UNIT-IV

Regulated Power Supplies: Voltage Regulation, block diagram of DC regulated power supply, Zener diode voltage regulators: transistor series voltage regulator, Transistor shunt voltage regulator, Controlled Transistor Voltage Regulator, Op-Amp Series and shunt voltage regulator.

Text Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.
Reference Books:
1. B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.
2. E S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.
4. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-203LA				Electronic Devices Lab			
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To teach the students how to experimentally plot the VI characteristics of various diodes such as p-n diode, zener diode etc. find the threshold voltage and zener breakdown voltage from the VI curve.						
CO2	To teach the students how to experimentally find the values of various parameters of Transistor such as voltage gain, current gain etc.						
CO3	To teach the students how to plot the input and output characteristics of FET and MOSFET by experimental method.						
CO4	To experimentally teach the students the concept of different configurations of regulated power supplies using Zener diodes and Op-Amp.						

List of experiments:

1. To study the VI characteristics of p-n diode in forward and reverse bias and find the threshold voltage from the VI curve.
2. To study the operation of Zener diode as a voltage regulator.
3. To study the operation of half-wave and full wave rectifiers and calculate their ripple factor values.
4. To study the operation of series and parallel Clippers using P-N junction diodes.
5. To study the operation of clampers using P-N junction diodes.
6. To experimentally plot the input and output characteristics of a given BJT transistor in CE configuration and calculate its various parameters.
7. To experimentally plot the input and output characteristics of a given BJT transistor in CB configuration and calculate its various parameters.
8. To study the transfer and drain characteristics of JFET and calculate its various parameters.
9. To study the transfer and drain characteristics of MOSFET and calculate its various parameters.
10. To study the different types of negative feedback in two stage amplifier and to observe its effects upon the amplifier parameters.
11. To study the Zener diode as a transistor series voltage regulator.
12. To study the Zener diode as a transistor shunt voltage regulator.
Reference Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.
Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-205A	Digital Electronics						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	Students will be able to understand the basic logic gates and will be able to apply minimization techniques for reducing a function upto six variables.						
CO2	Students will be able to design combinational circuits and applications related to them.						
CO3	Students will be able to write the truth table, excitation table, characteristic equations of various flip flops and to design the sequential circuits using Flip flops.						
CO4	Students will be able to familiarize with varied memory types and various A/D, D/A Converters and their characteristics.						

UNIT-I

Fundamentals of Digital Systems and Techniques: Digital signals, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, number systems: binary, signed binary, octal, hexadecimal number, binary arithmetic,one's and two's complements arithmetic, Codes:BCD codes, Excess-3, Gray codes, Error detecting and correcting codes: parity check codes and Hamming code

Minimization Techniques: Basic postulates and fundamental theorems of Boolean algebra: Standard representation of logic functions: SOP and POS forms, Simplification of switching functions using K-map and Quine-McCluskey tabular methods,Don't care conditions, Digital logic families: TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-statelogic.

UNIT-II

Combinational DigitalCircuits:Design procedure: Half adder, Full Adder, Half subtractor, Full subtractor , Parallel binary adder, parallel binary Subtractor, Carry Look Ahead adder, Serial Adder/Subtractor, BCD adder, Binary Multiplier, Binary Divider, Multiplexer/ De-multiplexer, decoder, encoder, parity checker, parity generators, code converters, Magnitude Comparator.

UNIT-III

Sequential circuits: A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K, T and D types flip flops, applications of flip flops: shift registers, serial to parallel converter, parallel to serial converter, Synchronous and Asynchronous mod counter,FSM, sequence generator and detector.

UNIT-IV

A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/Aconverter, specifications for D/A converters, analog to digital converters: quantization and encoding, parallel comparator A/Dconverter, successive approximation A/D converter, specifications for A/D converters

Semiconductor Memories and Programmable Logic Devices: Characteristics of memories, read only memory (ROM), read and write memory (RAM), Programmable logic array, Programmable array logic, Introduction to Field Programmable Gate Array (FPGA)

Text Books:
1. M. M. Mano, "Digital design", Pearson Education India, 2016.
2. Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 8th Edition, TMH, 2003.
3. Taub Schilling, Digital Integrated Electronics, TMH
Reference Books:
1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. A.K. Maini, Digital Electronics, Wiley India
3. R P Jain, Modern digital electronics, TMH

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-207LA	Digital Electronics Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	Students will be able to verify truth tables of basic logic gates and design various gates using universal gates.						
CO2	Students will be able to design various combinational circuits and verify their operation.						
CO3	Students will be able to design different sequential circuits by using flip flops and verify their operation.						
CO4	Students will be to study and design various encoders and decoders.						

List of experiments:

1. Familiarization with Digital Trainer Kit and associated equipment.

2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

3. Design and realize a given function using K-Maps and verify its performance.

4. To verify the operation of Multiplexer and De-multiplexer.

5. To verify the operation of Comparator.

6. To verify the truth table of S-R, J-K, T, D Flip-flops.

7. To verify the operation of Bi-directional shift register.

8. To design and verify the operation of 3-bit asynchronous counter.

9. To design and verify the operation of asynchronous Up/down counter.

10. To design and verify the operation of asynchronous Decade counter.

11. Study of Encoder and Decoder.

12. Study of BCD to 7 segment Decoder

Text Books:

1. M. M. Mano, "Digital design", Pearson Education India, 2016.
2. Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 8th Edition, TMH, 2003.

Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-209A				Signals and Systems			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO) At the end of this course, students will demonstrate the ability to							
CO1	Analyze different types of signals.						
CO2	Represent continuous and discrete systems in time and frequency domain using different transforms.						
CO3	Understand sampling theorem and its implications.						

UNIT-I

Introduction to Signals: Continuous and discrete time signals, deterministic and stochastic signals, periodic and a periodic signals, even and odd signals, energy and power signals, exponential and sinusoidal signals and singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation

Introduction to Systems: Linear and non-linear systems, time invariant and time varying systems, lumped and distributed systems, deterministic and stochastic systems, casual and non-causal systems, analog and discrete/digital memory and memory less systems.

UNIT-II

Random Variables: Introduction to Random Variables, pdf, cdf, moments, distributions, correlation functions.

Linear Time Invariant Systems: Introduction to linear time invariant (LTI) systems, properties of LTI systems, convolution integral, convolution sum, causal LTI systems described by differential and difference equations, Concept of impulse response.

UNIT-III

Discretization of Analog Signals: Introduction to sampling, sampling theorem and its proof, effect of undersampling, reconstruction of a signal from sampled signal.

Fourier Series : Continuous time Fourier series (CTFS), Properties of CTFS, Convergence of Fourier series, Discrete time Fourier Series (DTFS), Properties of DTFS **,** Fourier series and LTI system, Filtering.

UNIT-IV

Fourier Transform: Continuous Time Fourier Transform (CTFT), Properties of CTFT, Systems characterized by linear constant- coefficient differential equations, Discrete time fourier transform (DTFT), Properties of DTFT, Duality, Systems characterized by Linear constant coefficient difference equations.

Laplace Transform: Introduction to Laplace transform, Region of convergence for laplace transform, Inverse laplace transform, Properties oflaplace transform, Analysis and characterization of LTI systems using laplace transform, System function algebra and block diagram representations,Unilateral laplace transform.

Text Books:

1. Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab, Signals and Systems, Prentice Hall India, 2nd Edition, 2009

Reference Books:

1. Simon Haykins – "Signal & Systems", Wiley Eastern
2. Tarun Kumar Rawat , Signals and Systems , Oxford University Press.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. M. J. Robert "Fundamentals of Signals and Systems", McGraw Hill Education, 2007.
5. B. P. Lathi, "Linear Systems and Signals", Oxford University Press, 2009.

Note: Question paper template will be provided to the paper setter.

ECE-211LA				Signals & Systems Lab			
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To understand the basic concepts of software.						
CO2	To explore properties of various types of signals and systems.						
CO3	To explore different properties of signals and systems.						
CO4	To understand the concept of sampling in time and frequency domain.						

List of experiments:

1. Introduction of the MATLAB/SciLab/Octave software.
2. To demonstrate some simple signal.
3. To explore the effect of transformation of signal parameters (amplitude-scaling, time-scaling and time- shifting).
4. To visualize the complex exponential signal and real sinusoids.
5. To identify a given system as linear or non-linear.
6. To explore the time variance and time invariance property of a given system.
7. To explore causality and non-causality property of a system.
8. To determine Fourier transform of a signal.
9. To determine Laplace transform of a signal.
10. To demonstrate the time domain sampling of bandlimited signals (Nyquist theorem).
11. To demonstrate the sampling in frequency domain (Discrete Fourier Transform).
12. To demonstrate the convolution and correlation of two continuous-time signals.
13. To demonstrate the convolution and correlation of two discrete-time signals.

Reference Books:

1. B. P. Lathi, "Linear Systems and Signals", Oxford University Press, 2009.

2. Signals and Systems using Scilab, www.scilab.in.

3. Signals and Systems using Octave, www.octave.org

Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-213A	Network Theory						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	To understand the concept of network topologies and the network analysis in the time domain for solving simple and complex circuits.						
CO2	Describe the circuit element models, network analysis using Laplace transform and time domain behavior from the pole-zero plots.						
CO3	Describe the characteristics & parameters of two port networks.						
CO4	To understand the concept of filters and synthesis of one port networks.						

UNIT I

INTRODUCTION: - Principles of network topology, graph matrices, Network Analysis (Time-Domain): Singularity Functions, Source-Free RC, RL, Series RLC, Parallel RLC circuits, Initial & Final Conditions, Impulse & Step Response of RC, RL, Series RLC, Parallel RLC circuits.

UNIT 2

NETWORK ANALYSIS (using Laplace Transform): - Circuit Element Models, Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

NETWORK FUNCTIONS: - Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions.

UNIT 3

CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS: - Relationship of two-port variables, short-circuit admittance parameters, open circuit impedance parameters, transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4

TYPES OF FILTERS AND THEIR CHARACTERISTICS: - Filter fundamentals, constant-k and m-derived low-pass and high-pass filters.

NETWORK SYNTHESIS: - Causality & Stability, Hurwitz Polynomials, Positive real functions, Synthesis of one port networks with two kind of elements.

TEXT BOOKS:

1. Fundamentals of Electric Circuits: Charles K. Alexander, Matthew N. O. Sadiku, McGraw Hill Education
2. Network Analysis: M.E. Van Valkenburg, PHI

REFERENCE BOOKS:

1. Network Analysis & Synthesis: F. F. Kuo, John Wiley.
2. Circuits & Networks: Sukhija & Nagsarkar, Oxford Higher Education.
3. Basic Circuit Theory: DasoerKuh, McGraw Hill Education.
4. Circuit Analysis: G.K. Mithal, Khanna Publication.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

ES-219A				Essentials of Information Technology			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	Develop basic computational thinking. Learn how to reason with variables, state transitions, conditionals, and iteration						
CO2	Understand the notion of data types, and higher order data structures such as lists, tuples, and dictionaries.						
CO3	Develop a basic understanding of computer systems -architecture, OS, mobile and cloud computing.						
CO4	Learn basic SQL programming						

UNIT-I

Python Programming: Familiarization with the basics of Python programming, process of writing a program, running it, and print statements; simple data-types: integer, float, string. The notion of a variable, and methods to manipulate it, Knowledge of data types and operators: accepting input from the console, assignment statement, expressions, operators and their precedence. Conditional statements: if, if-else, if-elsif-else; Notion of iterative computation and control flow: for, while, flowcharts, decision trees and pseudo code

UNIT-II

Idea of debugging: errors and exceptions; debugging: pdb, break points. Sequence datatype: Lists, tuples and dictionary, Introduce the notion of accessing elements in a collection using numbers and names. Sorting algorithm: bubble and insertion sort; count the number of operations while sorting. Strings: Strings in Python : compare, concat, substring. **Data visualization using Pyplot:** line chart, pie chart, and bar chart.

UNIT-III

Computer Systems and Organisation: description of a computer system and mobile system, CPU, memory, hard disk, I/O, battery, power. Types of software:Types of Software – System Software, Utility Software and Application Software, how an operating system runs a program, operating system as a resource manager. **Cloud Computing**: Concept of cloud computers, cloud storage (public/private),and brief introduction to parallel computing.

UNIT-IV

Relational databases: idea of a database and the need for it, relations, keys, primary key, foreign key; use SQL commands to create a table, foreign keys; insert/delete an entry, delete a table. SQL commands: select, project, and join; indexes. Basics of NoSQL databases: Mongo DB

Text Books:
1. Python Programming: A modular approach by Sheetal Taneja and Naveen Kumar Pearson
Reference Books:
1. Python Programming - Using Problem Solving Approach by Reema Thareja Oxford Publication.
2. Database Management System a Practical Approach by Rajiv Chopra by S. Chand

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

MC-901A				Environmental Sciences			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

BS-207A	APPLIED AND COMPUTATIONAL MATHEMATICS						
LECTURE	TUTORIAL	PRACTICAL	CREDIT	MAJOR TEST	MINOR TEST	TOTAL	TIME
3	-	-	3	75	25	100	3 H
Purpose	The objective of this course is to familiarize the prospective Engineers with ordinary and partial differential equations, Laplace Transform which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximae of their solution. More precisely, the objectives are as under:						
Course Outcomes							
CO 1	To introduce the Ordinary & Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.						
CO 2	To study some extended topics in calculus essential for computations w.r.t. parameter variations ,vectors and field theory.						
CO 3	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.						
CO 4	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.						

UNIT-1

ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS

ODE: 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.

Second order linear differential equations with constant coefficients.

PDE: Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-2

ADVANCE CALCULUS

Multivariable Calculus: Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar and) Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere .

Vector Calculus: Gradient, divergence and Curl and their properties, Directional derivative. Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

UNIT-3

LAPLACE TRANSFORM

Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-4

NUMERICAL TECHNIQUES

Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Lagrange's formulae.

Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule, Taylor's series, Runge-Kutta method for solving first and second order equations.

Textbooks/References:

1. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.
2. W. E. Boyce and R. C. Di Prima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India,
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
6. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall.
7. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
8. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.

9. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
10. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
11. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
12. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
13. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
14. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
Note: The Examiner will be given the question paper template to set the questions.

EC-202A	Digital Communication						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	To learn digitization of analog signal by pulse modulation system and analyze their system performance						
CO2	To analyze different baseband transmission schemes and their performance.						
CO3	To learn and understand different digital modulation schemes and compute the bit error performance						
CO4	To analyze different modulation tradeoffs and different equalization techniques.						

UNIT-I
Pulse modulation.Sampling process. Pulse Amplitude and Pulse code modulation (PCM),Differential pulse code modulation. Delta modulation, Noise considerations in PCM, Time Division multiplexing.Quantization noise in delta modulation, The O/P signal to quantization noise ratio in delta modulation, O/P signal to noise ratio in delta modulation, varients of DM.

UNIT-II
Base Band Pulse Transmission: Matched filter and its properties, average probability of symbol error in binary enclosed PCM receiver, Intersymbol interference, Nyquist criterion for distortionless base band binary transmission, ideal Nyquist channel raised cosine spectrum, correlative level coding Duo binary signalling, tapped delay line equalization, adaptive equalization, LMS algorithm, Eye pattern.

UNIT-III
Elements of Detection Theory, Optimum detection of signals in noise,Coherent communication with waveforms- Probability of Error evaluations.

Pass band Digital Modulation schemes- ASK, Phase Shift Keying, Frequency Shift Keying,Quadrature Amplitude Modulation, Continuous Phase Modulation and Minimum Shift Keying. Signal space diagram and spectra of the above systems, effect of intersymbol interference, bit symbol error probabilities, synchronization.

UNIT-IV
Digital Modulation tradeoffs.Optimum demodulation of digital signals over band-limited channels- Maximum likelihood sequence detection (Viterbi receiver).Equalization Techniques.Synchronization and Carrier Recovery for Digital modulation.

Text Books:
1.Haykin S., "Communications Systems", John Wiley and Sons, 2001.
2.Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.
3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.

Reference Books:
1.Proakis J.G., ``Digital Communications", 4th Edition, McGraw Hill, 2000.
2.Lathi B.P., " Modern Digital and Analog Communication", 4th edition, Oxford university Press, 2010

EC-204LA	COMMUNICATION LAB						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
Upon completion of the course, students will be able to							
CO1	Generate and analyze Analog Modulated and demodulated Signals.						
CO2	Test & observe the outputs of different types of analog detectors.						
CO3	Generate and analyze digital Modulated and demodulated Signals.						
CO4	Test & observe the outputs of different types of digital detectors.						

List of experiments:

1: To study and Perform Amplitude Modulation & Demodulation.
2: To study and Perform Frequency Modulation and Demodulation.
3: To study and Perform Pulse Amplitude Modulation and Demodulation.
4: To study and Perform Pulse Width Modulation and Demodulation.
5: To study and Perform Pulse Position Modulation and Demodulation.
6: To study and Perform Pulse Code Modulation and Demodulation.
7: To study and Perform Time Division Multiplexing (TDM) system.
8: To study and Perform Amplitude Shift Keying (ASK) Modulation and De- Modulation.
9: To study and Perform Frequency Shift Keying (FSK) Modulation and De-Modulation.
10: To study and Perform Phase Shift Keying (PSK) Modulation and De-Modulation.
11: To study and Perform Quadrature Phase Shift Keying (QPSK) Modulation and De-Modulation.
12: To study and perform Adaptive Delta Modulation and demodulation.
13. To study Base Band Transmission and calculate bit error rate.

Note: At least ten (10) experiments from the above list are mandatory to perform for the students.

Reference Books:

1. Taub & Schilling, Principles of Communication Systems, McGraw Hill Publications, (1998) 2nd ed.
2. Simon Haykin, Communication Systems, John Wiley Publication, 3rd ed.
3. Sklar, Digital Communications, Prentice Hall-PTR, (2001) 2nd ed.
4. Lathi B. P., Modern Analog and Digital Communication, , Oxford University Press, (1998) 3rd

EC-206A				Analog Circuits			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	To make the students understand the analysis of various BJT and FET amplifiers using small signal models.						
CO2	To teach the students the concept of describe the frequency response of multistage amplifiers and the detailed concept of feedback topologies.						
CO3	To make the students learn various oscillator circuits using both Op-Amp and BJT.						
CO4	To teach the students the various application circuits of Op-Amp and designing for a given specification.						

UNIT-I

Amplifier Models: Amplifier types: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier, comparison based on input impedance and output impedance. Small signal analysis of BJT amplifiers: CE, CB and CC amplifiers using r_e model, small signal analysis of the CS JFET amplifiers, estimation of voltage gain, input resistance, output resistance etc, design procedure for particular specifications of amplifiers.

UNIT-II

Transistor Frequency Response: Class A, class B, class C amplifiers: calculation of maximum efficiency. Frequency response of the amplifiers: low frequency, mid-frequency and high frequency region. Effect of cascading of amplifiers on the frequency response, cut-off frequencies, Bandwidth and voltage gain. Miller effect, Feedback in amplifiers: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth, input impedance, output impedance.

UNIT-III

Oscillators: Barkhausen criterion for oscillators, types of Oscillators: RC phase shift oscillator, Wien bridge oscillator, LC oscillators : Hartley oscillator, Collpit oscillator, derivation of frequency of oscillation for BJT and Op-amp configurations, 555 timer: operation as astable and monostable multivibrator.

UNIT-IV

Op-Amp Applications: Simple op-amp circuits: adder, subtractor, Schmitt trigger, Differential amplifier: calculation of differential gain, common mode gain, CMRR, OP-AMP design: design of differential amplifier for a given specification, design of gain stages and output stages.

Text Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.

Reference Books:
1. B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.
2. E S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.
4. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.

EC-208LA	Analog Circuits Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To design and calculate the gain , frequency response etc. of the various configuration of transistor amplifier.						
CO2	To make students Design various RC oscillators using Op-Amp 741 for a given frequency of oscillation.						
CO3	To make students Design various RC oscillators using BJT for a given frequency of oscillation.						
CO4	To teach the students the design of various Op-Amp circuits such as adder, subtractor etc.						

List of experiments:

1. To design a simple common emitter (CE) amplifier circuit using BJT and find its gain and frequency response. To design a differential amplifier using BJT and calculate its gain and frequency response.
2. To design a BJT emitter follower and determine is gain, input and output impedances.
3. To design and test the performance of Phase shift Oscillator using Op-Amp 741.
4. To design and test the performance of Wien bridge oscillator using Op-Amp 741.
5. To design and test the performance of BJT - RC Phase shift Oscillator for f0 ≤ 10 KHz.
6. To design and test the performance of BJT – Hartley Oscillators for RF range f0 ≥100KHz.
7. To design and test the performance of BJT – Colpitt Oscillators for RF range f0 ≥100KHz.
8. To design an astable multivibrator using 555 timer.
9. To design a monostable multivibrator using 555 timer.
10. To design Schmitt trigger using Op-amp and verify its operational characteristics.
11. To design an adder circuit using Op-Amp to add three dc voltages.
12. To design a subtractor using Op-Amp to subtract DC voltages v1 and v2.

Reference Books:

1. Millman & Halkias: Integrated Electronics, TMH.
2. Boylestad & Nashelsky: Electronic Devices & Circuit Theory, PHI.
3. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.
Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-210A	MICROPROCESSORS AND MICROCONTROLLER						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**-**	**-**	**3**	**75**	**25**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	**Acquired knowledge about the architecture of Microprocessors and Microcontrollers.**						
CO2	**Acquired knowledge about instruction set and programming concept of Microprocessors and Microcontrollers in assembly and C language.**						
CO3	**To understand peripheral interfacing with Microprocessors and Microcontrollers.**						
CO4	**To design the systems /models based on Microprocessors and Microcontrollers**						

UNIT-I

Evolution of Microprocessor, Introduction to 8-bit Microprocessor 8085 architecture, Pin Details 8085 Microprocessor, 8086 Architecture description of data registers, address registers; pointer and index registers, PSW, Queue, BIU and EU, 8086 Pin diagram descriptions. Generating 8086 CLK and reset signals using 8284. WAIT state generation. Microprocessor BUS types and buffering techniques, 8086 minimum mode and maximum mode CPU module, 8086 CPU Read/Write timing diagrams in minimum mode and maximum mode.   **UNIT-II**

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, 8051 addressing modes.

UNIT-III

8086 Instruction format, addressing modes, Data transfer instructions, string instructions, logical instructions, arithmetic instructions, transfer of control instructions; process control instructions. 8051 Data transfer instructions, arithmetic and logical instructions, Jump and Call instructions, I/O port, Timer and Counter programming, Serial port and Interrupt programming, Assembly language programs.

UNIT-IV

Memory devices, Address decoding techniques, Interfacing SRAMS; ROMS/PROMS, 8086 Interrupt mechanism; interrupt types and interrupt vector table. Intel's 8255 - description and interfacing with 8086, ADCs and DACs, - types operation and interfacing with 8086.

Interfacing of Matrix Keyboards, ADC, DAC, Temperature Sensor, Stepper Motor with 8051.

Text Books:

1. D.V. Hall, Microprocessors and Interfacing, McGraw Hill 2nd ed.
2. Kenneth Ayala," The 8051 Microcontroller" 3rd ed. CENGAGE Learning.

3. M.A. Mazidi, J.G. Mazidi, R. D. McKinlay," The 8051 Microcontroller and Embedded systems using assembly and C" -2nd Ed, Pearson Education.
4. Liu, Gibson, "Microcomputer Systems: The 8086/88 Family", 2nd Edition, PHI,2005.
5. Barry B. Brey, "The Intel Microprocessor8086/8088, 80186", Pearson Education, Eighth Edition, 2009.
6. Uffenback, "The 8086 Family Design" PHI, 2nd Edition.

Reference Books:

1. Mke Predko, "Programming and Customizing the 8051 Microcontroller", TMH.
2. Manish K Patel,"Microcontroller based embedded system", McGraw Hill Education.

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

EC-212LA	MICROPROCESSORS AND MICROCONTROLLER LAB						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3 Hrs.
Course Outcomes (CO)							
CO1	To familiarization with 8085, 8086 Microprocessors and 8051 Microcontrollers.						
CO2	Ability to write an assembly language program for 8086 Microprocessors as well as C language program for 8051 Microcontroller.						
CO3	Ability to interfacing the various Peripheral to 8086 Microprocessors and 8051 Microcontrollers.						
CO4	Ability to design the systems based on 8051 Microcontrollers.						

List of experiments to be performed using 8086 and 8051 Microcontrollers

For 8086 Microprocessor write an Assembly Language Program to

1 Add / Sub two 16 bit numbers.
2 Multiply two 16 bit unsigned/ signed numbers.
3 Divide two unsigned/ signed numbers (32/16 , 16/8, 16/16, 8/8)
4 Find smallest/ largest number from array of n numbers.
5 Arrange numbers in array in ascending/ descending order.
6 Convert Hex to Decimal, Decimal to Hex.
7 Compare two strings using string instructions / without using string instructions.
8 Display string in reverse order, string length, Concatenation of two strings.
9 To find 1's and 2's complement of a number.
10 To find the Fibonacci Series.
11 To find Log of a given number using look up table.
12 To find Factorial of a number.
13 To write an ALP using 8051 Microcontrollers to perform addition, subtraction, multiplication and division of two eight bit numbers.
14 To write an ALP using 8051 Microcontrollers to perform logical operation i.e., AND, OR, XOR and Complement of two eight bit numbers.
15 To write an ALP using 8051 Microcontrollers to perform multi byte addition and subtraction of unsigned number.
16 To write an embedded C program using 8051 Microcontrollers for interfacing LCD to display message "LCD Display" on LCD screen.
17 To write an embedded C program using 8051 Microcontrollers for interfacing keypad to port P0 .Whenever a key is pressed; it should be displayed on LCD.
18 To write an embedded C program using 8051 Microcontrollers 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.
19 To write an embedded C program using 8051 Microcontrollers for interfacing stepper motor to rotate clockwise and anticlockwise directions.
20 To write an embedded C program using 8051 Microcontrollers for interfacing relay and buzzer.

Reference 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.

Note: Atleast ten (10) experiments from the above list are mandatory to perform for the students.

EC-214A	ELECTROMAGNETIC FIELD THEORY						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.

UNIT I

Review: vector analysis in all the three coordinate system, line, surface & volume integrals, gradient, divergence & curl of a vector & their physical significance, Gauss Divergence theorem, Stokes theorem. Gauss law in electrostatics & its applications, uniform line, surface & volume charge distributions, concepts of electric field & electric potentials, electric field & potential due to a linear dipole, method of images.

UNIT II

Biot Savart's law, Amperes circuital law & its applications. Boundary conditions for both the electric & magnetic fields at the interface of various types of media. Laplace, Poisson's equation & continuity equation. Faraday's & Lenz's laws, How Maxwell fixed Ampere's law, Maxwell's equations in differential & integral forms & their physical significance in circuit theory, retarded potentials.

UNIT III

Plane & uniform plane waves and their properties, waves equations in various media. . Polarisation & its types. Intrinsic impedance, propagation constant. Reflection & refraction of uniform plane waves at the interface of conductor- dielectric & dielectric - dielectric (both normal and oblique incidence). Relaxation time ,skin effect, skin depth & surface impedance, Poynting vector theorem & its physical significance.

.UNIT IV

Distributed parameters, circuit parameters, concepts of voltage & current flow on a transmission line, Transmission line equations, characteristic impedance. Reflection of transmission line, maxima & minima, standing wave ratio of a transmission line. Impedance matching, Smith's chart & its computational applications.

Concept of Wave Guide and TE, TM and TEM modes in rectangular and circular wave guide. Cut off and guide wave length.

References:
1. Fields and Waves by D.K. Cheng. (Pearson Education)
2. Electomagnetics by J.D. Krauss(TMGH)
3. Principles of Electomagnetics by Sadiku (Oxford Univ. Press)

ES -208A				BASICS OF ANALOG COMMUNICATION			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.

Course Outcomes (CO):Upon completion of the course, students will be able to

CO1	Describe different types of noise and predict its effect on various analog communication systems.
CO2	Understand and analyze various Amplitude modulation and demodulation methods.
CO3	Understand and analyze Angle modulation and demodulation methods.
CO4	Understand the concepts of Transmitters and Receivers and their circuits.

Unit-I

Communication system and Noise: Constituents of communication system, Modulation, Bandwidth requirement, Noise, Classification of noise, Resistor noise, Multiple resistor noise sources, Noise Temperature, Noise bandwidth, Noise figure, its calculation and measurement, Bandpass noise representation, Noise calculation in Communication Systems: Noise in Amplitude Modulated System, Noise in angle modulated systems.

Analog Modulation Techniques: Theory of amplitude modulation, AM power calculations, AM modulation with a complex wave, Concepts of angle modulation, Theory of frequency modulation, Mathematical analysis of FM, Spectra of FM signals, Narrow band FM, Wide band FM, Phase modulation, Phase modulation obtained from frequency modulation, Comparison of AM, FM & PM.

Unit-II

AM Transmission: Generation of Amplitude Modulation, Low level and high level modulation, Basic principle of AM generation, Square law modulation, Vander bijl modulation, Suppressed carrier AM generation (Balanced Modulator) ring Modulator.

AM Reception: Tuned Ratio Frequency (TRF) Receiver, Super heterodyne Receiver, RF Amplifier, Image Frequency Rejection, Cascade RF Amplifier, Frequency Conversion and Mixers, Tracking & and Alignment, IF Amplifier, AM detectors, Distortion in diode detectors, AM receiver characteristics.

Unit-III

FM Transmission: FM allocation standards, Generation of FM by direct method, Varactor diode Modulator, Indirect generation of FM, The Armstrong method RC phase shift method, Frequency stabilized reactance FM transmitter, FM stereo transmitter, Noise triangle.

FM Reception: Direct methods of Frequency demodulation, Frequency discrimination (Balanced slope detector), Foster seelay of phase discriminator, Ratio detector, Indirect method of FM demodulation, FM detector using PLL, Pre-emphasis / de-emphasis, FM receiver, FM stereo receiver.

Unit-IV

SSB Transmission: Introduction, Advantages of SSB Transmission, Generation of SSB, The Filter method The Phase Shift Method, The Third Method, Pilot Carrier SSB, Vestigial Side-band Modulation (VSB), VSB-SC, Application of AM and FM in TV transmission.

SSB Reception: SSB Product Demodulator, Balanced Modulator as SSB Demodulator, Pilot Carrier SSB Receiver, Modern Communication Receiver.

Analog Pulse Modulation: Introduction, Pulse amplitude modulation (PAM), PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation (PTM): Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), PWM and PPM Demodulator,

Text Books

1. Kennedy, G., Electronic Communication Systems, McGraw-Hill (2008) 4th ed.

2. Lathi.B.P.,Modern Digital and Analog Communications Systems 3rd ed.

Reference Books:

1.Taub, H., Principles of Communication Systems, McGraw-Hill (2008) 3rd ed.

2. Haykin, S., Communication Systems, John Willey (2009) 4th ed.

3. Proakis, J. G. and Salehi, M., Fundamentals of Communication Systems, Dorling Kindersley (2008) 2nd ed.

4. Mithal G K, Radio Engineering, Khanna Pub.

5. Singh & Sapre—Communication Systems: 2/e, TMH

Note: Separate paper template will be provided to the paper setter for setting the question paper of end term semester examinations.

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
   1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
   1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

Bachelor of Technology (Electrical Engineering)
(Credit Based)
Modified Scheme of Studies/Examination Semester III
(Modified & w.e.f. Session 2019-20)

Sr. No.	Course No.	Subject	L:T:P	Hours/Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	*EE-201A	**Electric Circuit Theory**	3:1:0	4	4	75	25	0	100	3
2	EE-203A	Analog Electronics	3:0:0	3	3	75	25	0	100	3
3	*EE-205A	**Electrical Machines - I**	3:1:0	4	4	75	25	0	100	3
4	BS-207A	Applied and Computational Mathematics	3:0:0	3	3	75	25	0	100	3
5	HM-903A	Soft Skills & Interpersonal Communication	3:0:0	3	3	75	25	0	100	3
6	*EE-211A	**Electrical Machines – I Lab**	0:0:2	2	1	-	40	60	100	3
7	EE-207A	Analog Electronics Lab	0:0:2	2	1	-	40	60	100	3
8	**EE-209A	Industrial Training-I	2:0:0	2	-	-	100	0	100	3
9	***MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3
		Total		26	19	375	205	120	700	

* Subjects Common with IIIrd Semester. B.Tech. [Electrical & Electronics Engg.] Scheme, K.U.K.

**EE-209A is a mandatory credit-less 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 qualify.

 ***MC-901A is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

Bachelor of Technology (Electrical Engineering)
(Credit Based)
Scheme of Studies/Examination Semester-IV (Modified & w.e.f. Session 2019-20)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	EE-202A	Digital Electronics	3:1:0	4	4	75	25	0	100	3
2	EE-204A	Signals and Systems	3:1:0	4	4	75	25	0	100	3
3	*EE- 206A	**Electrical Machines – II**	3:1:0	4	4	75	25	0	100	3
4	*EE-208A	**Power Electronics**	3:1:0	4	4	75	25	0	100	3
5	EE-216A	Electromagnetic Fields	3:0:0	3	3	75	25	0	100	3
7	*EE-210A	**Electrical Machines- II Lab**	0:0:2	2	1	-	40	60	100	3
8	*EE-212A	**Power Electronics Lab**	0:0:2	2	1	-	40	60	100	3
9	EE-214A	Digital Electronics Laboratory	0:0:2	2	1	-	40	60	100	3
10	**MC-902A	Constitution of India	3:0:0	3	-	75	25	0	100	3
		Total		28	22	375	245	180	800	

* Subjects Common with IV Semester. B.Tech. [Electrical & Electronics Engg.] Scheme, K.U.K.

**MC-902A 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.

EE-201A				Electric Circuit Theory			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with electric network function and network synthesis.						
Course Outcomes							
CO1	Apply network theorems for the analysis of electrical circuits.						
CO 2	Obtain the transient and steady-state response of electrical circuits.						
CO 3	Analyse circuits in the sinusoidal steady-state (single-phase and three-phase).						
CO 4	Analyse two port circuit behavior.						

Unit-I

Solution of First and Second order networks:
Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.

Unit-II

Electrical Circuit Analysis Using Laplace Transforms
Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros, series and parallel resonances.

Unit-III

Two Port Network and Network Functions:
Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.

UNIT-IV

Network Synthesis:
Hurwitz polynomials, Properties of Hurwitz polynomials, Positive real functions, procedure of testing of PR functions, concept and procedure of network synthesis, properties of expressions of driving point immitances of LC networks. LC Network synthesis: Foster's I & II Form, Cauer's I & II form, RC & RL Network.

Suggested Books:
1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.
3. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
4. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
5. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.

Note: The paper setter will set the paper as per the question paper templates provided.

EE-203A	Analog Electronics	3L:0T:0P	3 credits	3 h Time

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the characteristics oftransistors.
- Design and analyze various rectifier and amplifiercircuits.
- Design sinusoidal and non-sinusoidaloscillators.
- Understand the functioning of OP-AMP and design OP-AMP basedcircuits.

UNIT 1: Diode circuits

P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes, clamping and clippingcircuits.

UNIT 2: BJT circuits

Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and common- collector amplifiers; Small signal equivalent circuits, high-frequency equivalent circuits

UNIT 3: MOSFET circuits

MOSFET structure and I-V characteristics. MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers; small signal equivalent circuits - gain, input and output impedances, trans-conductance, high frequency equivalent circuit.

UNIT 4: Differential, multi-stage and operational amplifiers (8 Hours)

Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidthproduct)

Text/References:

1. A. S. Sedra and K. C. Smith, " Microelectronic Circuits", New York, Oxford University Press,1998.
2. J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.
3. J. Millman and A. Grabel, " Microelectronics", McGraw Hill Education,1988.

4. P.Horowitz and W.Hill,"TheArtofElectronics",CambridgeUniversityPress,1989

Note: The paper setter will set the paper as per the question paper templates provided.

EE-205A	Electrical Machine-I						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with electric machines and transformer.						
Course Outcomes							
CO1	To understand concept ,working, operation, maintenance of single phase transformer						
CO 2	To understand concept ,working, operation, maintenance of three phase transformer & conversion from three phase to multiple phases						
CO 3	To understand construction ,working, operation of D.C. Generator						
CO 4	To understand concept ,working, operation, testing of D.C. Motor						

UNIT – I

TRANSFORMERS:
Principle, construction of core, e.m.f. equation, winding &tank, cooling, operation, testing of single phase transformer, equivalent circuit, phasor diagram, parameters determination, P.U representation of parameters, regulation, losses & efficiency, separation of iron losses, parallel operation,all-day efficiency, Sumpner's test, specifications of transformer, maintenance of transformer, difference between power transformer and distribution transformer.

UNIT – II

Three phase transformer: Types and their comparative features, Zig-zag connection.
Auto-Transformer: Principle, construction, comparison with two winding transformers, applications.
Nature of magnetizing current: plotting of magnetizing current from B-H curve, inrush current.
Phase-Conversion: Three to two phase, three to six phase and three to twelve phase conversions. Introduction to three windings transformer, tap-changing & phase- shifting transformers.

UNIT – III

D.C. Generator-Principle & construction of D.C. generator, simplex lap, wave winding, E.M.F. equation, types, voltage build up, armature reaction, compensating winding, function of commutator, methods of improving commutation, load characteristics, parallel operation.
Excitation System—Purpose and requirements of excitation system, brushless excitation system.

UNIT- IV

D.C. Motor-
Principle of DC motors, function of commutator in DC motors, torque and output power equations, load characteristics, losses, starting, starters, speed control, braking, testing , Swinburne test, Hopkinson test, Ward Leonard Method, efficiency & applications.

Suggested Books:
1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
5. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

Note: The paper setter will set the paper as per the question paper templates provided.

BS-207A	APPLIED AND COMPUTATIONAL MATHEMATICS						
LECTURE	TUTORIAL	PRACTICAL	CREDIT	MAJOR TEST	MINOR TEST	TOTAL	TIME
3	-	-	3	75	25	100	3 H
Purpose	The objective of this course is to familiarize the prospective Engineers with ordinary and partial differential equations, Laplace Transform which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						
Course Outcomes							
CO 1	To introduce the Ordinary & Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.						
CO 2	To study some extended topics in calculus essential for computations w.r.t. parameter variations ,vectors and field theory.						
CO 3	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.						
CO 4	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.						

UNIT-1

ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS

ODE: 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.
Second order linear differential equations with constant coefficients.

PDE: Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-2

ADVANCE CALCULUS

Multivariable Calculus: Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar and) Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere .

Vector Calculus: Gradient, divergence and Curl and their properties, Directional derivative. Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

UNIT-3

LAPLACE TRANSFORM

Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-4

NUMERICAL TECHNIQUES

Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Lagrange's formulae.

Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule, Taylor's series, Runge-Kutta method for solving first and second order equations.

Textbooks/References:

1. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.
2. W. E. Boyce and R. C. Di Prima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India,
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
6. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall.
7. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
8. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
9. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
10. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
11. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
12. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
13. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
14. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Note: The Examiner will be given the question paper template to set the questions.

HM- 903A				Soft Skills & Interpersonal Communication			
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	-	-	3	75	25	100	3 Hrs.
			Course Outcomes (CO)				
CO1	Develop basic understanding of Communication						
CO2	Understand the process of communication and speaking						
CO3	Develop the Personality concepts and its implementation						
CO4	Develop the basic of Group Discussion and interviews						

UNIT-I

Communication**:** Introduction Verbal, Non-Verbal, kinesics, proxemics, chronemics, Types of communication, extrapersonal communication, intrapersonal communication, intrapersonal communication, mass communication,Creativity in communication, Role of communication, flow of Communication and its need, Persuasive communication and negotiation;Time management in Persuasive communication, Importance of Persuasive Communication

UNIT-II

Barriers in the way of communication, noise, intrapersonal barriers, interpersonal barriers,organizational barriers, Extrapersonal barriers, Basics of communication:importance of communication,process of communication, objectives and characteristics of communication,Communication skills: Accent, Intonation, Phonetics, Speaking skills, Confidence, clarity, Fluency,Quality,pronunciation

UNIT-III

Personality Development; what is personality? Role of personality,Heredity, Environment, situation, Basics of personality, Soft skills; Needs and training, Activity in soft skills, Organizational skill;Introduction and its need,basics principles for Organization skills,Stress management;Introduction, Stress at home and office, Stress prevention, analyze the model of stress.

UNIT-IV

Group discussion, form of Group discussion, strategy for Group discussion, discussing problems and solution, Oral presentation, introduction, planning, Occasion, Purpose, Modes of delivery, Resume making;Purpose of Resume, Resume design and structure, contents in Resume, types of resume, Job interview, introduction, objective of Interview, types of interview, stages of interview,Face to face interview and campus interview

Text Books:

1.Technical Communication Principles and Practice by Meenakshi Raman and Sangeeta Sharma by Oxford Publication

Reference Books:

1.Personality Development and soft skills by Barun K. Mitra, OxfordPublication

2.Communication Skills For Engineers by C.Muralikrishna and Sunita Mishra, PearsonPub.

Note: The paper setter will set the paper as per the question paper templates provided.

EE -211A			Electrical Machines Lab-I				
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
-	-	**2**	**1**	**60**	**40**	**100**	**3h**

LIST OF EXPERIMENTS:

1. To find turns ratio, polarity & mark dot convention of a 1-phase transformer.
2. To perform open & short circuit tests on a 1-phase transformer& find parameters.
3. To perform Sumpner's Back to Back test on 1-phase transformer& find parameters.
4. Parallel operation of two 1-phase transformers and observe load sharing.
5. To convert three phase supply to 2-phase by Scott-connection, compare line currents theoretically& practically for unbalanced load.
6. To perform load test on DC shunt generator & find efficiency& observe speed at different load.
7. Speed control of DC shunt motor by armature & field control method, draw graph between speed & field current.
8. To perform Swinburne's test of DC shunts motor and find efficiency.
9. To perform Hopkinson's test of DC shunts M/Cs.
10. To perform Ward Leonard method for speed control DC shunts motor.
11. To make various types of three phase connections , using three single phase transformers, study relevant features
12. Characteristics for compound, series shunt generators.

Note: At least eight experiments should be performed from above list.

EE-207A			Analog Electronics Lab				
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
-	**-**	**2**	**1**	**60**	**40**	**100**	**3h**

List of Experiments:

1. To Design a simple common emitter (CE) amplifier Circuit and find its gain and   frequency response.
2. To Design a differential amplifier and calculate its gain and frequency response
3. To design RC coupled Single stage amplifier and determination of the gain , frequency response.
4. To design a Emitter follower and determination of the gain, input and output impedances.
5. To design and test the performance of RC Phase shift Oscillator.
6. To design and test the performance of Hartley Oscillators.
7. To design and test the performance of Colpitt Oscillators.
8. To design an astable multivibrator using 555 timer.
9. To design a monostable multivibrator using 555 timer.
10. To design Schmitt trigger using op-amp and verify its operational characteristics.

Note: At least eight experiments should be performed from above list.

EE-209A	INDUSTRIAL TRAINING-I							
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Practical	Total	Time (Hrs.)
2	0	0	--	--	100	--	100	3 h
Purpose	To provide comprehensive learning platform to students where they can enhance theiremploy ability skills and exposure to the industrial environment.							
Course Outcomes								
CO1	Capability to acquire and apply fundamental principles of engineering.							
CO 2	Become updated with all the latest changes in technological world.							
CO 3	Capability and enthusiasm for self-improvement through continuous professionaldevelopment and life-long learning							
CO 4	Awareness of the social, cultural, global and environmental responsibility as anengineer.							

Note: EE-209A 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 qualify.

The candidate has to submit a training report of his/her work/project/assignment completed in the industry during the training period. The evaluation will be made on the basis of submitted training report and viva-voce/presentation.

MC-901A	Environmental Sciences						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.
(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity-In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

EE-202A	Digital Electronics	3L:1T:0P	4 credits

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand working of logic families and logicgates.
- Design and implement Combinational and Sequentiallogic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Be able to use PLDs to implement the given logicalproblem.

Unit-I

Fundamentals of Digital Techniques:

Digital signal, review of number systems, binary codes, BCD, Excess-3, Gray, EBCDIC, ASCII, logic gates- AND, OR, NOT, NAND, NOR, EX-OR, Boolean algebra, Error detection and correction, hamming code.

Unit-II

Combination Design using Gates:

Design using gates, K- map and Quine-Mccluskey methods of simplification.

Combinational design using MSI Devices

Multiplexers and Demultiplexers and their uses as logic elements, Decoders, Adders/Subtracters, BCD arithmetic circuits, Encoders, Decoders/Drivers for display devices.

Unit-III

Design of Sequential circuits:

Flip flops: S-R, J-K, T,D, master slave, edge triggered, shift registers, sequence generators, counters-asynchronous and synchronous, ring counters and Johnson Counter.

D/A &A/D Converters:

D/A converters- weighted resistor and R-2 R ladder, specifications for D/A converters, A/D converters: Sample and hold circuits, Quantization, Parallel-comparator, successive approximation, counting type, dual slope ADC.

Unit-IV

Digital logic families:

Bipolar logic families: RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic, interfacing of CMOS and TTL families.

Programmable logic devices:

ROM, PLA, PAL, FPGA and CPLDS.

REFERENCES:

1. Modern Digital Electronics (Edition III) : R.P. Jain, TMH.
2. Digital Integrated Electronics: Taub& Schilling, MGH
3. Digital Principles and Applications: Malvino& Leach, MGH
4. Digital Fundamentals,Floyd,11thEd.,Pearson.

Note: The paper setter will set the paper as per the question paper templates provided.

EE-204A	Signals and Systems	3L:1T:0P	4 credits

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the concepts of continuous time and discrete timesystems.
- Analyse systems in complex frequencydomain.
- Understand sampling theorem and itsimplications.

Unit-I

Introduction to Signals: Continuous and discrete time signals, deterministic and stochastic signals, periodic and aperiodic signals, even and odd signals, energy and power signals, exponential and sinusoidal signals and singular functions. Signal representation in terms of singular functions,

Introduction to Systems: Linear and non-linear systems, time invariant and time varying systems ,lumped and distributed systems, deterministic and stochastic systems, casual and non-causal systems, analog and discrete/digital memory and memory less systems.

Unit-II

Random Variables: Introduction to Random Variables, PDF, CDF

Linear Time Invariant Systems: Introduction to linear time invariant (LTI) systems, properties of LTI systems, convolution integral, convolution sum, causal LTI systems described by differential and difference equations. Concept of impulse response.

Unit-III

Discretization of Analog Signals: Introduction to sampling, sampling theorem and its proof. Effect of under sampling, reconstruction of a signal from sampled signal.

Fourier Series : Continuous time Fourier series (CTFS), Properties of CTFS, Convergence of Fourier series.

Unit-IV

Fourier Transform: Continuous Time Fourier Transform (CTFT), Properties of CTFT, Systems characterized by linear constant- coefficient differential equations.

Discrete time Fourier transform (DTFT), Properties of DTFT, Duality, Systems characterized by linear constant coefficient difference equations.

Laplace Transform: Introduction to Laplace transform, Region of convergence for laplace transform, Inverse Laplace transform, Properties of Laplace transform, Analysis and characterization of LTI systems using LaplaceTransform.

REFERENCES :

1. Oppenheim, Willsky, Nawab, Signals and Systems, Prentice Hall India, 2nd Edition, 2009
2. Simon Haykins – "Signal & Systems", Wiley Eastern
3. Tarun Kumar Rawat, Signals and Systems, Oxford University Press.

Note: The paper setter will set the paper as per the question paper templates provided.

EE-206A	Electrical Machines-II						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with the basics of Electrical Machines						
Course Outcomes							
CO1	Understand the concepts of rotating magnetic fields.						
CO 2	Understand the operation of ac machines.						
CO 3	Analyse performance characteristics of ac machines.						
CO 4	Analyse synchronous machine						

UNIT-I

Induction Machines:
Basic concept of Induction machines: winding factors, generated e.m.f. and m.m.f distribution, a.c. winding, rotating magnetic field.
3-phase Induction Motor: Construction, features, production of torque, phasor diagram, equivalent circuit, performance analysis, torque –slip characteristics, running, light and blocked rotor test, load test on 3-ph I.M.

UNIT-II

Single phase induction motors:-
Constructional features & double revolving field theory, equivalent circuit, determination of parameters. Split phase, starting methods, types& applications.
Starting of 3-ph I.M. Starting methods of squirrel cage and wound rotor induction motor.
Induction Generator-Operation, applications, advantages.

UNIT-III

Three Phase Synchronous Generators:
Principle, construction, EMF equation, armature winding, armature reaction, equivalent circuit, voltage regulation – synchronous reactance method , Rothert'sm.m.f method, Potier triangle method, Output power equation, power angle curve, two reactance theory, slip test, Transient and subtransient reactance, synchronization, parallel operation.

UNIT-IV

Three Phase Synchronous Motor: Construction, Principle of operation, Equivalent circuit, torque, power developed, starting, V-curve, Hunting-causes , effects & reduction , synchronous condenser applications. Comparison between induction motor and synchronous motor, high 1286tarting torque motors.

Suggested Books:
1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
4. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
5. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.

Note: The paper setter will set the paper as per the question paper templates provided.

EE-208A	Power Electronics						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with the Converter and Power switching device						
Course Outcomes							
CO1	Understand the differences between signal level and power level devices.						
CO 2	Analyse controlled rectifier circuits.						
CO 3	Analyse the operation of DC-DC choppers.						
CO 4	Analyse the operation of voltage source inverters.						

UNIT-I

Power switching devices :

Diode, Thyristor, MOSFET, IGBT: I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET and IGBT.

UNIT-II

Thyristor rectifiers

Single-phase half-wave and full-wave rectifiers, Single-phase full-bridge thyristor rectifier with Rload and highly inductive load; Three-phase full-bridge thyristor rectifier with R-load and highly inductive load; Input current wave shape and power factor.

UNIT-III

DC-DC buck converter:

Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage, power circuit of a buck converter, analysis and waveforms at steady state, duty ratio control of output voltage.

DC-DC boost converter:

Power circuit of a boost converter, analysis and waveforms at steady state, relation between duty ratio and average output voltage.

UNIT-IV

Single-phase voltage source:

Power circuit of single-phase voltage source inverter, switch states and instantaneous output voltage, square wave operation of the inverter, concept of average voltage over a switching cycle, bipolar sinusoidal modulation and unipolar sinusoidal modulation, modulation index and output voltage.

Suggested Books:

1. M. H. Rashid, "*Power electronics: circuits, devices, and applications*", Pearson Education India, 2009.
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
3. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007.
4. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.

Note: The paper setter will set the paper as per the question paper templates provided.

EE-216A	Electromagnetic Fields	3L:0T:0P	3 credits	Time 3 h
Course Outcomes	At the end of the course, students will demonstrate the ability • To understand the basic laws ofelectromagnetism. • To obtain the electric and magnetic fields for simple configurations under static conditions. • To analyse time varying electric and magneticfields. • To understand Maxwell's equation in different forms and differentmedia. • To understand the propagation of EMwaves. This course shall have Lectures and Tutorials. Most of the students find difficult to visualize electric and magnetic fields. Instructors may demonstrate various simulation tools to visualize electric and magnetic fields in practical devices like transformers, transmission lines and machines.			

Unit-I

Review of Vector Calculus
Vector algebra-addition, subtraction, components of vectors, scalar and vector multiplications, triple products, three orthogonal coordinate systems (rectangular, cylindrical and spherical). Vector calculus- differentiation, partial differentiation , integration, vector operat ordel, gradient, divergence and curl; integral theorems of vectors. Conversionofavectorfromonecoordinatesystemtoanother.

Unit-II

Static Electric Field
Coulomb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energydensity.

Unit-III

Conductors, Dielectrics and Capacitance
Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric materials, Capacitance, Capacitance of a two wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation, Application of Laplace's and Poisson's equations.

Unit-IV

Static Magnetic Fields and Maxwell's Equations:
Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials.
Steady magnetic fields produced by current carrying conductors. Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions.
Maxwell's equations in differential and integral forms and their physical significances in circuit and field theory.
Text / References:
1. M.N.O.Sadiku,"ElementsofElectromagnetics",OxfordUniversityPublication,2014.
2. A.Pramanik,"Electromagnetism-Theoryandapplications",PHILearningPvt.Ltd,New Delhi,2009.
3. A. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India,2012.
4. G. W. Carter, "The electromagnetic field in its engineering aspects", Longmans,1954.
5. W.J.Duffin,"ElectricityandMagnetism",McGrawHillPublication,1980.
6. W.J.Duffin,"AdvancedElectricityandMagnetism",McGrawHill,1968.
7. E. G. Cullwick, "The Fundamentals of Electromagnetism" , Cambridge University Press, 1966.
8. B. D. Popovic, "Introductory Engineering Electromagnetics", Addison-Wesley Educational Publishers, International Edition,1971.
9. W. Hayt, "Engineering Electromagnetics", McGraw Hill Education,2012.

Note: The paper setter will set the paper as per the question paper templates provided.

EE -210A	Electrical Machines Lab-II						
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
-	**-**	**2**	**1**	**60**	**40**	**100**	**3h**

LIST OF EXPERIMENTS:

1) To perform load test on a 3-phase induction motor & DC generator set and to determine the efficiency of induction motor.
2) Determine mechanical losses by light running of a 3-phase induction motor.
3) Study and starting of 1-phase induction motor. To perform light running and block rotor test and to determine the parameters of the equivalent circuit.
4) To perform the open circuit test and block rotor test on 3-phase induction motor and draw the circle diagram.
5) To perform & study effect of rotor resistance on a poly phase slip ring induction motor.
6) To calculate regulation by synchronous impedance method:-
a) Conduct open and short circuit test on a three phase alternator.
b) Determine and plot variation of synchronous impedance with If
c) Determine SCR
d) Determine regulations for 0.8 lagging power factor, 0.8 leading power factor and unity PF.
7) To plot V curves of a synchronous machine.
a) Determination of Xo of a synchronous machine.
b) Measurement Xd&Xq (Direct axis and Quardrature axis reactance) by slip test
8) To measure Xq of synchronous machine (negative sequence reactance).
9) To calculate regulation by ZPF method.
10) To perform and study parallel operation of synchronous generators.
Note: At least eight experiments should be performed from above list.

EE -212A				Power Electronics Lab			
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
-	-	**2**	**1**	**60**	**40**	**100**	**3h**

LIST OF EXPERIMENTS:

1. To Plot the firing characteristics of given silicon control rectifier.
a. By varying the gate current Ig keeping forward voltage Vak fixed.
b. By varying forward voltage Vak keeping gate current fixed.
2. To study the V-I characteristics of given UJT. To plot graph between Ve and Ie . To find negative resistance from the graph.
3. To plot V-I characteristics of given Triac in I and III quadrant.
4. To plot the drain characteristics of given F.E.T & to evaluate the parameter rd, Idss.
5. To study the UJT based relaxation oscillator & to evaluate the dynamic resistance.
6. To study & draw the characteristics of DC-DC chopper power circuit
7. To study the characteristics of single phase fully controlled converter circuit.
8. To study the characteristics of 3-phase fully controlled converter power circuit.
9. To study single phase Mc Murray Inverter power circuit.
10. To study single phase cyclo-converter circuit.

Note: At least eight experiments should be performed from above list.

EEN -214A			Digital Electronics Lab				
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3h

LIST OF EXPERIMENTS:

1) Study of TTL gates- AND, OR, NOR, NAND, NOT, EX-OR, EX-NOR.
2) Design & realize a given function using K-Map and verify its performance.
3) To verify the operation of multiplexer & Demultiplexers.
4) To verify the operation of comparator.
5) To verify the truth tables of S-R, J-K, T& D type flip flops
6) To verify the operation of bi-directional shift register.
7) To design & verify the operation of 3-bit synchronous counter.
8) To design and verify the operation of synchronous UP/DOWN decade counter using JK flip flop & drive a seven segment display using the same.
9) To design and verify the operation of asynchronous UP/DOWN decade counter using JK flip flop & drive a seven segment display using the same.
10) To design and realize sequence generator for a given sequence using JK Flip flop.
11) Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
12) Design a 4-bit shift register and verify its operation of a ring counter and a Johnson counter.
Note: At least ten experiments should be performed from above list.

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution ofIndia.
Scheme of the fundamentalrights

UNIT -II

The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and theStates.
Parliamentary Form of Government in India – The constitution powers and status of the President ofIndia

UNIT - III

Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments inIndia.
Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme inIndia.

UNIT-IV

Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article19.Scope of the Right to Life and Personal Liberty under Article21.

Text Books

1. Constitution of India. Prof.Narender Kumar (2008) 8[th]edition. Allahabad LawAgency.
ReferenceBooks:

1. The constitution of India. P.M. Bakshi (2016) 15[th]Edition. Universal lawPublishing.
   Note: The paper setter will set the paper as per the question paper templates provided.

KURUKSHETRA UNIVERSITY KURUKSHETRA

Bachelor of Technology (Electrical & Electronics Engineering) (Credit Based)
Scheme of Studies/Examination (Modified)
Semester III (w.e.f. session 2019-2020)

Sr. No.	Course No.	Subject	L:T:P	Hours/Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	*EE-201A	**Electric Circuit Theory**	3:1:0	4	4	75	25	0	100	3
2	BS-201A	Optics & Waves	3:0:0	3	3	75	25	0	100	3
3	*EE-205A	**Electrical Machines - I**	3:1:0	4	4	75	25	0	100	3
4	EEN-205A	Analog Electronics	3:0:0	3	3	75	25	0	100	3
5	EEN -209A	Signals and Systems	3:1:0	4	4	75	25	0	100	3
6	*EE-211A	**Electrical Machines Lab – I**	0:0:2	2	1	-	40	60	100	3
7	EEN -207A	Analog Electronics Lab	0:0:2	2	1	-	40	60	100	3
8	EEN -211A	Signal and Systems Lab	0:0:2	2	1	-	40	60	100	3
9	**EEN-215A	Industrial Training-I	2:0:0	2	-	-	100	-	100	3
10	***MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3
		Total		29	21	375	245	180	800	

* Subjects Common with III Semester. B.Tech. [Electrical Engg.] Scheme, K.U.K.

**EEN-215A is a mandatory credit-less 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 qualify.

 ***MC-901A is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

KURUKSHETRA UNIVERSITY KURUKSHETRA
Bachelor of Technology (Electrical & Electronics Engineering) (Credit Based)
Scheme of Studies/Examination (Modified)
Semester IV (w.e.f. session 2019-2020)

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	BS-207A	Applied and Computational Mathematics	3:0:0	3	3	75	25	0	100	3
2	HM-903A	Soft Skills & Interpersonal Communication	3:0:0	3	3	75	25	0	100	3
3	*EE- 206A	**Electrical Machines – II**	3:1:0	4	4	75	25	0	100	3
4	*EE-208A	**Power Electronics**	3:0:0	3	3	75	25	0	100	3
5	EEN-210A	Digital Electronics	3:0:0	3	3	75	25	0	100	3
6	EEN -202A	Basics of Analog Communication	3:0:0	3	3	75	25	0	100	3
7	*EE-214A	**Electrical Machines Lab - II**	0:0:2	2	1	-	40	60	100	3
8	*EE-216A	**Power Electronics Lab**	0:0:2	2	1	0	40	60	100	3
9	EEN-218A	Digital Electronics Lab	0:0:2	2	1	-	40	60	100	3
10	**MC-902A	Constitution of India	3:0:0	3	-	75	25	0	100	3
		Total		28	22	450	270	180	900	

* Subjects Common with IV Semester. B.Tech. [Electrical Engg.] Scheme, K.U.K.

**MC-202A 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.

EE-201A				Electric Circuit Theory			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with electric network function and network synthesis.						
Course Outcomes							
CO1	Apply network theorems for the analysis of electrical circuits.						
CO 2	Obtain the transient and steady-state response of electrical circuits.						
CO 3	Analyse circuits in the sinusoidal steady-state (single-phase and three-phase).						
CO 4	Analyse two port circuit behavior.						

Unit-I

Solution of First and Second order networks:
Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.

Unit-II

Electrical Circuit Analysis Using Laplace Transforms
Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros, series and parallel resonances

Unit-III

Two Port Network and Network Functions:
Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.

UNIT-IV

Network Synthesis:
Hurwitz polynomials**,** Properties of Hurwitz polynomials**,** Positive real functions, procedure of testing of PR functions, concept and procedure of network synthesis, properties of expressions of driving point immitances of LC networks. LC Network synthesis: Foster's I & II Form, Cauer's I & II form, RC & RL Network.

Suggested Books:
1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.
3. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
4. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
5. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.

Note: The paper setter will set the paper as per the question paper templates provided.

BS – 201A				Optics and Waves			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the fundamentals of wave and optics for the applications in Engineering field.						
Course Outcomes							
CO1	Familiarize with basic phenomenon used in propagation of waves.						
CO 2	Introduce the fundamentals of interference, diffraction, polarization and their applications.						
CO 3	To make the students aware to the importance of Laser in technology.						

Unit - I

Waves: Travelling waves, Characteristics of waves, Mathematical representation of travelling waves, General wave equation, Phase velocity, Light source emit wave packets, Wave packet and Bandwidth, Group velocity and real light waves.

Propagation of light waves: Maxwell's equations, Electromagnetic waves and constitutive relations, Wave equation for free-space, Uniform plane waves, Wave polarization, Energy density, the pointing vector and intensity, Radiation pressure and momentum, Light waves at boundaries, Wave incident normally on boundary, Wave incident obliquely on boundary: law of reflection, Snell's law and reflection coefficients.

Unit - II

Interference: Principle of Superposition, Conditions for Sustained interference, Young's double slit experiment, Division of wave-front: Fresnel's Biprism and its applications, Division of amplitude: Interference due to reflected and transmitted light, Wedge-shaped thin film, Newton's rings and its applications, Michelson Interferometer and its applications.

Unit – III

Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit, Plane transmission diffraction grating: theory, secondary maxima and secondary minima, width of principal maxima, absent spectra, overlapping of spectral lines, determination of wavelength; Dispersive power and resolving power of diffraction grating.

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, Biquartz polarimeter.

Unit – IV

Laser: Stimulated Absorption, Spontaneous and Stimulated Emission; Einstein's Coefficients and its derivation, Population Inversion, Direct and Indirect pumping, Pumping schemes, Main components of Laser, Gas lasers (He-Ne, CO_2), Solid state lasers (Ruby, Neodymium, semiconductor), Dye laser, Characteristics of Laser, Applications of Laser.

Text/Reference Books:
1. P.K. Diwan, Applied Physics for Engineers, *Wiley India Pvt. Ltd*., *India*
2. N. Subrahmanyam, B. Lal, M.N. Avadhanulu, A Textbook of Optics, *S. Chand & Company Ltd*., *India.*
3. A. Ghatak, Optics, *McGraw Hill Education (India) Pvt. Ltd., India*.
4. E. Hecht, A.R. Ganesan, Optics, *Pearson India Education Services Pvt. Lt., India.*
Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

EE-205A	Electrical Machines-I

L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with electric machines and transformer.						
Course Outcomes							
CO1	To understand concept ,working, operation, maintenance of single phase transformer						
CO 2	To understand concept ,working, operation, maintenance of three phase transformer & conversion from three phase to multiple phases						
CO 3	To understand construction ,working, operation of D.C. Generator						
CO 4	To understand concept ,working, operation, testing of D.C. Motor						

UNIT – I

TRANSFORMERS:

Principle, construction of core, e.m.f. equation, winding &tank, cooling, operation, testing of single phase transformer, equivalent circuit, phasor diagram, parameters determination, P.U representation of parameters, regulation, losses & efficiency, separation of iron losses, parallel operation,all-day efficiency, Sumpner's test, specifications of transformer, maintenance of transformer, difference between power transformer and distribution transformer.

UNIT – II

Three phase transformer: Types and their comparative features, Zig-zag connection.
Auto-Transformer: Principle, construction, comparison with two winding transformers, applications.
Nature of magnetizing current: plotting of magnetizing current from B-H curve, inrush current.
Phase-Conversion: Three to two phase, three to six phase and three to twelve phase conversions. Introduction to three windings transformer, tap-changing & phase- shifting transformers.

UNIT – III

D.C. Generator-Principle & construction of D.C. generator, simplex lap,wave winding, E.M.F. equation, types, voltage build up, armature reaction, compensating winding, function of commutator, methods of improving

commutation, load characteristics, parallel operation.
Excitation System—Purpose and requirements of excitation system, brushless excitation system.

UNIT- IV

D.C. Motor-

Principle of DC motors, function of commutator in DC motors, torque and output power equations, load characteristics, losses, starting, starters, speed control, braking, testing , Swinburne test, Hopkinson test, Ward Leonard Method, efficiency & applications.

Suggested Books:
1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
5. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

Note: The paper setter will set the paper as per the question paper templates provided.

EEN- 205A	Analog Electronics						
L	T	P	Credit	Major	Minor Test	Total	Time

				Test			
3	-	-	3	75	25	100	3h
Purpose	To familiarize the students with rectifier, oscillator and amplifier circuits.						
Course Outcomes							
CO1	Understand the characteristics of transistors.						
CO 2	Design and analyse various rectifier and amplifier circuits.						
CO 3	Design sinusoidal and non-sinusoidal oscillators.						
CO 4	Understand the functioning of OP-AMP and design OP-AMP based circuits.						

Unit-I

Diode circuits:

P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes, clamping and clipping circuits.

Unit-II

BJT circuits:

Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, common-emitter, common-base and common-collector amplifiers; Small signal equivalent circuits, high-frequency equivalent circuits

Unit-III

MOSFET circuits: MOSFET structure and I-V characteristics. MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers

Oscillators : Barkhausen criteria, Wein Bridge, RC phase shift, Colpitts & Hartley oscillator . Multivibrators using transistor, crystal oscillator.

Unit-IV

Differential, multi-stage and operational amplifiers: Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)

Suggested Books:

1.A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford University Press, 1998.

2.J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.

3.J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 1988.

4.P. Horowitz and W. Hill, "The Art of Electronics", Cambridge University Press, 1989.

Note: The paper setter will set the paper as per the question paper templates provided.

EEN- 209A	Signals & Systems						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h

Purpose	To familiarize the students with signal and system.
Course Outcomes	
CO1	Introduce and classify signals and systems based on their properties.
CO 2	To understand the basic concepts of random variables and Linear time invariant systems.
CO 3	To understand the basic concepts of fourier and laplace transform.
CO 4	Understand sampling theorem and its implications.

Unit-I

Introduction to Signals:

Continuous and discrete time signals, deterministic and stochastic signals, periodic and aperiodic signals, even and odd signals, energy and power signals, exponential and sinusoidal signals and singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation.

Introduction to Systems:

Linear and non-linear systems, time invariant and time varying systems ,lumped and distributed systems, deterministic and stochastic systems, casual and non-causal systems, analog and discrete/digital memory and memory less systems.

Unit-II

Linear Time Invariant Systems: Introduction to linear time invariant (LTI) systems, properties of LTI systems,convolution integral, convolution sum, causal LTI systems described by differential and difference equations. Concept of impulse response.

Unit-III

Fourier and Laplace Transform:

Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT). Parseval's Theorem. Review of the Laplace Transform for continuous time signals and systems, system functions, poles and zeros of system functions and signals, Laplace domain analysis, solution to differential equations and system behavior.

Unit-IV

Sampling and Reconstruction:

The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects. Relation between continuous and discrete time systems.

Suggested Books:

1. Oppenheim, Willsky, Nawab, Signals and Systems, Prentice Hall India, 2nd Edition, 2009
2. Simon Haykins – "Signal & Systems", Wiley Eastern
3. Tarun Kumar Rawat, Signals and Systems, Oxford University Press.

 Note: The paper setter will set the paper as per the question paper templates provided.

EE -211A				Electrical Machines Lab-I			
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3h

LIST OF EXPERIMENTS:

1. To find turns ratio, polarity & mark dot convention of a 1-phase transformer.
2. To perform open & short circuit tests on a 1-phase transformer& find parameters.
3. To perform Sumpner's Back to Back test on 1-phase transformer& find parameters.
4. Parallel operation of two 1-phase transformers and observe load sharing.
5. To convert three phase supply to 2-phase by Scott-connection, compare line currents theoretically& practically for unbalanced load.
6. To perform load test on DC shunt generator & find efficiency& observe speed at different load.
7. Speed control of DC shunt motor by armature & field control method, draw graph between speed & field current.
8. To perform Swinburne's test of DC shunts motor and find efficiency.
9. To perform Hopkinson's test of DC shunts M/Cs.
10. To perform Ward Leonard method for speed control DC shunts motor.
11. To make various types of three phase connections , using three single phase transformers, study relevant features
12. Characteristics for compound, series shunt generators.

Note: At least eight experiments should be performed from above list.

EEN -207A			Analog Electronics Lab				
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3h

List of Experiments:

1. To Design a simple common emitter (CE) amplifier Circuit and find its gain and frequency response.
2. To Design a differential amplifier and calculate its gain and frequency response
3. To design RC coupled Single stage amplifier and determination of the gain , frequency response.
4. To design a Emitter follower and determination of the gain, input and output impedances.
5. To design and test the performance of RC Phase shift Oscillator.
6. To design and test the performance of Hartley Oscillators.
7. To design and test the performance of Colpitt Oscillators.
8. To design an astable multivibrator using 555 timer.
9. To design a monostable multivibrator using 555 timer.
10. To design Schmitt trigger using op-amp and verify its operational characteristics.

Note: At least eight experiments should be performed from above list.

EEN -211A	Signal and Systems Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	2	1	60	40	100	3h

LIST OF EXPERIMENTS

1) To demonstrate some simple signal.
2) To explore the effect of transformation of signal parameters (amplitude-time-scaling and time-shifting).
3) To explore the various properties of the impulse signals.
4) To visualize the complex exponential signal and real sinusoids.
5) To identify a given system as linear or non-linear.
6) To explore the time variance and time invariance property of a given system.
7) To explore causality and non-causality property of a system.
8) To visualize the relationship between the continuous-time Fourier series and Fourier transform of a signal.
9) To visualize the relationship between the discrete-time Fourier series and Fourier transform of a signal.
10) To visualize the relationship between continuous-time and discrete-time Fourier transform of a signals.
11) To demonstrate the time domain sampling of band limited signals (Nyquist theorem).
12) To demonstrate the time domain sampling of non-band limited signals and anti aliasing filter.
13) To demonstrate the signal reconstruction using zero-order hold and first-order hold filters.
14) To demonstrate the sampling in frequency domain (Discrete Fourier Transform).
15) To demonstrate the spectral analysis using Discrete Fourier Transform.

Note: At least eight experiments should be performed from above list.

EEN-215A				INDUSTRIAL TRAINING-I				
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Practical	Total	Time (Hrs.)
2	0	0	--	--	100	--	100	3 h
Purpose	To provide comprehensive learning platform to students where they can enhance their employ ability skills and exposure to the industrial environment.							
Course Outcomes								
CO1	Capability to acquire and apply fundamental principles of engineering.							
CO 2	Become updated with all the latest changes in technological world.							
CO 3	Capability and enthusiasm for self-improvement through continuous professional development and life-long learning							
CO 4	Awareness of the social, cultural, global and environmental responsibility as an engineer.							

Note: EEN-215A 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 qualify.

The candidate has to submit a training report of his/her work/project/assignment completed in the industry during the training period. The evaluation will be made on the basis of submitted training report and viva-voce/presentation.

MC-901A				Environmental Sciences			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

BS-207A		APPLIED AND COMPUTATIONAL MATHEMATICS					
LECTURE	TUTORIAL	PRACTICAL	CREDIT	MAJOR TEST	MINOR TEST	TOTAL	TIME
3	-	-	3	75	25	100	3 H
Purpose	The objective of this course is to familiarize the prospective Engineers with ordinary and partial differential equations, Laplace Transform which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						
Course Outcomes							
CO 1	To introduce the Ordinary & Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.						
CO 2	To study some extended topics in calculus essential for computations w.r.t. parameter variations ,vectors and field theory.						
CO 3	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.						
CO 4	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.						

UNIT-1

ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS

ODE: 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.
Second order linear differential equations with constant coefficients.

PDE: Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-2

ADVANCE CALCULUS

Multivariable Calculus: Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar and) Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere .
Vector Calculus: Gradient, divergence and Curl and their properties, Directional derivative. Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

UNIT-3

LAPLACE TRANSFORM

Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-4

NUMERICAL TECHNIQUES

Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Lagrange's formulae.
Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule, Taylor's series, Runge-Kutta method for solving first and second order equations.

Textbooks/References:

1. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.
2. W. E. Boyce and R. C. Di Prima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India,
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
6. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall.
7. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
8. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
9. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
10. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
11. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
12. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
13. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
14. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Note: The Examiner will be given the question paper template to set the questions.

HM- 903A	Soft Skills & Interpersonal Communication						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 Hrs.
Course Outcomes (CO)							
CO1	Develop basic understanding of Communication						
CO2	Understand the process of communication and speaking						
CO3	Develop the Personality concepts and its implementation						
CO4	Develop the basic of Group Discussion and interviews						

UNIT-I

Communication: Introduction Verbal, Non-Verbal, kinesics, proxemics, chronemics, Types of communication, extrapersonal communication, intrapersonal communication, intrapersonal communication, mass communication,Creativity in communication, Role of communication, flow of Communication and its need, Persuasive communication and negotiation;Time management in Persuasive communication, Importance of Persuasive Communication

UNIT-II

Barriers in the way of communication, noise, intrapersonal barriers, interpersonal barriers,organizational barriers, Extrapersonal barriers, Basics of communication:importance of communication,process of communication, objectives and characteristics of communication,Communication skills: Accent, Intonation, Phonetics, Speaking skills, Confidence, clarity, Fluency,Quality,pronunciation

UNIT-III

Personality Development; what is personality? Role of personality,Heredity, Environment, situation, Basics of personality, Soft skills; Needs and training, Activity in soft skills, Organizational skill;introduction and its need

,basics principles for Organization skills,Stress management;Introduction, Stress at home and office, Stress prevention, analyze the model of stress.

UNIT-IV

Group discussion, form of Group discussion, strategy for Group discussion, discussing problems and solution, Oral presentation, introduction, planning, Occasion, Purpose, Modes of delivery, Resume making;Purpose of Resume, Resume design and structure, contents in Resume, types of resume, Job interview, introduction, objective of Interview, types of interview, stages of interview,Face to face interview and campus interview

Text Books:

1.Technical Communication Principles and Practice by Meenakshi Raman and Sangeeta Sharma by Oxford Publication

Reference Books:

1. Personality Development and soft skills by Barun K. Mitra, Oxford Publication
2. Communication Skills For Engineers by C.Muralikrishna and Sunita Mishra, Pearson Pub.

Note: Separate paper **template** will be provided to the paper setter for setting the question paper of end term semester examinations.

EE-206A				Electrical Machines-II			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	1	-	4	75	25	100	3h
Purpose	To familiarize the students with the basics of Electrical Machines						
Course Outcomes							
CO1	Understand the concepts of rotating magnetic fields.						
CO 2	Understand the operation of ac machines.						
CO 3	Analyse performance characteristics of ac machines.						
CO 4	Analyse synchronous machine						

UNIT-I

Induction Machines:
Basic concept of Induction machines: winding factors, generated e.m.f. and m.m.f distribution, a.c. winding, rotating magnetic field.

3-phase Induction Motor: Construction, features, production of torque, phasor diagram, equivalent circuit, performance analysis, torque -slip characteristics, running, light and blocked rotor test, load test on 3-ph I.M.

UNIT-II

Single phase induction motors:-
Constructional features & double revolving field theory, equivalent circuit, determination of parameters. Split phase, starting methods, types& applications.

Starting of 3-ph I.M. Starting methods of squirrel cage and wound rotor induction motor.

Induction Generator-Operation, applications, advantages.

UNIT-III

Three Phase Synchronous Generators:
Principle, construction, EMF equation, armature winding, armature reaction, equivalent circuit, voltage regulation - synchronous reactance method , Rothert's m.m.f method, Potier triangle method, Output power equation, power angle curve, two reactance theory, slip test, Transient and subtransient reactance, synchronization, parallel operation.

UNIT-IV

Three Phase Synchronous Motor: Construction, Principle of operation, Equivalent circuit, torque, power developed, starting, V-curve, Hunting-causes , effects & reduction , synchronous condenser applications. Comparison between induction motor and synchronous motor, high startig torque motors.

Suggested Books:
1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
4. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
5. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.

Note: The paper setter will set the paper as per the question paper templates provided.

EE-208A	Power Electronics						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To familiarize the students with the Converter and Power switching device						
Course Outcomes							
CO1	Understand the differences between signal level and power level devices.						
CO 2	Analyse controlled rectifier circuits.						
CO 3	Analyse the operation of DC-DC choppers.						
CO 4	Analyse the operation of voltage source inverters.						

UNIT-I

Power switching devices :
Diode, Thyristor, MOSFET, IGBT: I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET and IGBT.

UNIT-II

Thyristor rectifiers
Single-phase half-wave and full-wave rectifiers, Single-phase full-bridge thyristor rectifier with Rload and highly inductive load; Three-phase full-bridge thyristor rectifier with R-load and highly inductive load; Input current wave shape and power factor.

UNIT-III

DC-DC buck converter:
Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage, power circuit of a buck converter, analysis and waveforms at steady state, duty ratio control of output voltage.

DC-DC boost converter:
Power circuit of a boost converter, analysis and waveforms at steady state, relation between duty ratio and average output voltage.

UNIT-IV

Single-phase voltage source:
Power circuit of single-phase voltage source inverter, switch states and instantaneous output voltage, square wave operation of the inverter, concept of average voltage over a switching cycle, bipolar sinusoidal modulation and unipolar sinusoidal modulation, modulation index and output voltage.

Suggested Books:
1. M. H. Rashid, "*Power electronics: circuits, devices, and applications*", Pearson Education India, 2009.
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
3. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007.
4. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.

Note: The paper setter will set the paper as per the question paper templates provided.

EEN-210A	Digital Electronics

L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To familiarize the students with the logic device.						
Course Outcomes							
CO1	To understand fundamentals of Digital techniques, Binary codes.						
CO 2	To design basic circuits using Gates and MSI Devices						
CO 3	To understand design of synchronous and Asynchronous sequential circuits A/D and D/A convertors						
CO 4	Concept of Digital logic families, programmable logic devices						

Unit-I

Fundamentals of Digital Techniques:

Digital signal, review of number systems, binary codes, BCD, Excess-3, Gray, EBCDIC, ASCII, logic gates-AND, OR, NOT, NAND, NOR, EX-OR, Boolean algebra, Error detection and correction, hamming code.

Unit-II

Combination Design using Gates:

Design using gates, K- map and Quine-Mccluskey methods of simplification.

Combinational design using MSI Devices

Multiplexers and Demultiplexers and their uses as logic elements, Decoders, Adders/Subtracters, BCD arithmetic circuits, Encoders, Decoders/Drivers for display devices.

Unit-III

Design of Sequential circuits:

Flip flops: S-R, J-K, T,D, master slave, edge triggered, shift registers, sequence generators, counters-asynchronous and synchronous, ring counters and Johnson Counter.

D/A &A/D Converters:

D/A converters- weighted resistor and R-2 R ladder, specifications for D/A converters, A/D converters: Sample and hold circuits, Quantization, Parallel-comparator, successive approximation, counting type, dual slope ADC,

specifications of ADCs.

Unit-IV

Digital logic families:

Logic families: TTL, ECL, MOS, and CMOS logic families. Tristate logic, interfacing of CMOS and TTL families.

Programmable logic devices: ROM, PLA, PAL, FPGA and CPLDS.

Suggested Books:

1. Modern Digital Electronics (Edition III) : R.P. Jain, TMH.
2. Digital Integrated Electronics: Taub& Schilling, MGH
3. Digital Principles and Applications: Malvino & Leach, MG

Note: The paper setter will set the paper as per the question paper templates provided.

EEN-202A	Basic of Analog Communication						
L	T	P	Credit	Major	Minor Test	Total	Time

				Test			
3	-	-	3	75	25	100	3h
Purpose	To familiarize the students with the communication and Modulation technique.						
Course Outcomes							
CO1	Basics of communication & noise generation.						
CO 2	Amplitude modulation, concept of SSB waves & DSBSC,VSB Modulation						
CO 3	Concept of TDM, FDM, PAM and Digital communication.						
CO 4	Concept of Pulse code modulation, differential pulse code modulation						

Unit-I

Introduction to Communication Systems:

The essentials of a communication system, modes and media's of communication, introduction to wired and wireless media, classification of signals and systems, Fourier Analysis of signals.

Introduction to noise:

External noise, internal noise, S/N ratio, noise figure, Noise in reactive circuits.

Unit-II

Modulation Techniques: Basic constituents of Communication Systems, need of modulation, Amplitude modulation, spectrum AM Wave , modulation index, DSBSC modulation, Collector modulation, Square law modulation methods of generating SSB Signals, vestigial side band modulation, Detection of AM Signal; Diode detector, Square Law Detector. Time Constant RC in diode detector. Diode detector with filter. FDM, Power relations in AM wave.

UNIT III

Angle Modulation : Frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Secley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT IV

Transmitter & Receiver: Classification of radio transmitters, Block diagram of FM transmitter, Privacy devices Armstrong FM transmitter, Simple FM transmitter using Reactance modulator. Classification of radio receivers, TRF receives, superheterodyne receivers, Image Signal rejection, frequency mixers. Tracking and alignment of receivers, Intermediate frequency, AGC, AFC, SSB receiver.

Suggested Books:

1. Principle of communication of engineering : By Umesh Sinha.
2. Communication system By R.Singh & S. D. Sapre (TMH)
3. Electronics communication system By George Kenddy (TMH)
4. Communication system B**y** Taub Schilling.(TMH)

Note: The paper setter will set the paper as per the question paper templates provided.

EE -214A	Electrical Machines Lab-II						
L	T	P	Credit	Practical	Minor Test	Total	Time

-	-	2	1	60	40	100	3h

LIST OF EXPERIMENTS:

1) To perform load test on a 3-phase induction motor & DC generator set and to determine the efficiency of induction motor.

2) Determine mechanical losses by light running of a 3-phase induction motor.

3) Study and starting of 1-phase induction motor. To perform light running and block rotor test and to determine the parameters of the equivalent circuit.

4) To perform the open circuit test and block rotor test on 3-phase induction motor and draw the circle diagram.

5) To perform & study effect of rotor resistance on a poly phase slip ring induction motor.

6)To calculate regulation by synchronous impedance method:-

a) Conduct open and short circuit test on a three phase alternator.

b) Determine and plot variation of synchronous impedance with If

c) Determine SCR

d) Determine regulations for 0.8 lagging power factor, 0.8 leading power factor and unity PF.

7) To plot V curves of a synchronous machine.

a) Determination of Xo of a synchronous machine.

b) Measurement Xd&Xq (Direct axis and Quardrature axis reactance) by slip test

8) To measure Xq of synchronous machine (negative sequence reactance).

9) To calculate regulation by ZPF method.

10) To perform and study parallel operation of synchronous generators.

Note: At least eight experiments should be performed from above list.

EE -216A			Power Electronics Lab					
L	T	P	Credit	Practical	Minor Test	Total	Time	

-	-	2	1	60	40	100	3h	

LIST OF EXPERIMENTS:

1. To Plot the firing characteristics of given silicon control rectifier.
a. By varying the gate current Ig keeping forward voltage Vak fixed.
b. By varying forward voltage Vak keeping gate current fixed.
2. To study the V-I characteristics of given UJT. To plot graph between Ve and Ie . To find negative resistance from the graph.
3. To plot V-I characteristics of given Triac in I and III quadrant.
4. To plot the drain characteristics of given F.E.T & to evaluate the parameter rd, Idss.
5. To study the UJT based relaxation oscillator & to evaluate the dynamic resistance.
6. To study & draw the characteristics of DC-DC chopper power circuit
7. To study the characteristics of single phase fully controlled converter circuit.
8. To study the characteristics of 3-phase fully controlled converter power circuit.
9. To study single phase Mc Murray Inverter power circuit.
10. To study single phase cyclo-converter circuit.

Note: At least eight experiments should be performed from above list.

EEN -218A	Digital Electronics Lab							
L	T	P	Credit	Practical	Minor Test	Total	Time	

-	-	2	1	60	40	100	3h

LIST OF EXPERIMENTS:

1) Study of TTL gates- AND, OR, NOR, NAND, NOT, EX-OR, EX-NOR.
2) Design & realize a given function using K-Map and verify its performance.
3) To verify the operation of multiplexer &Demultiplexers.
4) To verify the operation of comparator.
5) To verify the truth tables of S-R, J-K, T& D type flip flops
6) To verify the operation of bi-directional shift register.
7) To design & verify the operation of 3-bit synchronous counter.
8) To design and verify the operation of synchronous UP/DOWN decade counter using JK flip flop & drive a seven segment display using the same.
9) To design and verify the operation of asynchronous UP/DOWN decade counter using JK flip flop & drive a seven segment display using the same.
10) To design and realize sequence generator for a given sequence using JK Flip flop.
11) Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
12) Design a 4-bit shift register and verify its operation of a ring counter and a Johnson counter.
Note: At least ten experiments should be performed from above list.

MC-902A	Constitution of India

Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books

1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency.

Reference Books:

1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

Bachelor of Technology (Food Technology)
Credit-Based
SCHEME OF STUDIES/EXAMINATIONS (Modified)
Semester – III (w.e.f. session 2019-20)

S. No.	Course No.	Course Title	Teaching Schedule				Credits	Allotment of Marks				Duration of Exam (Hrs.)
			L	T	P	Hours/Week		Major Test	Minor Test	Practical	Total	
1	FTT-201A	Food Microbiology	3	0	0	3	3.0	75	25	0	100	3
2	FTT-203A	Food chemistry	3	0	0	3	3.0	75	25	0	100	3
3	FTT-205A	Unit Operation In Food Engg. – I	3	0	0	3	3.0	75	25	0	100	3
4	FTT-207A	Food processing	3	0	0	3	3.0	75	25	0	100	3
5	FTT -211L A	Food Microbiology Lab	0	0	3	3	1.5	0	40	60	100	3
6	FTT – 213LA	Food chemistry Lab	0	0	4	4	2.0	0	40	60	100	3
7	FTT – 215 LA	Unit Operation In Food Engg. - I Lab	0	0	4	4	2.0	0	40	60	100	3
8	FTT – 217 LA	Food processing Lab	0	0	4	4	2.0	0	40	60	100	3
		Total	**12**	**0**	**15**	**27**	**19.5**	**300**	**260**	**240**	**800**	
9	FTT-219A	Industrial Training-I	2	0	0	2	-	-	100	-	100	-
10	*MC-902A	Constitution of India	3	0	0	3		75	25	0	100	3

Note: FTT-219 A is a mandatory credit less course in which the students evaluated for the industrial training undergone after 2nd semester and students will be required to get passing marks to qualify.

*MC-902A is a mandatory credit less course in which the student will be required to get passing marks in the major test.

Bachelor of Technology (Food Technology)
Credit-Based
SCHEME OF STUDIES/EXAMINATIONS (Modified)
Semester – IV (w.e.f. session 2019-20

S. No.	Course No.	Course Title	Teaching Schedule				Credits	Allotment of Marks				Duration of Exam (Hrs.)
			L	T	P	Hours/ Week		Major Test	Minor Test	Practical	Total	
1	FTT-202A	Human Nutrition	3	0	0	3	3.0	75	25	0	100	3
2	FTT- 204A	Thermal Processing	3	0	0	3	3.0	75	25	0	100	3
3	FTT – 206A	Unit Operation In Food Engg. – II	3	0	0	3	3.0	75	25	0	100	3
4	FTT- 208 A	Dairy Technology	3	0	0	3	3.0	75	25	0	100	3
5	FTT-210A	Fruit and Vegetable Processing	3	0	0	3	3.0	75	25	0	100	3
6	FTT- 214LA	Thermal Processing Lab	0	0	3	3	1.5	0	40	60	100	3
7	FTT -216LA	Unit Operation In Food Engg. - II Lab	0	0	3	3	1.5	0	40	60	100	3
8	FTT-218LA	Dairy Technology Lab	0	0	3	3	1.5	0	40	60	100	3
9	FTT-220LA	Fruit and Vegetable Processing Lab	0	0	3	3	1.5	0	40	60	100	3
		Total	**15**	**0**	**12**	**27**	**21**	**375**	**285**	**240**	**900**	
10	MC-901A*	Environmental Sciences*	3	0	0	3		75	25	0	100	3

*MC-901Ais 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.

FTT-201A				Food Microbiology				
L	T	P	Credit	Major Test	Minor Test	Total	Time	
3	-	-	3	75	25	100	3h	
Purpose	To introduce the Basics concept of Microbiology.							
Course Outcomes(CO)								
CO 1	To teach about the history and scope of food microbiology.							
CO 2	To learn about the role of microorganisms in different foods.							
CO 3	To impart knowledge of different fermented foods produced by microorganisms.							
CO 4	Describe the microbial spoilage and food borne diseases and their control.							

Unit-I

Introduction – History of microbiology, cellular organization- eukaryotic and prokaryotic organisms, Food borne and related organisms-bacteria, yeast, molds & viruses. Importance of microorganism in food industry.

Unit-II

Type & Growth Pattern- Growth pattern in microbes, relationship between number of generations and total number of microbes., physical & chemical factors affecting growth and destruction of microbes- aerobes and anaerobes, psychrophiles, psychrotrophs, pedophiles, thermo uric, thermopiles, halophiles, osmophiles & spore formers.

Unit-III

Metabolism & Microbial Techniques:- Fermentation, putrefaction, lipolysis, antagonism and synergism in microorganisms. Rapid methods of microbial analysis: immunoassays, nucleic acid probes & PCR in food analysis. Techniques of pure culture: Definition, Serial Dilution, pour plate, streak plate, spread plate, slant,broth and enrichment culture, lyophilization.

Unit-VI

Food borne infections– Types of food poisonings, important features and control, microbial toxins, mushrooms and algae as foods, probiotics, indicator organisms, detection & quantification of microbes and their products including toxins, sources and control of microorganisms-asepsis, sanitation.
Recommended Books:-

Author	Title
James M. J.	Modern Food Microbiology, 5th Edition, CBS Publishers
W.C. Frazier	Food Microbiology
Bibek Ray	Fundamental Food Microbiology, CRC Press.
Roger. Y. Stainier	General Microbiology', 5th Edn. Macmillan, 1987.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -211LA	Food Microbiology Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	3	1.5	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Food Microbiology.						
Course Outcomes							
CO1	To make the students familiar with the experiments of Microbiology.						
CO2	To give the knowledge of handling of the experiments related with Food Microorganisms.						

Note: Student will be required to perform the following Experiments:--

List of Experiments

1. Working study of various equipments related to Microbiology.

2. Isolation of pure culture using pour plate technique.

3. Isolating pure culture using spread plate technique.

4. Measurement the size of given microbial cell using micrometry.

5. Enumeration total viable count in a culture.

6. To perform Gram staining technique of bacteria.

7. To study the microbial spoilage of given food sample.

FTT-203A				Food chemistry				
L	T	P	Credit	Major Test	Minor Test	Total	Time	
3	-	-	3	75	25	100	3h	
Purpose	To introduce the Basics concept of Food Chemistry.							
Course Outcomes(CO)								
CO 1	To teach about the role of food chemistry in food proseccing.							
CO 2	To learn about the role of biomolecules in food chemistry.							
CO 3	To impart knowledge of different tupes of biomolecules.							
CO 4	Describe the details of Carbohydrates, Proteins, Vit. etc.							

UNIT-I

Introduction:- Development of food chemistry and its role in food processing.

Water: Importance of water in foods. Structure of water & ice. Concept of bound & free water and their implications.

Unit-II

Proteins:-Proteins in human's diet, classification and properties of amino acids, chemicaland physical properties of protein, structure of amino acids, essential and non-essential amino acids, isolation of amino acids, criteria of purity of proteins, separation, qualitative and quatitative analysis of proleins. Changes during processing, protein determination methods.

Carbohydrates: Nomenclature and classification, structure, physical and chemicalproperties of polysaccharides (cellulose, starch, fructans, galactans, hemi-cellulose, pectic substances) and their functions, changes in carbohydrates during processing.

Unit-III

Lipids:-Structure, physical and chemical properties, utilization of fats and oils, margarine, shortenings, salad and cooking oils in diet, introduction to hydrogenation and its importance.

Browning Reactions:- Enzymatic and non-enzymatic browning. Advantages and disadvantages factors affecting their reaction and control.

Vitamins & Minerals:- Types, chemistry and functions, source and deficiency diseases. Changes during Processing

Unit-IV

Enzymes: Nomenclature, mechanism of enzyme action, factors affecting enzyme action, enzymes important in foods.

Pigments: Structure and properties of chlorophyll, anthocyanins, tannin, myoglobin and carotenoids, chemical changes during processing.

Recommended Books

Author	Title
M.C code and Smith	Unit operations of Chemical Engineering
Cadger & Bancharo	Introduction to Chem. Engg

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -213L A	Food Chemistry Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	4	2.0	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Food Chemistry.						
Course Outcomes							
CO1	To make the students familiar with the experiments of Chemistry.						
CO2	To give the knowledge of handling of the experiments related with food chemistry.						

Note: Student will be required to perform the following Experiments:--

List of Experiments

1 Preparation of sample for analysis

2. Determination of acidity/pH of food samples.

3. Qualitative tests for the presence of carbohydrates & Proteins in food samples.

4. Estimation of preservatives, ant oxidation & tannins Estimation of pectin in fruit (Guava).

5. Determination of saponification value and un-saponifiable matter.

6. Determination of vitamin C in food sample.

FTT-205A	Unit Operation In Food Engg. – I						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the Basics concept of Food Chemistry.						
Course Outcomes(CO)							
CO 1	To teach about the Measurement Techniques.						
CO 2	To learn about the role of mixing & Agitation in food Engg.						
CO 3	To impart knowledge of different types of fluid Transport.						
CO 4	Describe the details of Fluidization.						

UNIT-I

Fluid Transport:- Analogy between Momentum, Heat and Mass transfer, Transportestimation, Dependence of velocity on temperature, pressure and composition, boundary conditions, velocity profiles thro pipes & flat plates, annulus space, Euler's equation & its application in stationary & moving fluid bodies, moment urn transport in turbulent flows. Flow of fluids, Nozzies and diffusers, Transportation of fluids, pumps, centrifugal reciprocating, Plunger, gear pump and vaccum pump, compressors, single and multistage, Ejectors.

UNIT-II

How Measurement Techniques: Venturi meter, orifice meter Rotameter, V-notch, Squarenotch and weirs, pitot tube, simple numerical problems.

UNIT-III

Mixing And Agitation: Different type of Agitators such as Propeller, paddle and Turbine,power calculation in agitation for Newtonian and non-Newtonian fluids, various types of mixers such as Ribbon mixer, Halical mixer etc. Mixing index, difference between mixing and Agitation.

UNIT-IV

Fluidization:-Flow through packed beds, Mechanism of fluidization, Minimum porosity,bed height minimum fluidization velocity. Two phase flow, pneumatic conveying and applications.

Recommended Books

Author	Title
Fennama	Food Chemistry
Lehhninger	Principles of Biochemistry
Frank A. Lee	Basic Food Chemistry', Springer Publication, 2013
L.H. Meyer, L.H. Van	Food Chemistry', Reinhold Company Publication, New York
Lehninger	Principles of Biochemistry', Palgrave Macmillan Publication

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -215L A		Unit Operation In Food Engg. - I Lab					
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	4	2.0	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Food Engg.						
Course Outcomes							
CO1	To make the students familiar with the experiments of unit Operation.						
CO2	To give the knowledge of handling of the experiments related with Food Engg.						

Note: Student will be required to perform the following Experiments:--

List of Experiments

1.To study the process of roasting/

2.To study the effect of time- temperature combination on roasting.

3. Determination of oil uptake by the food product during frying

4. Study on qualitative changes in the fried food product

5. To study the puffing/ popping characteristics of selected grains

6. To determine the efficacy of a blanching process

7. To determine time-temperature combination for a blanching process

8. To determine the efficacy of a sterilization process

9. Numerical problem on thermo bacteriology (D, Z and F)

10. Determination of F value for a product in can/ retortable pouch

FTT-207A				Food Processing			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the Basics concept of Food Processing.						
Course Outcomes(CO)							
CO 1	To teach about the Scope & trends in Food Industry.						
CO 2	To learn about the different types of preservation methods.						
CO 3	To impart knowledge of different types of unconventional methods.						
CO 4	Describe the details of asepsis of microorganisms.						

UNIT-I

Scope and Trends in Food Industry:- Status of Indian food industry with emphasis of Jammu and Kashmir. Definition of food-Food technology, Food science, Food preservation and food engineering basic consideration. Importance of Food processing and preservation. Classification of foods on the basis of shelf life, pH, origin: Different types of Food spoilage viz. microbiological, bio-chemical and physical and their effects on food spoilage viz. microbiogical, bio-chemical, Chemical and Physical and their effects on food quality.

UNIT-II

Preservation by sugar and salt:-Principle of salt (pickling, fermentation etc.) and sugar preservation. Preparation of intermediate moisture food (IMF)

Preservation by Low Temperature:-Low temperature required for different foods-Refrigeration-refrigeration load: refrigeration systems: Slow and fast freezing, freezing process: Types of freezer advantages and disadvantages: storage and thawing of frozen food.

Preservation by High Temperature:- Pasteurization, Sterilization, Canning: Definition, advantages and disadvantages, can formation. Unit operations in camming selection of raw material peeling coring. Blanching filling, brining/syruping, exhausting, sealing. Processing, cooling labeling and storage.

UNIT-III

Moisture Removal:-Evaporation, concentration, drying, and dehydration, types of dryers, advantages and disadvantages, operation and maintenance of different drying system, selection of dryers, basics of drying calculations

Chemical preservatives in Food Preservation:-Types of chemical preservativeused in different food products and their stability during processes.

UNIT-IV

Radiation preservation of foods:-Irradiation of Foods, dozes of dozer of irradiation-its effect on food quality
New and unconventional Methods of Processing:-

Principles of :
- High pressure Technology of Food preservation
- Infra Ted (IR) technique
- Microwave heating

Asepsis and removal of micro organism

Recommended Books :-

Author	Title
Norman N. Potter	Principles of Food Processing
Girdhari Lal, G. S. Siddappa, G. L	Preservation of Fruits & Vegetables
P. Fellows	Food Processing Technology: Principles and Practice

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -217L A			Food processing Lab					
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	4	2.0	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Food .							
Course Outcomes								
CO1	To make the students familiar with the experiments of unit Operation.							
CO2	To give the knowledge of handling of the experiments related with Food Engg.							

Note: Student will be required to perform the following Experiments:--

List of Experiments

1. Demonstration of various machineries used in processing.

2. Demonstration of effect of blanching on food quality characteristics.

3. Preservation using heat.

4. Preservation by low temperature.

5. Preservation by high concentration of sugar(Jam/Jelly/Marmalade /syrup/squash).

6. Preservation by using salt (pickling).

7. Preservation by using chemical preservatives (sodium benzoate, calcium propionate).

8. Drying and dehydration of fruit.

9. Drying and dehydration of vegetables

10. Preservation of coconut shreds using humectants.

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

FTT-202A				Human Nutrition				
L	T	P		Credit	Major Test	Minor Test	Total	Time
3	-	-		3	75	25	100	3h
Purpose	To introduce the Basics concept of Human Nutrition.							
Course Outcomes(CO)								
CO 1	To teach about the concept & content of nutrition.							
CO 2	To learn about the different types of Nutrients.							
CO 3	To impart knowledge of different types of Malnutrition.							
CO 4	Describe the details of assessment of nutritional status.							

UNIT-I

Concepts and content of nutrition: Nutrition agencies; Nutrition of community; Nutritional policies and their implementation; Metabolicfunction of nutrients

Nutrients: Sources, functions, digestion, absorption, assimilation and transport of carbohydrates, proteins and fats in human beings;

UNIT-II

Water and energy balance: Water intake and losses; Basal metabolism- BMR; Body surface area and factors affecting BMR. Classification, functions, sources, digestion, requirements, and effects of deficiencies and excess of carbohydrates, fats and proteins.

UNIT-III

Recommended dietary allowances; For various age group; according physiological status; Athletic and sports man; Geriatric persons

Malnutrition: Type of Malnutrition; Multi-factorial causes; Epidemiology of under nutrition and over nutrition; Nutrition infection and immunity; Nutrition education

UNIT-IV

Assessment of nutritional status: Diet surveys; Anthropometry; Clinical examination; Biochemical assessment; Additional medical information.

In-born error of metabolism: Blood constituents; Nutrients; Hormones and enzymes; Miscellaneous disorders Food fad and faddism potentially toxic substance in human food.

Recommended Books :-

Author	Title
Swaminathan M	Advanced Text Book on Food & Nutrition (Volume I and II)
Stewart Truswell	ABC of Nutrition (4th edition)
Jim M. and Stewart T.	Essentials of Human Nutrition
Micheal J. G.,Susan A.L. Aedin	Introduction to Human Nutrition
Carolyn D. Berdanier, Elaine B.	Handbook of Nutrition and Food

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT-204A				Thermal Processing			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose		To introduce the Basics concept of Thermal Processing.					
Course Outcomes(CO)							
CO 1		To teach about the concept of heat & mass transfer.					
CO 2		To learn about the different types of mode of heat transfer.					
CO 3		To impart knowledge of different types of heat exchange.					
CO 4		Describe the details of mass transfer.					

UNIT-I

Introduction:-basic concepts of heat and mass transfer, importance of heat and mass transfer in Food Processing.

UNIT-II

Modes of heat transfer:-

(A) Conduction:- Principle of conduction, derivation of general heat conduction equation in Cartesian and cylindrical coordinates, steady state heat transfer through slabs. Composite walls, cylinders, spheres etc; insulation and its purposes, critical thickness of insulation for cylinders and spheres, general heat transfer equation for extended surfaces (Fins)

(B) Convection:- Natural and forced convection, dimensional analysis for free and forced convection, dimensionless numbers used in convective heat transfer, Important correlations for free and forced convection.

 (C) Radiation:- Introduction, reflection, absorption and transmission of radiation, characteristics of black, grey and real bodies in relation to thermal radiation, Stefan Boitzman low; kirchoffs law; Wein displacement law, intensity of radiation, radiation between two bodies.

Unit-III

Heat exchangers:-Classification, overall heat transfer coefficient, fouling factors, log-mean temperature difference for parallel and counter flow heat exchangers, heat transfer in shell and tube heat exchangers, effectiveness of parallel and counter flow heat exchanger by general and NTU (Number of Transfer Units) method, design of heat exchanger, applications of plate heat exchanger in HTST pasteurizer.

Unit-IV

Mass Transfer:-Introduction to mass transfer and diffusion, Flick's law of diffusion of mass transfer derivation of general diffusion mass transfer equation, molecular diffusion of gases, solid, liquid and biological materials, convective mass transfer coefficient, Natural and forced convective mass transfer, dimensional analysis for free and forced convective mass transfer.

Author	Title
D.S. Kumar	Heat & Mass Transfer
G.K. Roy	Fundamentals of Engineering heat & Mass Transfer
R.C. Sachdeva	Fundamentals of Engineering heat & Mass Transfer

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -214L A				Thermal Processing Lab				
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	3	1.5	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Thermal Processing lab.						
Course Outcomes							
CO1	To make the students familiar with the experiments of unit Operation.						
CO2	To give the knowledge of handling of the experiments related with Food Engg.						

Note: Student will be required to perform the following Experiments:--

List of Experiments –

1**.** Heat transfer analysis during conduction and convection.

2. Determination of thermal conductivity of food products and insulators.

3. Determination of thermal properties (specific heat, thermal conductivity) of frozen foods.

4. Heat transfer during agitation and mixing.

5. Study of water distillation plant.

6. Demonstration of continuous distillation apparatus in operation.

7. Determination of glass transition temperature of food sample.

8. To study mass transfer during leaching process.

FTT-206A				Unit Operation In Food Engg. – II			
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose			To introduce the Basics concept of Food Engg.				
Course Outcomes(CO)							
CO 1		To teach about the concept of heat & mass transfer.					
CO 2		To learn about the different types of mode of heat transfer.					
CO 3		To impart knowledge of different types of heat exchange.					
CO 4		Describe the details of mass transfer.					

UNIT-I

Evaporation: Principles of evaporation, mass and energy balance, factors affecting rate of evaporation, thermodynamics of evaporation (phase change, boiling point elevation, Dühring plot.

Heat and mass transfer in evaporator, factors influencing the overall heat transfer coefficient, influence of feed liquor properties on evaporation Evaporation equipment: Natural circulation evaporators, horizontal/vertical short tube, natural circulation with external calandria, long tube, and forced circulation.

Evaporator ancillary plant, design of evaporation systems, single effect, multiple effect evaporators, feeding methods of multiple effect evaporation systems, feed preheating, vapor recompression systems; Fouling of evaporators and heat exchanges; Recompression heat and mass recovery and vacuum creating devices.

UNIT-II

Food freezing: Introduction, Principles of food freezing, Freezing systems; Direct contact systems, air blast immersion; Changes in foods; Frozen food properties; freezing time, factors influencing freezing time, freezing/thawing time; Frozen food storage: Quality changes in foods during frozen storage Freeze drying: equipment and practice Expression and Extraction: liquid-liquid extraction processes, types of equipment and design for liquid-liquid extraction, continuous multistage counter current extraction.

UNIT-III

Crystallization and Dissolution: theory and principles, kinetics, applications in food industry, equipment for crystallization. Distillation: Principles, vapor-liquid equilibrium, continuous flow distillation, batch/differential distillation, fractional distillation, steam distillation, distillation of wines and spirits.

Baking: Principles, baked foods, baking equipment; roasting: Principles of roasting, roasting equipment

UNIT-III

Pasteurization: Purpose, microorganisms and their reaction to temperature and other influences, methods of heating, design and mode of operation of heating equipment, plate heat exchanger.

Sterilization: Principles, design of batch and continuous sterilization, different methods and equipments; UHT sterilization, in the package sterilization, temperature and pressure patterns, equipment for sterilizing goods in the package.

Aseptic processing: principles, analysis of thermal resilience, duration mathematics of conduction heating; Blanching: principle and equipment; Homogenization, Emulsification.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

  Text Books:

Author	Title
Brenan, Butters, Cowell and Lilly	Food Engineering Operation
Albertlbarz and Gustavo V. Barbosa- Cánovas	Unit Operations in Food Engineering.
Earle RL	Unit Operations in Food Processing
WarrenL.McCabe Julian Smith Peter Harriott	Unit Operations of Chemical Engineering

FTT -216L A	Unit Operation In Food Engg. – II Lab							
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	3	1.5	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Unit Operation In Food Engg lab.							
Course Outcomes								
CO1	To make the students familiar with the experiments of unit Operation.							
CO2	To give the knowledge of handling of the experiments related with Food Engg.							

Note: Student will be required to perform the following Experiments:--

List of Experiments –

1. Study of cleaners for grains (Screening, aspiration, abrasion and magnetic cleaning) .

2. Study of washers for fruits and vegetables (soaking tank, belt washer).

3. Study of crop dryer, hot air dryer and vacuum dryer.

4. Study of principle and working of spray dryer.

5. Study of principle and working of roller drum dryer and fluidized bed dryer.

6. Study of freeze drying process and freeze dryer.

7. Study of graders for grains.

8. Study of graders for fruits and vegetables.

9. Study of different components of flour mill.

10. Study of different material handling equipments.

11. Layout, design, sizing capacity and drawing of traditional storage structures.

12. Visit to traditional storage structure.

FTT-208A			Dairy Technology				
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the Basics concept of Dairy Tech..						
Course Outcomes(CO)							
CO 1	To teach about the concept of milk.						
CO 2	To learn about the different types of milk products.						
CO 3	To impart knowledge about Evaporated and Condensed milk.						
CO 4	Describe the details of processing of milk products.						

UNIT-I

Fluid Milk: Composition of milk and factor affecting it. Physico-chemical characteristics of milk and milk constituents. Production and collection , cooling and transportation of milk. Packaging storage and distribution of pasteurized milk.:

UNIT –II

Whole, Standardized, Toned, Double toned and skim milk. Test for milk quality and Adulteration. UHT processed milk, flavoured, Sterilized milk. Cleaning and sanitization of dairy equipments. Definition, Classification, Composition and physico-chemical properties of cream. Production processes and quality control.

UNIT -III

Butter: Definition, Classification, Composition and methods of manufacture, Packaging and storage. Butter oil/Ghee. Ice cream: Definition, Classification and Composition, Constituents and their role. Preparation of mixes and freezing of Ice cream, Overrun,Judging, Grading, and defects of Ice cream.

UNIT -IV

Evaporated and Condensed milk: Method of manufacture, Packaging and storage. Defects, Causes, and prevention. Roller and Spray Drying of milk solids. Instantization. Flow ability, Dustiness, Reconstituability, Dispersability, Wet ability, Sink ability and appearance of milk powders.

Text Books;-

Author	Title
Vaclavik V.A.and Christian E.W	Essentials of food science. 2nd edition Springer International.
Spreer E. (1998)	Milk and dairy product technology.
Smit G.	Dairy processing- improving quality. Woodhead Publishing.
Hohnson M. and Alford (1987)	Fundamentals of dairy chemistry. 2nd edition.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -218L A	Diary Tech. Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	3	1.5	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Dairy Tech. lab.						
Course Outcomes							
CO1	To make the students familiar with the experiments of milk products.						
CO2	To give the knowledge of handling of the experiments related with Dairy.						

Note: Student will be required to perform the following Experiments:--

List of Experiments;-

1. Sampling of milk and milk products.

2 . Platform tests of raw milk (clot on boiling (COB) test, alcohol test.

3 . Determination of physical properties of milk.

4 . Determination of proximate composition and biochemical properties of milk.

5 . Determination of microbiological properties of milk.

6 . Detection of adulterants in milk.

7 . Identification and demonstration of liquid milk processing equipment, pipes and fittings.

8 . Preparing standardized milk as per requirement.

9 . Separation of fat from milk.

10. Pasteurization and homogenization of milk.

FTT-210A			Fruit and Vegetable Processing					
L	T	P	Credit	Major Test	Minor Test	Total	Time	
3	-	-	3	75	25	100	3h	
Purpose		To introduce the Basics concept of Dairy Tech..						
Course Outcomes(CO)								
CO 1		To teach about the concept of milk.						
CO 2		To learn about the different types of milk products.						
CO 3		To impart knowledge about Evaporated and Condensed milk.						
CO 4		Describe the details of processing of milk products.						

UNIT-I

Production and processing scenario of fruits and vegetables in India and world; Scope of fruit and vegetable processing industry in India. Overview of principles and preservation methods of fruits and vegetables; Supply chain of fresh fruits and vegetables

UNIT-II

Primary processing and pack house handling of fruits and vegetables; Peeling, slicing, cubing, cutting and other size reduction operations for fruits and vegetables

Minimal processing of fruits and vegetables; Blanching- operations and equipment Unit 4 Canning:- Definition, processing steps, and equipment; cans and containers, quality assurance and defects in canned products;

UNIT-III

FSSAI specifications and preparation and preservation of juices, squashes, syrups, sherbets, nectars, cordials, etc.; Processing and equipment for above products;

FSSAI specifications of crystallized fruits and preserves, jam, jelly and marmalades, candies Preparation, preservation and machines for manufacture of above products.

UNIT-IV

Preparation, preservation and machines for manufacture of chutney, pickles, sauce, puree, paste, ketchup; toffee, cheese, leather, dehydrated, wafers and papads, soup powders;

Production of pectin and vinegar Commercial processing technology of selected fruits and vegetables for production of various value added processed products.

.. **Text Books;-**

Author	Title
U.D. Chavan and J.V. Patil. 2013.	Industrial Processing of Fruits and Vegetables.
S. Rajarathnam and R.S. Ramteke.	Advances in Preservation and Processing Technologies of Fruits and Vegetables.
Y.H. Hui. 2006.	Handbook of Fruits and Fruit Processing.
W.V. Cruess. 2004.	Commercial Fruit and Vegetable Products.
Y. H. Hui, Sue Chazala, Dee M. Graham, K.D. Murrell and Wai-Kit Nip.	Handbook of Vegetable Preservation and Processing.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

FTT -220L A			Fruit & Vegetables Processing Lab				
L	T	P	Credit	Practical	Minor Test	Total	Time
-	-	3	1.5	60	40	100	3h
Purpose	Give the knowledge of basic practicals of Fruit & Vegetables processing lab.						
Course Outcomes							
CO1	To make the students familiar with the experiments of primary processing.						
CO2	To give the knowledge of handling of the experiments related with preparation of different types products from fruits.						

Note: Student will be required to perform the following Experiments:--

List of Experiments;-

1. Primary processing of selected fruits and vegetables.

2. Canning of Mango/Guava/ Papaya.

3. Qualitative analysis of pectin.

4. Determination of salt concentration in processed/ preserved product.

5. Determination of sulphurdioxide content in processed/preserved product.

6. Preparation of jam from selected fruits.

7. Preparation of jelly from selected fruits.

8. Preparation of fruit marmalade.

9. Preparation of RTS/ nectar.

10. Preparation of squash/ crush.

11. Preparation of cordial.

12. Preparation of anardana.

13. Preparation of pickles.

14. Dehydration of ginger, onion and garlic.

15. Preparation of banana and potato wafers.

16. Preparation of vegetable sauces.

MC-901A				Environmental Sciences			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

Kurukshetra University, Kurukshetra

('A+' Grade, NAAC Accredited)

Bachelor of Technology (Information Technology)
Credit-Based Scheme of Studies/Examination(Modified)
Semester III & IV (w.e.f. session 2019-2020)

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit
1HourTutorial (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 160is required for a student to be eligible to get Under Graduate degreein Information Technology (IT).

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
IT: Information Technology (IT)
OE-IT: Open Elective Courses-Information Technology (IT)

		Bachelor of Technology (Information Technology)								
		Credit-Based Scheme of Studies/Examination(Modified)								
		Semester III(w.e.f. session 2019-2020)								
S. No.	Course Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	ES-201A	Electronics Fundamentals	3:0:0	3	3	75	25	0	100	3
2	ES-217A	Digital Electronics and logic design	3:0:0	3	3	75	25	0	100	3
3	PC-IT-205A	Data Structure	3:0:0	3	3	75	25	0	100	3
4	PC-IT-207A	Object Oriented Programming using C++	3:0:0	3	3	75	25	0	100	3
5	BS-205A	Mathematics - III	3:0:0	3	3	75	25	0	100	3
6	HM-905A	Fundamentals of Management	3:0:0	3	3	75	25	0	100	3
7	ES-211LA	Basic Electronics Lab	0:0:2	2	1	0	40	60	100	3
8	ES-213LA	Digital Electronics and logic designLab	0:0:2	2	1	0	40	60	100	3
9	PC-IT-215LA	Object Oriented Programming Lab	0:0:3	3	1.5	0	40	60	100	3
		Total		25	21.5	450	270	180	900	
10	SIM-201A*	Seminar on Summer Internship	2:0:0	2	0	0	50	0	50	

*Note:SIM-201A*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.

S. No.	Course Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	ES-IT-202A	Basics of Communication	3:0:0	3	3	75	25	0	100	3
2	PC-IT-204A	Discrete Mathematics	3:0:0	3	3	75	25	0	100	3
3	PC-IT-206A	Operating System	3:0:0	3	3	75	25	0	100	3
4	PC-IT-208A	Microprocessor Interfacing and Application	3:0:0	3	3	75	25	0	100	3
5	PC-IT-210A	Database Management Systems	3:0:0	3	3	75	25	0	100	3
6	HM-901A	Management Information system	3:0:0	3	3	75	25	0	100	3
7	PC-IT-212LA	Microprocessor Interfacing and Application Lab	0:0:3	3	1.5	0	40	60	100	3
8	PC-IT-214LA	Operating Systems Lab	0:0:3	3	1.5	0	40	60	100	3
9	PC-IT-216LA	Database Management Systems Lab	0:0:3	3	1.5	0	40	60	100	3
		Total		27	22.5	450	270	180	900	
10	MC-901A*	Environmental Sciences	3:0:0	3	0	75	25	0	100	3

Title rows above the table:

Bachelor of Technology (Information Technology)
Credit-Based Scheme of Studies/Examination(Modified)
Semester IV(w.e.f. session 2019-2020)

*MC-901Ais a mandatory credit less course in which the student will be required to get passing marks in the major test.
Note: Students be encouraged to go to 6-8 weeks summer internships mandatory during the summer break after the completion of fourth semester exams.

ES- 201A	Electronics Fundamentals						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To make the students conversant with basic fundamentals of the Electronics						
	Course Outcomes						
CO1	To introduce the students to diode and its applications						
CO2	To help students understand the working of transistor as amplifier and switch						
CO3	To familiarize about the application of transistor as an oscillator						
CO4	To aware the students about th characteristics of a Digital Data Acquisition System						

UNIT 1

Semiconductor Diode: Classification of semiconductor, PN junction diodes, VI characteristics of PN junction diode, Application of PN junction diode: Half wave, full wave and bridge type rectifier circuits;clipper circuit ; Zener and Avalanche breakdown , Zener diode , VI characteristics , Zener diode as a voltage regulator ; Light emitting Diode (LED).

UNIT 2

Transistor: Types of transistor, Characteristic of transistor in Common Base and Common Emitter configuration, Transistor load line, operating point, Faithful amplification, Stabilisation, Transistor Biasing for NPN transistor: a) Base resistor method, b) Voltage divider Method; Single Stage NPN common emitter amplifier, NPN transistor as switch.

UNIT 3

Oscillator: Tank circuit, Barkhausen Criteria, Types of transistor oscillator: Tuned collector oscillator, Colpitt's oscillator, Hartley oscillator, Phase shift oscillator, Wien Bridge oscillator, Crystal oscillator.

UNIT 4

Electronic Measurement: Elements of measurement system, Characteristics of measuring devices: Resolution, Sensitivity, Accuracy , Precision , Repeatability , Drift , Calibration, Settling time, Response time, Significant figure, Threshold , Error, Types of Error.
Transducer, classification of transducer , Characteristics of good transducer , Selection criteria of transducer for measurement;Construction and working of a) LVDT b) Thermocouple; Block diagram of Digital Data Acquisition System.

Suggested books
- Boylstead , Nashelsky , "Electronic Devices and Circuit Theory" , PHI
- Bhargav , Kulshreshtha , "Basic Electronics and Linear Circuits" , Tata McGraw Hill
- Sanjay Sharma, "Electronic Devices and Circuits" , SK Kataria and sons
- J.B Gupta , " Electronic and Electrical Measurements and Instrumentation " , SK Kataria

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

ES-217A	Digital Electronics and Logic Design						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To provide the conceptual knowledge about the design of digital circuits						
	Course Outcomes						
CO1	To introduce Simplification of switching functions using K map and QM methods						
CO2	To familiarize students with combinational circuit design						
CO3	Digital circuit design using sequential method						
CO4	To brief students how to change analog data into digital and vice versa.						

UNIT 1

Fundamentals of Digital Techniques: Review of logic gates and number system; 1's and 2's compliment Arithmetic; Introduction to Boolean algebra using basic postulates and theorems; Binary codes: BCD, Excess-3, Gray codes; Standard representation of logic functions: SOP and POS forms; Simplification of switching functions using K map and Quine-McCluskey methods.

UNIT 2

Design of Combinational circuits: Half and Full Adders;Half and Full Subtractors; Multiplexers and Demultiplexers / Decoders;Implementation of SOP logic functions using multiplexers and Demultiplexers / Decoders; Encoders. Decoders / Drivers for display devices, code converters.

UNIT 3

Sequential circuits: Latches, Flip Flops: S-R- J-K. T, D, master-slave, edge triggered flip flop;Race around condition; Excitation table; Interconversion among flip flop, Design of Synchronous and Asynchronous counters; Modulo N counter design; Shift registers.

UNIT 4

A/D and D/A converters: Sample and hold circuit, Quantization , weighted resistor and R -2 R ladder Digital to Analog Converters, Specifications for D/A converters., Flash type Analog to digital Converter; Successive approximation type Analog to digital Converter, specifications of ADCs.
Programmable Logic Devices:
Introduction to PLA and PAL, Implementation of simple functions using PLA and PAL.

Suggested Books
- R. P. Jain , "Modem Digital Electronics (Edition III)"; TMH
- Anand Kumar , "Fundamentals of digital circuits" ; PHI
- Malvino & Leach, "Digital Principles and Applications", McGraw Hill.
- Thomas L. Floyd, "Digital Fundamentals", Pearson Education Inc,

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-IT-205A	Data Structures						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To introduce the principles and paradigms of Data Structures for design and implement the software systems logically and physically						
	Course Outcomes						
CO1	To introduce the basic concepts of Data structure, basic data types, searching and sorting based on array data types.						
CO2	To introduce the structured data types like Stacks, Queue, and its basic operations' implementation.						
CO3	To introduces dynamic implementation of linked list.						
CO4	To introduce the concepts of Tree and graph and implementation of traversal algorithms.						

UNIT 1

Introduction to Data Structures: Definition & abstract data types, Real life applications with example; built in and user defined data structures.

Arrays: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multidimensional arrays. Implementation of Data Structures like structure, Sparse matrices: implementation of transpose.

Sorting &Searching: Basic Searching techniques (Linear & binary), Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, radix, heap sort.

UNIT 2

Stacks: Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression, Applications.

Queues: Definition, Sequential implementation of linear queues, Operations. Circular queue: implementation (using arrays), Advantage over linear queue, Priority queues& Applications.

UNIT 3

Linked Lists: Need of dynamic data structures, Operations on lists. Dynamic implementation of linked lists, Comparison between Array and Dynamic Implementation of linked list. Linked implementation of stacks and queues. Circular lists, implementation of primitive operations. Doubly linked lists: continuous & dynamic implementation, operations.

UNIT 4

Trees: Definition, Basic terminology, Binary tree, Array and Dynamic Implementation of a binary tree, primitive operations on binary trees. External and internal nodes. Binary tree traversals: preorder, inorder and postorder traversals. Representation of infix, postifix and prefix expressions using tree, Introduction to Binary Search Trees, B trees, B+ trees , AVL Trees, threaded trees, balanced multi way search trees.

Graphs: Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs,. Graph traversals, minimum-spanning trees, computer representation of graphs.

Suggested Books:

- Tenenbaum , "Data Structures" , PHI Pub.
- Aho, Hopcroft , Ullman , "Data Structures and Algorithms" , Addison-Wesley.
- Horowitz & Sahni , " Fundamentals of Data structures" , Addison-Wesley
- Robert Kruse , "Data Structures and Program Design" , PHI,
- Symour Lipschetz , " Theory & Problems of Data Structures" , TMH

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-IT-207 A	Object Oriented Programming Using C++						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To introduce the principles and paradigms of OOPS for design and implementation of Object Oriented System						
	Course Outcomes						
CO1	To introduce the basic concepts of object oriented programming language and the its representation						
CO2	To allocate dynamic memory, access private members of class and the behavior of inheritance and its implementation.						
CO3	To introduce polymorphism, interface design and overloading of operator.						
CO4	To handle backup system using file, general purpose template and handling of raised exception during programming						

UNIT 1

Introduction to C++: C++ Standard Library, Basics of a Typical C++ Environment, Pre-processors Directives, Illustrative Simple C++ Programs. Header Files and Namespaces, libraryfiles, Concept of objects, basic of object modeling, object classes, associations, behaviors, description, Object Oriented Analysis & Object Modeling techniques,.

Object Oriented Concepts : Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable(public, protected, private, package), Other Modifiers, Polymorphism: Overloading, Inheritance, Overriding Methods, Abstract Classes, Reusability, Class's Behaviors.

Classes and Data Abstraction: Introduction, Structure Definitions, Accessing Members of Structures, Class Scope and Accessing Class Members, Separating Interface from Implementation, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors, Using Default Arguments With Constructors, Using Destructors, Classes: Constructor(Constant) Object and Constructor Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using This Pointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Container Classes And Integrators, Proxy Classes, Function overloading.

UNIT 2

Operator Overloading: Introduction, Fundamentals of Operator Overloading, Restrictions On Operators Overloading, Operator Functions as Class Members vs. as Friend Functions,Overloading, <<, >> Overloading Unary Operators, Overloading Binary Operators.

Inheritance: Introduction, Inheritance: Base Classes And Derived Classes, Protected Members, Casting Base- Class Pointers to Derived- Class Pointers, Using Member Functions, OverridingBase –Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived –Class Object To Base- Class ObjectConversion, Composition Vs. Inheritance.

UNIT 3

Virtual Functions and Polymorphism: Introduction to Virtual Functions, Abstract Base Classes And Concrete Classes, Polymorphism, New Classes And Dynamic Binding, Virtual Destructors, Polymorphism, Dynamic Binding.

Files and I/O Streams: Files and Streams, Creating a Sequential Access File, Reading Data From A Sequential Access File, Updating Sequential Access Files, Random Access Files, Creating ARandom Access File, Writing Data Randomly To a Random Access File, Reading Data Sequentially from a Random Access File. Stream Input/Output Classes and Objects, Stream Output,Stream Input, Unformatted I/O (with read and write).

UNIT 4

Templates & Exception Handling: Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends, Templates and Static Members, Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception, Catching an Exception, Re-throwing an Exception, Exception specifications, Processing Unexpected Exceptions, Constructors, Destructors and Exception Handling, Exceptions and Inheritance.

Suggested Books:
- Deitel , "C++ How to Program" , Prentice Hall
- Robert Lafore, "Object Oriented Programming in Turbo C++" , The Waite Group Press.
- Ravichandran , "Programming with C++" , 2003, TMH
- Balagurusamy , "Object oriented Programming with C++", Tata McGraw-Hill

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BS-205A	Mathematics-III						
Lecture	Tutorial	Practical	Credit	Theory	Sessional	Total	Time
3	0	0	3.0	75	25	100	3 Hour
Purpose	To familiarize the prospective engineers with techniques in sequence and series, multivariable calculus, and ordinary differential equations.						
Course Outcomes (CO)							
CO1	To develop the tool of sequence, series and Fourier series for learning advanced Engineering Mathematics.						
CO2	To introduce effective mathematical tools for the solutions of differential equations that model physical processes.						
CO3	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.						
CO4	To familiarize the student with calculus of vector functions that is essential in most branches of engineering.						

UNIT-I

Sequence and Series: Convergence of sequence and series, tests for convergence (Comparison test, D'Alembert's Ratio test, Logarithmic test, Cauchy root test, Raabe's test).

Fourier series: Introduction, Fourier-Euler Formula, Dirichlet's conditions, Change of intervals, Fourier series for even and odd functions, Half range sine and cosine series.

UNIT-II

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.

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-III

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-IV

Vector Calculus: Introduction, Scalar and Vector point functions, Gradient, divergence and Curl and their properties, Directional derivative. Line integrals, surface integrals, volume integrals, Theorems of Green, Gauss and Stokes (without proof).

Suggested Books:

- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
- N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
- S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
- E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
- E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
- G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

HM - 905A	Fundamentals of Management						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To enhance the knowledge about the basic management concepts so that engineers can apply their managerial skills.						
	Course outcomes						
CO1	An overview about Business Environment and its Components.						
CO2	Understand the concept of Financial Management and its importance.						
CO3	Enabling the students to know about the hiring and guiding the work force by the understanding of Human Resource Management.						
CO4	To understand the concept of economical production aspects of Management.						

UNIT 1

Business Environment: Concept, nature and objectivesof business, social responsibility of business, Constituent of Business Environment; Economic, Social, Political, Legal and technological. Definition, Nature and Significance of Management, Henry Fayol's Principles of Management, Functions of Management.

UNIT 2

Financial Management: Introduction of Financial Management, Objectives of Financial Decisions, Financial Planning-Tools of financial planning, Management of working capital, factors affecting requirements of working capital. Capital Structure decisions. Features of appropriate capital structure. Sources of finance.

UNIT 3

Personnel Management: Personnel Management-Meaning, Nature and importance, Functions of Personnel Management (a) Managerial Functions and (b) Operative functions. Job Analysis; Meaning and importance; Process of Job Analysis, Job Description and Job Specification. Human Resource Development-Meaning and Concept.

UNIT 4

Production Management: Production Management: Definition and objectives. Plant Location: Ideal plant location, Factors affecting plant location. Plant Layout: Ideal plant layout, Factors affecting Plant layout. Work Measurement: Meaning Objectives and Essentials of work measurement. Production Control: meaning and Importance of production control and steps involved in production control, Nature, scope and importance of Marketing Management, Modern Marketing concepts. Role of marketing in economics development. Marketing Mix. Marketing Information System. Meaning, nature and scope of International Marketing.

Suggested Books:

- Charunilam , "Business Environment" , Himalaya Publishing House
- Harold, Koontz & Cyriol ,"Mangement" , MGH
- Principles of Personnel Management-Edwin B.PhilpoMGH
- Cundiff &Stiff , "Basic Marketing" PHI

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

ES- 211LA	Basic Electronics Lab						
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
0	**0**	**2**	**1.0**	**60**	**40**	**100**	**3h**
Purpose	To give hands on experience to students with electronic devices						
	Course Outcomes						
CO1	To introduce students with CRO						
CO2	To familiarize students with characteristics of Diode and transistor						
CO3	To implement Zener diode as a voltage regulator						
CO4	Measurement of displacement using LVDT						

LIST OF EXPERIMENTS

1. To study CRO
2. To plot the VI characteristics of PN junction diode
3. To plot the VI characteristics of Zener diode.
4. To study the half and full wave rectifier
5. To study the Bridge rectifier.
6. To plot the VI characteristics of transistor in CB mode
7. To plot the VI characteristics of transistor in CE mode
8. To study Zener diode as a voltage regulator
9. To study RC oscillator
10. To study single stage CE amplifier
11. To study LVDT for linear displacement

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NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ES- 213LA	Digital Electronics Lab						
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
0	**0**	**2**	**1.0**	**60**	**40**	**100**	**3h**
Purpose	**To implement theoretical digital electronics into practical circuits**						
	Course Outcomes						
CO1	To verify the truth table for various gates.						
CO2	To Implement the Boolean Expression to design circuit for any function.						
CO3	To learn the various methods for counter design						
CO4	To design state machine circuits using sequential circuits.						

LIST OF EXPERIMENTS
1. Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R, J-K, T & D type flip flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3-bit synchronous counter.
8. To design and verify the operation of synchronous UP/DOWN decade counter using J K flipflops & drive a seven-segment display using the same.
9. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flipflops & drive a seven-segment display using the same.
10. To design & realize a sequence generator for a given sequence using J-K flip-flops.
11. Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
12. Design a 4-bit shift-register and verify its operation.

Note: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus

PC-IT-215LA	Object oriented Programming Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
0	0	3	1.5	60	40	100	3h
Purpose	To design and implement the Object Oriented System						
	Course Outcomes						
CO1	To familiarize with the class and objects						
CO2	To implement the concept of constructors						
CO3	To familiarize the concept of operator overloading						
CO4	To implement the concepts of Inheritance						

LIST OF EXPERIMENTS
1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, andreturns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values fromthe user to test this function.
2. A point on the two two numbers can represent dimensional plane: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of theorigin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whoseY coordinate is the sum of their Y coordinates. Write a program that uses a structure called point to model a point. Define three points, and have the user input values to two ofthem. Than set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:
   Enter coordinates for P1: 3 4
   Enter coordinates for P2: 5 7
   Coordinates of P1 + P2 are: 8, 11
3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out thespecified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should displaythe result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with theprogram might look like this.
   Enter first number, operator, second number: 10/ 3
   Answer = 3.333333
   Do another (Y/ N)? Y
   Enter first number, operator, second number 12 + 100
   Answer = 112
   Do another (Y/ N) ? N
4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that
   uses a structure to store these three parts of a phone number separately. Call the structure phone. Create two structure variables of type phone. Initialize one, and have the user
   input a number for the other one. Then display both numbers. The interchange might look like this:
   Enter your area code, exchange, and number: 415 555 1212
   My number is (212) 767-8900
   Your number is (415) 555-1212
5. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that canread values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the resultsmaybe a DM object or DB object, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and cenitmetresdepending on the object on display.

6. Create a class rational which represents a numerical value by two double values- NUMERATOR & DENOMINATOR. Include the following public member Functions:
• constructor with no arguments (default).
• constructor with two arguments.
• void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
• Overload + operator to add two rational number.
• Overload >> operator to enable input through cin.
• Overload << operator to enable output through cout.
Write a main ( ) to test all the functions in the class.

7. Consider the following class definition
class father {
protected :int age;
public;
father (int x) {age = x;}
virtual void iam ( )
{ cout<< "I AM THE FATHER, my age is : "<< age<< end1:}
};
Derive the two classes son and daughter from the above class and for each, define iam ( ) to writeour similar but appropriate messages. You should also define suitable constructors for theseclasses.Now, write a main ( ) that creates objects of the three classes and then calls iam ( ) for them.Declare pointer to father. Successively, assign addresses of objects of the two derived classes tothis pointer and in each case, call iam ( ) through the pointer to demonstrate polymorphism inaction.

8. Write a program that creates a binary file by reading the data for the students from the terminal.
`The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.

9. A hospital wants to create a database regarding its indoor patients. The information to store include
a) Name of the patient
b) Date of admission
c) Disease
d) Date of discharge
Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to
enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients. List the information about all the to store the
age of the patients. List the information about all the pediatric patients (less than twelve years in age).

NOTE: A student has to perform at least ten experiments. Six experiments should be performed from the above list. Remaining four experiments may be performed as per relevance with the field of data structures within the scope of the syllabus.

ES-IT-202A	Basics of Communication						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To provide the basic knowledge of electronic communication						
	Course Outcomes						
CO1	To introduce the students to the concept of communication.						
CO2	To study signal modulation.						
CO3	To educate about the various demodulation techniques in digital communication						
CO4	To understand various methods for data transmission.						

UNIT 1

Introduction: What is communication, Elements of communication system, classification of signal, Concept of bandwidth, sources of signal, Types of communication channels, classification of electronic communication system, Limitations of communication system, Electromagnetic spectrum for communication, Gain attenuation and Decibels of a system, Noise, Classification of noise.

UNIT 2

Signal Modulation : What is modulation, Need for modulation, Amplitude Modulation, modulation index, power relation in AM, Generation of AM using collector modulation method; Frequency Modulation , modulation index in FM ; Generation of FM using Armstrong method; Comparison of AM and FM.

UNIT 3

Radio receiver: AM demodulator using diode detector, FM demodulation using slope detector method, Tuned frequency receiver, Superheterodyne receiver; RF amplifier; IF amplifier; Image frequency;Double spotting, Superheterodyne tracking.

UNIT 4

Optical Communication
Basic fiber optic system, Advantages and disadvantages of optical fibers, Classification of optical fiber, construction of fiber cable, Numerical aperture, losses in fiber optic system, Major requirements for optical fiber emitter, Advantages of LED as a source, Performance Requirements of detectors.

 Suggested Books:
- George Kennedy,"Electronic Communication System", Mc Graw Hill.
- Sanjay Sharma , " Digital communication" , SK Kataria and sons
- Anokh Singh, "Principles of Communication engineering" , S Chand &Co.
- Sarkar, "Optical Electronics and fiber optic Communication", New Age International

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-IT-204A	Discrete Mathematics						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To provide the conceptual knowledge of Discrete structure.						
	Course Outcomes						
CO1	To study various fundamental concepts of Set Theory and Logics.						
CO2	To study and understand the Relations, diagraphs and lattices.						
CO3	To study the Functions and Combinatorics.						
CO4	To study the Algebraic Structures.						

UNIT 1

Set Theory & Logic Fundamentals: Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets and Products, Partition of sets, The Principle of Inclusion-Exclusion.Logic : Propositions and Logical operations, Truth tables, Equivalence, Implications, Laws of Logic, Normal forms, Predicates and quantifiers, Mathematical Induction.

UNIT 2

Relations, Diagraphs and lattices Product sets and partitions, relations and diagraphs, paths in relations and diagraphs, properties of relations, equivalence and partially ordered relations, computer representation of relations and diagraphs, manipulation of relations, Transitive closure and Warshall's algorithm, Posets and Hasse Diagrams, Lattice.

UNIT 3

Functions and Combinatorics : Definitions and types of functions: injective, subjective and bijective, Composition, identity and inverse, Review of Permutation and combination-Mathematical Induction, Pigeon hole principle, Principle of inclusion and exclusion, Generating function-Recurrence relations.

UNIT 4

Algebraic Structures: Algebraic structures with one binary operation -semi groups, monoids and groups, Product and quotient of algebraic structures, Isomorphism, homomorphism, automorphism, Cyclic groups, Normal sub group, codes and group codes, Ring homomorphism and Isomorphism.

Suggested Books:
- Liu , "Elements of Discrete Mathematics" , McGraw Hill
- Kolman , Ross , "Discrete mathematical structures" PHI Pvt. Ltd.
- Ralph P., Grimaldi, "Discrete and Combinatorial mathematics", Addison-Wesley
- Kenneth H.Rosen, "Discrete Mathematics and its Applications", , McGraw Hill

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-IT-206A	Operating Systems						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To familiarize how an operating system controls the computer						
	Course Outcomes						
CO1	To study about the process of Operating System and it's scheduling.						
CO2	To learn about interprocess communication and deadlocks.						
CO3	To learn about memory management and Virtual Memory.						
CO4	To learn about distributed system and file system of operating system.						

UNIT 1

Introductory Concepts: Operating System functions and characteristics, historical evolution of operating systems, Real time systems, Distributed systems, Methodologies for implementation of O/S service , system calls, system programs , interrupt mechanisms.

Processes: Processes model, process states, process hierarchies, implementation of processes, data structures used such as process table, PCB creation of processes, context switching, exit of processes.Process scheduling**:** objective, preemptive Vs non- preemptive scheduling, comparative assessment of different algorithms such as round robin, priority bases scheduling, FCFS, SJF, multiple queues with feedback.

UNIT 2

Interprocess communication: Race conditions, critical sections, problems of mutual exclusion, Peterson's solution, producer-consumer problem, semaphores, counters, monitors, message passing; Deadlocks:conditions, modeling, detection, recovery, avoidance, deadlock prevention.

UNIT 3

Memory Management: Multiprogramming with fixed partition, variable partitions, virtual partitions, virtual memory, paging, demand paging design and implementation in paging such as page tables ,inverted page tables, page replacement algorithms, page fault handling, working set model, local vs global allocation, page size, segmentation and paging.

UNIT 4

File Systems: File type, attributes, access and security, file operations, directory structures, path names, directory operations, implementation of file systems, implementation of file and file operations calls, implementation of directories, sharing of files, disk space management, block allocation, free space management, logical file system, physical file system.

Distributed Systems: Introduction to II/W and S/W concepts in distributed systems, Network operating systems and NFS, NFS architecture and protocol, client- server model, distributed file systems, RPC- Basic operations, parameter passing, RPC semantics

Suggested Books:
- Peterson & Silberschatz, "Operating System concepts", Addison Wesley
- Brinch, Hansen, "Operating System Principles" PHI
- Tenanbaum, "Operating System", PHI.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-IT-208A	Microprocessor Interfacing & Application						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To learn the architecture and programming of Intel family microprocessors 8085 and its interfacing.						
	Course Outcomes						
CO1	To study the Architecture of 8085 microprocessors						
CO2	Familiarization with the instruction / commands of 8085						
CO3	Introduction to interfacing of microprocessor						
CO4	Concept of data transfer among various peripheral devices						

UNIT 1

Introduction of Microcomputer System: Architecture of Intel 8085 microprocessor, Pin description ; Internal architecture , Bus , register organization, Memory organization, Flags, stack, Timing and control unit, instruction cycle, machine cycle, Timing diagram for Fetch and Memory read / write .

UNIT 2

Programming of 8085: Instruction and data formats; Instruction Set of 8085; introduction to Assembly Language Programming**;** Stacks and Subroutines; counter and time delay.

UNIT 3

Interfacing I/O devices: Basic interfacing concept; Interfacing output displays; Interfacing input devices; Memory Mapped I/O ; Interrupt structure of 8085

UNIT 4

Peripheral devices: An introduction to following devices: a) Programmable Peripheral Interface (8255); b) DMA controller (8237); c) Programmable keyboard / Display interface (8279)
Microprocessor application: Interfacing of LCD, matrix keyboard, Introduction to Microprocessor Controlled Temperature System (MCTS)

Suggested Books

- Gaonkar, "Microprocessor Architecture, Programming & Application with the 8085", Penram International Publishing (India).
- B Ram , "Fundamentals of Microprocessors And Microcontrollers" , Dhanpat Rai & sons
- Ray and Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw-Hill
- Udaya Kumar ,"The 8085 Microprocessor: Architecture, Programming and Interfacing" , Pearson education

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC - IT-210A	Data Base Management Systems						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To familiarize the students with Data Base Management system						
	Course Outcomes						
CO1	To provide introduction to relational model.						
CO2	To learn about ER diagrams and SQL.						
CO3	To understand about the concept of functional dependencies.						
CO4	To understand about Query Processing and Transaction Processing.						

UNIT I

Introduction: Concept & Overview of DBMS, Advantages of DBMS over file processing system, Database Languages, Responsibilities of Database Administrator, Database Users, Three Schema architecture of DBMS & Data Independence, Data Models.

Entity-Relationship Model: Basic concepts, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features: Specialization and Generalization.

UNIT 2

The Relational Data Model &Algebra: Relational Model: Structure of relational Databases, Relational Algebra & various operations (Set operation, select, project, joins, division), Relational Calculus: Domain, Tuple.

Integrity Constraints & Introduction to Sql:-

Domain Constraints, Referential Integrity Constraints, Basic Structure & Concept of DDL, DML, DCL, Aggregate Functions, Null Values, Introduction to views, creating, modifying and deleting views.

UNIT 3

Relational Database Design : Functional Dependency, Different anomalies in designing a Database., Normalization – 1NF, 2NF, 3NF, Boyce-Codd Normal Form, Normalization using multivalued dependencies, 4NF, 5NF.

UNIT 4

Transaction Processing Concept: Introduction to transaction processing, transaction model properties, serializability:- Serial, non-serial and Serializable Schedules, Conflict Serializability.

Concurrency Control: Need of concurrency control, Different concurrency control Techniques: locking based, timestamps based technique. Deadlock handling and Recovery Techniques:- Deferred update/ immediate update, shadow paging.

Suggested Books:

- Elmasri and Navathe , "Fundamentals of Database Systems" , Addision-Wesley,
- Silberschatz, and Korth ,"Database System Concepts", McGraw-Hill
- Date , "An Introduction to Database Systems" ,Addison-Wesley,
- Bhattacharyya, "Database Management Systems" , Tata McGraw-Hill Publishing.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

HM-901A	Management Information System						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To familiarize the students with Management Information System.						
	Course Outcomes						
CO1	To provide introduction to relational model.						
CO2	To learn about ER diagrams and SQL.						
CO3	To understand about the concept of functional dependencies.						
CO4	To understand about Query Processing and Transaction Processing.						

UNIT 1

Introduction: Definition information system, role and impact of MIS, The challenges of Information system, Nature of MIS, Characteristics of MIS, Myths regarding MIS, Requirements of MIS, Problems & Solutions in implementing MIS, Benefits of MIS, Limitations of MIS, Significance of MIS, Components of MIS. Role of MIS, Major Management challenge to building and using information system in Organization, functions of management.

UNIT 2

Information system and Organizations: The relationship between Organization and Information System, Information needs of different organization levels: Information concept as quality product, classification and value of information, methods of data and information collection. Strategic role of information system, Salient features of Organization, Information, management and decision making, How Organization affect Information Systems, How Information system affect Organization, Ethical and Social impact of information system.

UNIT 3

Business application of Information System: Foundation Concepts Information systems in Business: Information system and technology, Business Applications, Development and Management. The internetworked E-business Enterprise: Internet, and Extranet in business. Electronic Commerce System: Electronics commerce Fundamentals, Commerce Application and issues. E-business Decision Support: Decision support in E-Business, Artificial Intelligence Technologies in business.

UNIT 4

Technical Foundation of Information System: Computers and information processing, Computer Hardware, Computer software, Managing data resources, Telecommunication, Enterprise: wide computing and networking.
Strategic and Managerial Implications of Information Systems: Strategic Information System: Introduction, Characteristics of Strategic Information Systems, Strategic Information Systems (SISP), Strategies for developing an SIS, Potential Barriers to developing a Strategic Information System (SIS), Decision Support System (DSS): Decision making concepts, methods, tools and procedures. Managing Information Resources: Introduction, IRM, Principal of Managing Information Resources, IRM functions, Computer Security: Introduction, Computer Security, Types of Computer Security, Disaster Recovery Plan.

Suggested Books:
- W.S . Jawadakar, "Management Information System", McGraw Hill
- J. O. Brien, " Management Information System", TMH, New Delhi
- Uma G . Gupta, "Management Information System" Fifth Edition TMH.
- Kenneth C. Laudon, "Management Information System Organisation and Technology" TMH.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC - IT-212 LA	Microprocessors Interfacing and Application Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
0	0	3	1.5	60	40	100	3Hour
Purpose	To write the efficient Assembly Language Program for different problem statements and implement different system interfacing.						
	Course Outcomes						
CO1	To familiarize with 8085 microprocessor kit						
CO2	To implement 8 bit number addition						
CO3	Implementation of Programs on 8085 kit						
CO4	To implement the program for controlling stepper motor						

LIST OF EXPERIMENTS

1. Study of 8085 Microprocessor kit.
2. Write a program using 8085 and verify for:
   a. addition of two 8-bit numbers result is 8 bit
   b. addition of two 8-bit numbers result is 16 bit.
3. Write a program using 8085 and verify for:
   a. 8-bit subtraction
   b. 16-bit subtraction
4. Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.
5. Write a program using 8085 for multiplication of two 8- bit numbers by bit rotation method
6. Write a program using 8085 for division of two 8- bit
7. Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.
8. Shift an 8 bit number left by 2 bits.
9. Find 2's compliment of an 8bit and 16 bit number
10. To find larger of two numbers.
11. To find square-root of a number
12. Write a program to control the operation of stepper motor using 8085

NOTE: A student has to perform at least ten experiments.Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus

PC - IT-214 LA	Operating System Lab							
L	T	P	Credit	Practical	Minor Test	Total	Time
0	0	3	1.5	60	40	100	3Hour
Purpose	To introduce the principles and paradigms of Operating System							
	Course Outcomes							
CO1	To implement Process Scheduling algorithms.							
CO2	To implement deadlock.							
CO3	To implement Semaphores.							
CO4	To implement the program for memory allocation.							

LIST OF EXPERIMENTS
1. WAP to implement First Come First Scheduling (FCFS).
2. WAP to implement Shortest Job First Scheduling (SJF).
3. WAP to implement Priority Based Scheduling.
4. WAP to implement Banker's Algorithm.
5. WAP to implement LRU Page replacement Algorithm.
6. WAP to implement Round Robin Scheduling.
7. WAP to implement optimal page replacement algorithm.
8. WAP to implement producer-consumer problem.
9. WAP to implement first fit method.
10. WAP to implement best fit method.
11. WAP to implement worst fit method.
12. WAP to implement counting semaphores.

NOTE: A student has to perform at least ten experiments.Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus

PC - IT-216 LA	Database Management Systems Lab						
L	T	P	Credit	Practical	Minor Test	Total	Time
0	0	3	1.5	60	40	100	3Hour
Purpose	To implement practically the various concepts of DBMS						
	Course Outcomes						
CO1	To understand& Implement basic DDL commands.						
CO2	To learn & Implement DML and DCL commands.						
CO3	To understand the SQL queries using SQL operators.						
CO4	To understand the concept of relational algebra and implement using examples.						

LIST OF EXPERIMENTS
1.   Create a database and write the programs to carry out the following operation:
   - Add , Delete and modify a record in the database
   - Generate queries
   - Data operations
   - List all the records of database in ascending order.
2.   To perform various integrity constraints on relational database.
3.   Create a database and perform the following operations:-
   - Arithmetic and Relational operations
   - Group by & having clauses
   - Like predicate for pattern matching in database
4.   Create a view to display details of employees working on more than one project.
5.   Create a view to display details of employees not working on any project.
6.   Using two tables create a view which shall perform natural join, equi join, outer joins.
7.   Write a procedure to give incentive to employees working on all projects. If no such employee found give app. Message.
8.   Write a procedure for computing amount telephone bill on the basic of following conditions.
   1. telephone rent Rs. 205 including first 105 free units.
   2. if extra units>0 but <500 then rate is 80 paise per unit.
   3. if extra units>500 then rate is Rs. 1.20 per unit.
   For this purpose create a table with name, Phone No., No. of units consumed, bill amount of a customer.
9.   Write a procedure for computing income tax of employee on the basic of following conditions:-
   1. if gross pay<=40,000 then I.T rate is 0%.
   2. if gross pay>40,000 but <60000 then I.T rate is 10%.
   3. if gross pay>60,000 but <1,00,0000 then I.T rate is 20%.
   4. if gross pay>1,00,0000 then I.T rate is 30%.
   For this purpose create a table with name, ssn, gross salary and income tax of the employee.
10.   Write trigger for before and after insertion, deletion and updation process.

NOTE: A student has to perform at least ten experiments.Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus

MC-901A			Environmental Sciences				
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING) CREDIT BASED
KURUKSHETRA UNIVERSITY KURUKSHETRA
SCHEME OF STUDIES/EXAMINATION(Modified)
SEMESTER III (w.e.f. session 2019-2020)

S. No.	Course No.	Course Name	L:T:P	Hours/ Week	Credits	Major Test	Minor Test	Practical	Total	Duration of Exam (Hrs.)
						Examination Schedule (Marks)				
1	BS-201A	Optics & Waves	3:0:0	3	3	75	25	0	100	3
2	BS-204A	Higher Engineering Mathematics	3:0:0	3	3	75	25	0	100	3
3	ES-203A	Basic Electronics Engineering	3:0:0	3	3	75	25	0	100	3
4	MEC-201A	Theory of Machines	3:1:0	4	4	75	25	0	100	3
5	MEC-203A	Mechanics of Solids-I	3:1:0	4	4	75	25	0	100	3
6	MEC-205A	Thermodynamics	3:1:0	4	4	75	25	0	100	3
7	MEC-207LA	Theory of Machines Lab	0:0:2	2	1	0	40	60	100	3
8	MEC-209LA	Mechanics of Solids Lab	0:0:2	2	1	0	40	60	100	3
9	*MEC-211A	Industrial Training-I	2:0:0	2	-	-	100	-	100	
10	**MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3
		Total		30	23	450	230	120	800	

*MEC-211A 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 qualify.

**MC-901A 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(Modified)
SEMESTER IV (w.e.f. session 2019-2020)

S. No.	Course No.	Course Name	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	
1	ES-204A	Materials Engineering	3:0:0	3	3	75	25	0	100	3
2	MEC-202A	Applied Thermodynamics	3:0:0	3	3	75	25	0	100	3
3	MEC-204A	Fluid Mechanics & Fluid Machines	3:1:0	4	4	75	25	0	100	3
4	MEC-206A	Mechanics of Solids-II	3:1:0	4	4	75	25	0	100	3
5	MEC-208A	Instrumentation& Control	3:0:0	3	3	75	25	0	100	3
6	ES-206LA	Materials Engineering Lab	0:0:2	2	1	0	40	60	100	3
7	MEC-210LA	Fluid Mechanics & Fluid Machines Lab	0:0:2	2	1	0	40	60	100	3
8	*MC-902A	Constitution of India	3:0:0	3	-	75	25	-	100	3
		Total		24	19	375	205	120	700	

*MC-902A 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.

B. Tech (3rd Semester) Mechanical Engineering							
BS – 201A	Optics and Waves						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the fundamentals of wave and optics for the applications in Engineering field.						
Course Outcomes							
CO 1	Familiarize with basic phenomenon used in propagation of waves.						
CO 2	Introduce the fundamentals of interference, diffraction, polarization and their applications.						
CO 3	To make the students aware to the importance of Laser in technology.						

Unit - I

Waves: Travelling waves, Characteristics of waves, Mathematical representation of travelling waves, General wave equation, Phase velocity, Light source emit wave packets, Wave packet and Bandwidth, Group velocity and real light waves.

Propagation of light waves: Maxwell's equations, Electromagnetic waves and constitutive relations, Wave equation for free-space, Uniform plane waves, Wave polarization, Energy density, the pointing vector and intensity, Radiation pressure and momentum, Light waves at boundaries, Wave incident normally on boundary, Wave incident obliquely on boundary: law of reflection, Snell's law and reflection coefficients.

Unit - II

Interference: Principle of Superposition, Conditions for Sustained interference, Young's double slit experiment, Division of wave-front: Fresnel's Biprism and its applications, Division of amplitude: Interference due to reflected and transmitted light, Wedge-shaped thin film, Newton's rings and its applications, Michelson Interferometer and its applications.

Unit – III

Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit, Plane transmission diffraction grating: theory, secondary maxima and secondary minima, width of principal maxima, absent spectra, overlapping of spectral lines, determination of wavelength; Dispersive power and resolving power of diffraction grating.

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.

Unit – IV

Laser: Stimulated Absorption, Spontaneous and Stimulated Emission; Einstein's Coefficients and its derivation, Population Inversion, Direct and Indirect pumping, Pumping

schemes, Main components of Laser, Gas lasers (He-Ne, CO_2), Solid state lasers (Ruby, Neodymium, semiconductor), Dye laser, Characteristics of Laser, Applications of Laser.

Text/Reference Books:

1. P.K. Diwan, Applied Physics for Engineers, *Wiley India Pvt. Ltd*., *India*
2. N. Subrahmanyam, B. Lal, M.N. Avadhanulu, A Textbook of Optics, *S. Chand & Company Ltd*., *India.*
3. A. Ghatak, Optics, *McGraw Hill Education(India) Pvt. Ltd., India*.
4. E. Hecht, A.R. Ganesan, Optics, *Pearson India Education Services Pvt. Lt., India.*

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BS-204A	HIGHER ENGINEERING MATHEMATICS						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 h
Purpose	The objective of this course is to familiarize the prospective Engineers with Laplace Transform, partial differential equations which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						

Course Outcomes	
CO 1	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.
CO 2	To introduce the Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.
CO 3	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.
CO 4	To familiar with essential tool of Numerical differentiation and Integration needed in approximate solutions for the ordinary differential equations.

UNIT-1

Laplace Transform

Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-2

Partial Differential Equations

Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-3

Numerical Methods-1

Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

UNIT-4

Numerical Methods-2

Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules, Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations.

Textbooks/References:

1. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993. AICTE Model Curriculum in Mathematics.
2. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall, 1998.
3. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
4. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
8. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
9. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
10. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
11. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

B. Tech (3rd Semester) Mechanical Engineering							
ES-203A		Basic Electronics Engineering					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
3	0	0	3	75	25	100	3
Purpose :	To provide an overview of electronic devices and components to Mechanical engineering students.						
Course Outcomes							
CO 1	To introduce the basic electronics devices along with their applications.						
CO 2	To become familiar with basic operational amplifier circuits with applications and oscillators.						
CO 3	To understand the fundamentals of digital electronics.						
CO 4	To become familiar with basic electroniccommunication system.						

UNIT-I

Semiconductor Devices and Applications: Introduction to P-N junction Diode and V-Icharacteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. BJT structure, its input-output and transfer characteristics, BJT as a Common Emitter amplifier, frequency response and bandwidth.

UNIT-II

Operational amplifier and its applications: Introduction to operational amplifiers, inverting, non-inverting and differential modes, basic parameters of Op-amp, Op-amp in open loop configuration, study of practical op-amp IC 741, Op-amp applications: adder, subtractor, scale changer, averaging amplifer,comparator, integrator and differentiator.

Timing Circuits and Oscillators: IC 555 timer pin diagram: Astableand mono-stable operation, Barkhausen's criteria for oscillations, R-C phase shift and Wein bridge oscillators using BJT and Op-Amp and their frequency of oscillation.

UNIT-III

Digital Electronics Fundamentals : Difference between analog and digital signals, Booleanalgebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- maps, Logic ICs, half and full adder, multiplexers, de-multiplexers, flip-flops, basic counters.

UNIT-IV

Electronic Communication Systems: The elements ofcommunication system,
Transmission media: wired and wireless, need of modulation, AM and FM modulation schemes, Mobile communication systems: cellular concept and block diagram of GSM system.

Text Books:
1. Integrated Electronics, Millman&Halkias (Mc-Graw Hill)
2. Electronics Devices & Circuit Theory, RL Boylestead& L Nashelsky (PHI)

Reference Books:

1. Modern Digital Electronics, R P Jain, Tata McGraw Hill.

2. Electronic Communication Systems, G. Kennedy, McGraw Hill, 4th Edition

Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech (3rd Semester) Mechanical Engineering							
MEC-201A		THEORY OF MACHINES					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
3	1	0	4	75	25	100	3
Purpose:	To familiarize the students with design of various types of linkage mechanisms for obtaining specific motion, their analysisand applicability for optimal functioning.						
Course Outcomes							
CO 1	To understand the kinematics of simple mechanisms and methods of determining the link velocities.						
CO 2	To understand the acceleration of different mechanisms and profilegeneration of cams and followers.						
CO 3	To understand the concepts of static and dynamic force analysis of different mechanisms and balancing of different components.						
CO 4	To familiarize with gear, gear trains, belts and chain drives.						

UNIT-I

Simple Mechanisms: Introduction to mechanism and machine, Kinematic links, pairs and chains, Mobility of mechanisms, Equivalent mechanisms,Four bar chain, Inversion of four bar chain, slider crank chain and inversions.

Velocity Analysis: Determination of link velocities, Relative velocity method, Velocities in four bar mechanism, Slider crank mechanism, crank and slotted lever mechanism and quick return motion mechanism, Instantaneous center method: Types & location of instantaneous centers, Arnold Kennedy theorem, methods of locating instantaneous centers, steering gear mechanisms. Problems.

UNIT-II

Acceleration Analysis: Acceleration of a point on a link, four bar mechanism and slider crank mechanism, Coriolis component of acceleration, Klein's construction, Problems.

Cams and Followers: Classification & terminology, Cam profile by graphical methods with knife edge and radial roller follower for uniform velocity, simple harmonic, constant acceleration and deceleration and cycloidal motion of followers, Problems.

UNIT-III

Static and Dynamic Force Analysis:constraints and applied forces, static equilibrium, equilibrium of two and three-force member, equilibrium of four-forces and torque, free body diagrams. Dynamic Force Analysis:D'Alembert'sprinciple, equivalent offset interia force, Dynamic analysis of four-link,Dynamic analysis of slider-crank mechanisms, velocity and acceleration of piston, angular velocity and angular acceleration of connecting rod, turning moment on crank shaft, turning moment diagrams, fluctuation of energy, flywheels, Problems.

Balancing:rotating masses: Static and Dynamic Balancing, Single Rotating mass, Many Masses rotating in same plane and in different planes. Analytical method for balancing of rotating masses.Reciprocating masses: Balancing of reciprocating engine, Balancing of Multi-cylinder in line engines, balancing machines.

UNIT-IV

Belts and Chain Drives:classifications of belt, law of belting, Length of open and cross flat belt, Ratio of tensions,Centrifugal tension, power transmission, condition for maximum power transmission, creep of belt, V-belt drives: driving tensions, Chain drives: classifications, terminology of chains, kinematics of chains, Problems.

Gears and Gear Trains: Classification & terminology, Law of gearing, Tooth forms & comparisons, Length of path of contact, Contact ratio, Interference & undercutting in involute gear teeth, Minimum number of teeth on gear and pinion to avoid interference. Gear Trains:simple, compound, reverted andplanetary gear trains, Problems.

Text Books:
1. Theory of Mechanisms and Machines: Amitabha Ghosh and Ashok Kumar Mallik, Third Edition Affiliated East-West Press.
2. Thomas Bevan, Theory of Machines, 3rd edition, CBS Publishers & Distributors, 2005.
3. Cleghorn W.L., Mechanisms of Machines, Oxford University Press, 2005. 3. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGrawHill, 2009.
4. Theory of Machines and Mechanisms: Joseph Edward Shigley and John Joseph Uicker, Jr. Second Edition, MGH, New York.

Reference Books:
1. Mechanism and Machine Theory: J.S. Rao and R.V. Dukkipati Second Edition New age International.
2. Theory and Machines: S.S. Rattan, Tata McGraw Hill.
3. Kinematics of Machines-Dr. Sadhu Singh, Pearson Education

Note: The paper setter will set the paper as per the question paper templates provided.

	B. Tech. (3rd Semester) Mechanical Engineering						
MEC-203A	**MECHANICS OF SOLIDS-I**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	1	0	4	75	25	100	3
Purpose	The objective of this course is to make the students aware of Stress, Strain and deformation of solids with the applications to beams, shafts and column and struts. The course will help the students to build the fundamental concepts in order to solve engineering problems.						
Course Outcomes							
CO1	Apply fundamental principles of mechanics & principles of equilibrium to simple and practical problems of engineering, determine centroid and moment of inertia of a different geometrical shapes and able to understand its importance. Explain the basic concepts of stress and strain and solve the problems						
CO 2	Determine and calculate the values of principal stresses. Express the concept of shear force and bending moment of beams. Construct shear force and bending moment diagram for beams.						
CO 3	Express the concept of torsion of circular shaft and able to solve the problems on torsion of circular shaft. Illustrate and solve the problems on bending and shear stresses on beams						
CO 4	Solve the problems on column and strut and Derive the derivations and solve the problems on slope and deflection.						

Unit-I

Introduction: Force, types of forces, Characteristics of a force, System of forces, Composition and resolution of forces, forces in equilibrium, principle and laws of equilibrium, Free body diagrams, Lami's Theorem, equations of equilibrium, Concept of center of gravity and centroid, centroid of various shapes: Triangle, circle, semicircle and trapezium, theorem of parallel and perpendicular axes, moment of inertia of simple geometrical figures, polar moment of inertia. Numerical Problems

Simple Stresses & Strains: Concept & types of Stresses and strains, Poisson's ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hook's law, elastic constants & their relationships, temperature stress & strain in simple & compound bars under axial loading, Numerical problems.

Unit-II

Principle Stresses: Two dimensional systems, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stresses, Numerical Problems.

Shear Force & Bending Moments: Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without over-hang and calculation of maximum BM & SF and the point of contraflexture under (i) concentrated loads, (ii) uniformly distributed loads over whole span or a part of it, (iii)combination of concentrated loads and uniformly distributed loads, (iv) uniformly varying loads and (v) application of moments, relation between the rate of loading, the shear force and the bending moments, Numerical Problems.

. **Unit-III**

Torsion of Circular Members: Derivation of equation of torsion, Solid and hollow circular shafts, tapered shaft, stepped shaft & composite circular shafts, Numerical problems.

Flexural and Shear Stresses – Theory of simple bending, Assumptions, derivation of equation of bending, neutral axis, determination of bending stresses, section modulus of rectangular & circular (solid & hollow), I,T, Angle, channel sections, composite beams, shear stresses in beams with derivation, shear stress distribution across various beam sections like rectangular, circular, triangular, I, T, angle sections. combined bending and torsion, equivalent torque,. Numerical problems.

Unit-IV

Columns & Struts: Column under axial load, concept of instability and buckling, slenderness ratio, derivation of Euler's formula for crippling load for columns of different ends, concept of equivalent length, eccentric loading, Rankine formulae and other empirical relaions, Numerical problems.

Slope & Deflection : Relationship between bending moment, slope & deflection, moment area method, method of integration, Macaulay's method, calculations for slope and deflection of (i) cantilevers and (ii) simply supported beams with or without overhang under concentrated load, Uniformly distributed loads or combination of concentrated and uniformly distributed loads, Numerical problems.

Text Books:
1. Strength of Materials – R.K. Rajput, Dhanpat Rai & Sons.
2. Strength of Materials – Sadhu Singh, Khanna Publications.
3. Strength of Materials – R.K. Bansal, Laxmi Publications.

Reference Books:
1. Strength of Materials – Popov, PHI, New Delhi.
2. Strength of Materials – Robert l. Mott, Pearson, New Delhi
3. Strength of Material – Shaums Outline Series – McGraw Hill
4. Strength of Material – Rider – ELBS

B. Tech. (3rd semester) Mechanical Engineering							
MEC-205A	**THERMODYNAMICS**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**1**	**0**	**4**	**75**	**25**	**100**	**3**
Purpose	The objective of this course is to make the students aware of Energy, Entropy, and Equilibrium, various laws of thermodynamics, concepts and principles. The course will help the students to build the fundamental concepts to apply in various applications like IC engines and Air conditioning systems.						
Course Outcomes							
CO 1	Analyze the work and heat interactions associated with a prescribed process path and to perform an analysis of a flow system.						
CO 2	Define the fundamentals of the first and second laws of thermodynamics and explain their application to a wide range of systems.						
CO 3	Evaluate entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process from such calculations.						
CO 4	Solve the problems related to Steam and plot the processes on H-S and T-S diagram. Understand thermodynamics relations.						

Unit-I

Basic Concepts: Thermodynamics: Macroscopic and Microscopic Approach, Thermodynamic Systems, Surrounding and Boundary, Thermodynamic Property – Intensive and Extensive, Thermodynamic Equilibrium, State, Path, Process and Cycle, Quasi-static, Reversible and Irreversible Processes, Working Substance. Concept of Thermodynamic Work and Heat, Zeroth Law of Thermodynamic and its utility.

First Law of Thermodynamics: Energy and its Forms, Energy and 1st law of Thermodynamics, Internal Energy and Enthalpy, 1st Law Applied to Non-Flow Process, Steady Flow Process and Transient Flow Process, Throttling Process and Free Expansion Process.

Unit-II

Second Law of Thermodynamics: Limitations of First Law, Thermal Reservoir Heat Source and Heat Sink, Heat Engine, Refrigerator and Heat Pump, Kelvin- Planck and Clausius Statements and Their Equivalence, Perpetual Motion Machine of Second Kind. Carnot Cycle, Carnot Heat Engine and Carnot Heat Pump, Carnot's Theorem and its Corollaries, Thermodynamic Temperature Scale, Numericals

Entropy: Clausius Inequality and Entropy, Principle of Entropy Increase, Temperature-Entropy Plot, Entropy Change in Different Processes, Introduction to Third Law of thermodynamics.

Unit -III

Availability, Irreversibility and Equilibrium: High and Low Grade Energy, Available Energy and Unavailable Energy, Loss of Available Energy Due to Heat Transfer Through a Finite Temperature Difference, Availability of a Non-Flow or Closed System, Availability of a Steady Flow System, Helmholtz and Gibb's Functions, Effectiveness and Irreversibility.

Pure Substance: Pure Substance and its Properties, Phase and Phase Transformation, Vaporization, Evaporation and Boiling , Saturated and Superheated Steam, Solid – Liquid – Vapour Equilibrium, T-V, P-V and P-T Plots During Steam Formation, Properties of Dry, Wet and Superheated Steam, Property Changes During Steam Processes, Temperature – Entropy (T-S) and Enthalpy – Entropy (H-S) Diagrams, Throttling and Measurement of Dryness Fraction of Steam.

Unit-IV

Thermodynamic Relations: TDS Relations, Enthalpy and Internal Energy as a Function of Independent Variables, Specific Heat Capacity Relations, Clapeyron Equation, Maxwell Relations.

Gas Power Cycles: Air standard efficiency, Otto cycle, Diesel cycle, Dual cycle, Atkinson cycle, Stirling and Ericsson cycles, Brayton or Joule cycle, Lenoir cycle

Text Books:
1. Engineering Thermodynamics – C P Arora, Tata McGraw Hill
2. Engineering Thermodynamics – P K Nag, Tata McGraw Hill
3. Thermodynamics – An Engineering Approach; Y. A. Cengel, M. A. Boles; Tata McGraw Hill

Reference Books:
1. Thermal Science and Engineering – D S Kumar, S K Kataria and Sons
2. Engineering Thermodynamics -Work and Heat transfer – G F C Rogers and Maghew
Y R Longman

Note: The paper setter will set the paper as per the question paper templates provided.

	B.Tech (3rd Semester) Mechanical Engineering							
MEC-207LA	**THEORY OF MACHINES LAB**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time (Hrs)**
0	**0**	**2**	**1**	**0**	**40**	**60**	**100**	**3**
Purpose :	To familiarize and practice the students with various kinds of mechanisms andmachines.							
	Course Outcomes							
CO 1	To learn about various types of basic mechanism & their applications in different machines.							
CO 2	To study the effect of static and dynamic force on the components of single slider crank mechanism.							
CO 3	To find gyroscopic couple of a motorized gyroscope experimentally.							
CO 4	To study the design and working of various gear, gear trains, steering systems, belt drives, brakes and dynamometers.							

List of experiments
1. To study inversions of 4 bar mechanisms, single and double slider crank mechanisms.
2. To determine the ratio of times and tool velocities of Whitworth quick-return mechanism.
3. To plot slider displacement, velocity and acceleration against crank rotation for single slider crank mechanism.
4. To find out experimentally the Coriolis component of acceleration and compare with theoretical value.
5. To determine the moment of inertia of a flywheel.
6. To plot follower displacement v/s cam rotation for various cam follower systems.
7. To find gyroscopic couple on motorized gyroscope and compare with applied couple.
8. To calculate the torque on planet carrier and torque on internal gear using epicycle gear train and holding torque apparatus.
9. To determine the coefficient of friction between belt and pulley and plot a graph between log $_{10}$ T_1/T_2 v/s θ
10. To study the different types of centrifugal and inertia governor with demonstration.
11. To study different types of brakes and dynamometers with demonstration.
12. To study various types of steering mechanisms.

Note: At least eight experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

MEC-209LA	B.Tech. (3rd semester) Mechanical Engineering							
	MECHANICS OF SOLIDS LAB							
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Practical	Total	Time (Hrs.)
0	**0**	**2**	**1**	**0**	**40**	**60**	**100**	**3**
Purpose	To make the students aware of different properties of material using different experiments.							
Course Outcomes								
CO1	Ability to design and conduct experiments, acquire data, analyze and interpret data							
CO 2	Ability to determine the behavior of ferrous metals subjected to normal and shear stresses by means of experiments.							
CO 3	Ability to determine the behavior of structural elements, such as bars subjected to tension, compression, shear, bending, and torsion by means of experiments.							
CO 4	Physical insight into the behavior materials and structural elements, including distribution of stresses and strains, deformations and failure modes.							
CO5	Write individual and group reports: present objectives, describe test procedures and results, synthesize and discuss the test results.							

List of Experiments:
1. To study the Brinell hardness testing machine & perform the Brinell hardness test.
2. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.
3. To study the Vickers hardness testing machine & perform the Vickers hardness test.
4. To study the Erichsen sheet metal testing machine & perform the Erichsen sheet metal test.
5. To study the Impact testing machine and perform the Impact tests (Izod&Charpy).
6. To study the Universal testing machine and perform the tensile, compression & bending tests.
7. To perform the shear test on UTM.
8. To study the torsion testing machine and perform the torsion test.
9. To draw shear Force, Bending Moment Diagrams for a simply Supported Beam under point and distributed Loads.
10. To prepare the composite specimen using hot compression molding machine and test for different mechanical properties.
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Note: At least eight experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

	B.Tech. (3rd semester) Mechanical Engineering							
MEC-211A	**INDUSTRIAL TRAINING-I**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time (Hrs.)**
2	**0**	**0**	**--**	**--**	**100**	**--**	**100**	
Purpose	To provide comprehensive learning platform to students where they can enhance their employ ability skills and exposure to the industrial environment.							
Course Outcomes								
CO1	Capability to acquire and apply fundamental principles of engineering.							
CO 2	Become updated with all the latest changes in technological world.							
CO 3	Capability and enthusiasm for self-improvement through continuous professional development and life-long learning							
CO 4	Awareness of the social, cultural, global and environmental responsibility as an engineer.							

Note: 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 qualify.

The candidate has to submit a training report of his/her work/project/assignment completed in the industry during the training period. The evaluation will be made on the basis of submitted training report and viva-voce/presentation.

MC-901A	Environmental Sciences						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment

and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

	B.Tech. (4th Semester) Mechanical Engineering						
ES-204	**MATERIALS ENGINEERING**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**0**	**0**	**3**	**75**	**25**	**100**	**3**
Purpose:	To understand internal structure- properties relationship of different types of materials and learn about Metallographic analysis and Characterization.						
Course Outcomes							
CO 1	To understand the Crystal structures and deformation mechanism in various materials.						
CO 2	To study various types of phase diagrams, TTT curve and Iron carbon diagram. To learn about different heat treatment processes.						
CO 3	To learn about the failure mechanisms like Creep and Fatigue and designation of materials.						
CO 4	To study Basics of Metallography and Basic Principle involved in the working of various types of Material characterization techniques.						

UNITI

Crystallography: Review of Crystal Structure, Space Lattice, Co-ordination Number ,Number of Atomsper Unit Cell, Atomic Packing Factor; Numerical Problems Related to Crystallography.

Imperfection in Metal Crystals: Crystal Imperfections and their Classifications, Point Defects, Line Defects, Edge & Screw Dislocations, Surface Defects, Volume Defects.

Introduction to Engineering materials and Standard Materials Designation: Introduction to Engineering materials, Steel Terminology, Standard Designation System for Steels, Indian Standard specifications for steels as per BIS: Based on Ultimate Tensile Strength and based on Composition, AISI-SAE standard designation for Steels and Aluminium Alloys

UNIT II

Phase Diagrams: Alloy Systems, Solid solutions, Hume Rothery's Rules, Intermediate phases, Phase Diagrams, Gibbs Phase Rule, Cooling curves, The Lever Rule, binary phase diagrams, Applications of Phase Diagrams, Phase Transformation, Micro constituents of Fe-C system, Allotropic Forms of Iron ,Iron-iron carbide phase diagram, Modified Iron Carbon Phase Diagrams, Isothermal Transformation, TTT Curve,

Heat Treatment: Heat treatment of steels, Annealing, Normalising, Hardening, Tempering, Case Hardening, Ageing, Aus tempering and Mar tempering, Surface Hardening, Mass Effect, Equipments for Heat Treatment, Major Defects in Metals or Alloys due to faulty Heat treatment.

UNIT III

Deformation of Metal: Elastic and Plastic Deformation, Mechanism of Plastic Deformation, Slip; Critical Resolved Shear Stress, Twinning, Conventional and True Stress Strain Curves for Polycrystalline Materials, Yield Point Phenomena, Bauschinger Effect, Work Hardening.

Failure of Materials: Fatigue, Fatigue fracture, fatigue failure, Mechanismof Fatigue Failure, Fatigue Life calculations ,Fatigue Tests, Theories of Fatigue.

Creep: Creep Curve , Types of Creep, Factors affecting Creep, Mechanism of Creep, Creep Resistant Material, Creep Fracture, Creep Test, Stress Rupture test.

UNITIV

Introduction to Metallography: Metallography, Phase analysis, Dendritic growth, Cracks and other defects Corrosion analysis, Intergranular attack (IGA), Coating thickness and integrity, Inclusion size, shape and distribution, Weld and heat-affected zones (HAZ), Distribution and orientation of composite fillers, Graphite nodularity, Intergranular fracturing

Materials Characterization Techniques: Characterization techniques suchas X-Ray Diffraction (XRD), Scanning Electron Microscopy, transmission electron microscopy, atomic force microscopy, scanning tunneling microscopy, Atomic absorption spectroscopy.

Text Books:

1. Material Science by S.L.Kakani, New Age Publishers.
2. The Science and Engineering of Materials, Donald R. Askeland , Chapman & Hall.
3. Fundamentals of Material Science and Engineering by W. D. Callister, Wiley.
4. FundamentalofLightMicroscopyandElectronicImagingbyDouglasB.Murphy, Kindle Edition 2001

5. Materials Science and Engineering, V. Raghvan
6. Phase Transformation in Metals and Alloys,D. A.Porter &K.E. Easterling

Reference Books:

7. Material Science by Narula, TMH
8. Metallographic Handbook by Donald C. Zipperian, Pace Technologies, USA.
9. Robert Cahn Concise Encyclopedia of Materials Characterization, SecondEdition:2nd Edition (Advances in Materials Science and Engineering) Elsevier Publication 2005.
10. Smart Materials and Structures by Gandhi and Thompson, Chapman and Hall.

Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech. (4th Semester) Mechanical Engineering							
MEC-202A	**APPLIED THERMODYNAMICS**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**0**	**0**	**3**	**75**	**25**	**100**	**3**
Purpose:	This course aims to provide a platform to students to understand, model and analyze concept of dynamics involved in thermal energy transformation. To prepare them to carry out experimental investigation and analysis of problems related to applied thermodynamics.						
Course Outcomes							
CO1	Understand the working of boilers, types of boilers, accessories and mountings used on boilers.						
CO 2	Learn about simple and modified Rankine cycles.						
CO 3	Understand the design and analysis of steam flow through steam nozzles. To learn about the working of different types of condensers.						
CO 4	Analyze the working and design of the steam turbine and apply the knowledge in solving the engineering problems of turbines.						

UNITI

Steam Generators: Introduction; classification of boilers; comparison of fire tube and water tube boiler; their advantages; description of boiler; Lancashire; locomotive; Babcock; Wilcox etc.; boiler mountings; stop valve; safety valve; blow off valve; feed check etc.; water level indicator; fusible plug; pressure gauge; boiler accessories; feed pump; feed water heater; preheater; super heater; economizer; natural draught chimney design; artificial draught; stream jet draught; mechanical draught; calculation of boiler efficiency and equivalent evaporation.

UNIT II

Vapour Power Cycles: Simple and modified Rankine cycle; effect of operating parameters on Rankine cycle performance; effect of superheating; effect of maximum pressure; effect of exhaust pressure; reheating and regenerative Rankine cycle; types of feed water heater; reheat factor; binary vapour cycle. Simple steam engine, compound engine; function of various components.

UNIT III

Steam Nozzle: Function of steam nozzle; shape of nozzle for subsonic and supersonics flow of stream; variation of velocity; area of specific volume; steady state energy equation; continuity equation; nozzle efficiency; critical pressure ratio for maximum discharge; physical explanation of critical pressure; super saturated flow of steam; design of steam nozzle. Advantage of steam condensation; component of steam condensing plant; types of condensers; air leakage in condensers; Dalton's law of partial pressure; vacuum efficiency; calculation of cooling water requirement; air expansion pump.

UNIT IV

Steam Turbines: Introduction; classification of steam turbine; impulse turbine; working principle; compounding of impulse turbine; velocity diagram; calculation of power output and efficiency; maximum efficiency of a single stage impulse turbine; design of impulse turbine blade section; impulse, reaction turbine; working principle; degree of reaction; parsons turbine; velocity diagram; calculation of power output; efficiency of blade height; condition of maximum efficiency; internal losses in steam turbine; governing of steam turbine.

Text Books:
1. Thermal Engineering – P L Ballaney, Khanna Publishers.

2. Thermodynamics and Heat Engines vol II – R Yadav, Central Publishing House
3. Engineering Thermodynamics Work and Heat Transfer - G. F. C Rogers and Y. R. Mayhew, Pearson.
4. Applied Thermodynamics for Engineering Technologists - T. D. Eastop and A. McConkey, Pearson.
Reference Books:
1. Applied Thermodynamics for Engineering Technologists – T D Eastop and
   A. McConkey, Pearson Education
2. Heat Engineering – V P Vasandani and D S Kumar, Metropolitan Book Co Pvt Ltd.
Note: The paper setter will set the paper as per the question paper templates provided.

B. Tech. (4th Semester) Mechanical Engineering							
MEC-204A		**FLUID MECHANICS&FLUID MACHINES**					
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**1**	**0**	**4**	**75**	**25**	**100**	**3**
Purpose: To build a fundamental understanding of concepts of Fluid Mechanics and their application in rotodynamic machines.							
Course Outcomes							
CO1	Upon completion of this course, students will be able to apply mass and momentum conservation laws to mathematically analyze simple flow situations.						
CO2	The students will be able to obtain solution for boundary layer flows using exact or approximate methods.						
CO3	The students will be able to estimate the major and minor losses through pipes and learn to draw the hydraulic gradient and total energy lines.						
CO4	The students will be able to obtain the velocity and pressure variations in various types of simple flows.						
CO5	They will be able to analyze the flow and evaluate the performance of pumps and turbines.						

Unit I

Fluid Properties: Definition of fluid, Newton's law of viscosity, Units and dimensions-Properties of fluids, mass density, weight density, specific volume, specific gravity, viscosity, compressibility, surface tension and capillarity.
Fluid Kinematics: Types of fluid flows, stream, streak and path lines; flow rate and continuity equation, differential equation of continuity in cartesian and polar coordinates, rotation and vorticity, circulation, stream and potential functions, flow net. Problems.
Fluid Dynamics: Concept of system and control volume, Euler's equation, Navier-Stokes equation, Bernoulli's equation and its practical applications, Impulse momentum equation. Problems.

Unit II

Viscous Flow: Flow regimes and Reynold's number, relationship between shear stress and pressure gradient. Exact flow solutions, Couette and Poisuielle flow, laminar flow through circular conduits. Problems.
Turbulent Flow Through Pipes: Darcy Weisbach equation, friction factor, Moody's diagram, minor losses in pipes, hydraulic gradient and total energy lines, series and parallel connection of pipes, branched pipes; equivalent pipe, power transmission through pipes. Problems.
Boundary Layer Flow: Concept of boundary layer, measures of boundary layer thickness, Blasius solution, von-Karman momentum integral equation, laminar and turbulent boundary layer flows, separation of boundary layer and its control. Problems.

Unit III

Dimensional Analysis: Need for dimensional analysis – methods of dimension analysis – Dimensionless parameters – application of dimensionless parameters. Problems.
Hydraulic Pumps: Introduction, theory of Rotodynamic machines, Classification, various efficiencies, velocity components at entry and exit of the rotor, velocity triangles; Centrifugal pumps, working principle, work done by the impeller, minimum starting speed, performance curves, Cavitation in pumps, Reciprocating pumps, working principle, Indicator diagram, Effect of friction and acceleration, air vessels, Problems.

Unit IV

Hydraulic Turbines: Introduction, Classification of water turbines, heads and efficiencies, velocity triangles, Axial, radial and mixed flow turbines, Pelton wheel, Francis turbine and Kaplan turbines, working principles, work done, design of turbines, draft tube and types, Specific speed, unit quantities, performance curves for turbines, governing of turbines. Problems.
Text Books:
1. Introduction to Fluid Mechanics – R.W. Fox, Alan T. McDonald, P.J. Pritchard, Wiley Publications.

2. Fluid Mechanics – Frank M. White, McGraw Hill
3. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar, S.K. Kataria and Sons
4. Fluid Mechanics – Streeter V L and Wylie E B, Mc Graw Hill
5. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas, Tata McGraw Hill.

Reference Books:
1. Mechanics of Fluids – I H Shames, Mc Graw Hill
2. Fluid Mechanics: Fundamentals and Applications - YunusCengel and John Cimbala, McGraw Hill.
3. Fluid Mechanics: Pijush K. Kundu, Ira M. Cohen and David R. Rowling, Academic Press.

Note: The paper setter will set the paper as per the question paper templates provided.

	B. Tech. (4th Semester) Mechanical Engineering						
MEC-206A	**MECHANICS OF SOLIDS-II**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**1**	**0**	**4**	**75**	**25**	**100**	**3**
Purpose	The objective of this course is to show the development of strain energy and stresses in springs, pressure vessel, rings, links, curved bars under different loads. The course will help the students to build the fundamental concepts in order to solve engineering problems						
Course Outcomes							
CO1	Identify the basics concepts of strain energy and various theories of failures and solve the problems						
CO 2	Differentiate different types of stresses induced in thin pressure vessel and solve the problems. Use of Lame's equation to calculate the stresses induced in thick pressure vessel.						
CO 3	Able to compute stresses in ring, disk and cylinder due to rotation. Classify the different types of spring and analyze the stresses produced due to loading						
CO 4	Determine the stresses in crane hook, rings, chain link for different cross section and also the deflection of curved bars and rings. Analyze the stresses due to unsymmetrical bending and determine the position of shear centre of different section.						

Unit I

Strain Energy & Impact Loading: Definitions, expressions for strain energy stored in a body when load is applied (i) gradually, (ii) suddenly and (iii) with impact, strain energy of beams in bending, beam deflections, strain energy of shafts in twisting, energy methods in determining spring deflection, Castigliano's theorem, Numerical.

Theories of Elastic Failures: Various theories of elastic failures with derivations and graphical representations, applications to problems of 2- dimensional stress system with (i) Combined direct loading and bending, and (ii) combined torsional and direct loading, Numericals.

Unit II

Thin Walled Vessels: Hoop & Longitudinal stresses & strains in cylindrical &spherical vessels & their derivations under internal pressure, wire would cylinders, Numericals.

Thick Cylinders & Spheres: Derivation of Lame's equations, radial & hoop stresses and strains in thick, and compound cylinders and spherical shells subjected to internal fluid pressure only, hub shrunk on solid shaft, Numericals.

Unit III

Rotating Rims & Discs: Stresses in uniform rotating rings & discs, rotating discs of uniform strength, stresses in (I) rotating rims, neglecting the effect of spokes, (ii) rotating cylinders, hollow cylinders & solids cylinders. Numericals.

Springs: Stresses in closed coiled helical springs, Stresses in open coiled helical springs subjected to axial loads and twisting couples, leaf springs, flat spiral springs, concentric springs, Numericals.

Unit IV

Bending of Curved Bars : Stresses in bars of initial large radius of curvature, bars of initial small radius of curvature, stresses in crane hooks, rings of circular & trapezoidal sections, deflection of curved bars & rings, deflection of rings by Castigliano's theorem, stresses in simple chain links, deflection of simple chain links, Problems.

Unsymmetrical Bending: Introduction to unsymmetrical bending, stresses due to unsymmetrical bending, deflection of beam due to unsymmetrical bending, shear center for angle, channel, and I-sections, Numericals.

Text Books:

1. Strength of Materials – R.K. Rajput, Dhanpat Rai & Sons.
2. Strength of Materials – Sadhu Singh, Khanna Publications.
3. Strength of Materials – R.K. Bansal, Laxmi Publications.

Reference Books:

1. Strength of Materials – Popov, PHI, New Delhi.
2. Strength of Materials – Robert l. Mott, Pearson, New Delhi
3. Strength of Material – Shaums Outline Series – McGraw Hill
4. Strength of Material – Rider – ELBS

Note: The paper setter will set the paper as per the question paper templates provided.

	B. Tech. (4th Semester) Mechanical Engineering						
MEC-208A	**Instrumentation & Control**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time(Hrs)**
3	0	0	3	75	25	100	3
Purpose	To understand the basics of the measurement of various quantities using instruments, their accuracy and range and the techniques for controlling devices automatically.						
	Course Outcomes						
CO1	Students will have basic knowledge about measurement systems and their components.						
CO2	Students will learn about various sensors used for measurement of mechanical quantities.						
CO3	Students will have basic knowledge of process monitoring and control.						

Unit I

Instrumentation System: introduction, typical applications of instrument systems, functional elements of a measurement system, classification of instruments, standards and calibration, static and dynamic characteristics of measurement systems.

Statistical Error Analysis: statistical analysis of data and measurement of uncertainty: probability, confidence interval or level, mean value and standard deviation calculation, standard normal distribution curve and probability tables, sampling and theory based on samples, goodness of fit, curve fitting of experimental data.

Unit II

Sensors and Transducers: introduction and classification, transducer selection and specifications, primary sensing elements, resistance transducers, variable inductance type transducers, capacitive transducers, piezo-electric transducers, strain gauges.Smart Sensors: Introduction, architecture of smart sensor, bio sensor and physical sensor, Piezo-resistive pressure sensor, microelectronic sensor.

Measurement of force, torque, shaft power, speed and acceleration: force and weight measurement system, measurement of torque, shaft power, speed and velocity: electrical and contactless tachometers, acceleration: vibrometers, seismic and piezo-electric accelerometer.

Unit III

Measurement of pressure, temperature and flow: Basic terms, Pressure: Liquid column manometers, elastic type pressure gauges, electrical types for pressure and vacuum, temperature measuring instruments: RTD sensors, NTC thermistor, thermocouples, and semiconductor based sensors. Flow Measurement: drag force flow meter, turbine flow meter, electronic flow meter, electromagnetic flow meter, hot-wire anemometer.

Instruments for measuring Humidity, Density, and Viscosity: Humidity definitions, Humidity measuring devices, Density and Specific Gravity, Basic terms, Density measuring devices, Density application considerations, Viscosity, Viscosity measuring instruments, basic terms used in pH, pH measuring devices, pH application considerations. Problems.

Unit IV

Basic Control System: Introduction, basic components of control system, classification : closed loop and open loop control system, transfer function, block diagram representation of closed loop system and its reduction techniques, mathematical modelling of various mechanical systems and their analogy with electrical systems, signal flow graph and its representation.

Mechanical Controllers: Basics of actuators: pneumatic controller, hydraulic controller and their comparison.

Text Books:

1.Instrument and control by Patranabis D., PHI Learning.
2.Fundamental of Industrial Instrumentation and Process control by W.C.DUNN, McGrawHill,

3. Thomas G. Beckwith, Roy D. Marangoni, John H. LienhardV , Mechanical Measurements (6th Edition), Pearson Education India, 2007
4. Gregory K. McMillan, Process/Industrial Instruments and Controls Handbook, Fifth Edition, McGraw-Hill: New York,1999.
Reference Books:
1. Mechanical Measurement and Control by A K Sawhney
2. Modern control Engineering by Katsuhiko Ogata, PHI publication
Note: The paper setter will set the paper as per the question paper templates provided.

	B. Tech. (4th Semester)Mechanical Engineering							
ES-206LA	**MATERIALS ENGINEERING LAB**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time (Hrs.)**
0	**0**	**2**	**1**	**-**	**40**	**60**	**100**	**3**
Purpose	Tomakethestudentsawareofmaterialstructureandpropertiesofmaterialusing differentexperiments.							
CourseOutcomes								
CO 1	Ability to design and conduct experiments, acquire data, analyze and interpret data							
CO 2	Ability to determine the grain size and microstructure in different Ferrous alloys by means of experiments.							
CO 3	Ability to learn about microstructures of different Non-Ferrous alloys by means of experiments.							
CO 4	To learn about heat treatment processes through experiments.							
CO 5	Ability to Analyze microstructure of Heat-treated specimens and perform Fatigue and creep test on different materials.							

List ofExperiments:
1. To Study various Crystal Structures through Ball Models.
2. To study the components and functions of Metallurgical Microscope.
3. To learn about the process of Specimen Preparation for metallographic examination.
4. To perform Standard test Methods for Estimation of Grain Size.
5. To perform Microstructural Analysis of Carbon Steels and low alloy steels.
6. To perform Microstructural Analysis of Cast Iron.
7. To perform Microstructural Analysis of Non-Ferrous Alloys: Brass & Bronze.
8. To perform Microstructural Analysis of Non-Ferrous Alloys: Aluminium Alloys.
9. To Perform annealing of a steel specimen and to analyze its microstructure.
10. To Perform Hardening of a steel specimen and to analyze its microstructure.
11. To performFatiguetest on fatiguetestingmachine.
12. To perform Creep test oncreep testingmachine.

Note: At least eight experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

	B. Tech. (4th Semester) Mechanical Engineering							
MEC-210LA	**FLUID MECHANICS &FLUID MACHINES LAB**							
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time**
0	**0**	**2**	**1**	**0**	**40**	**60**	**100**	**3**
Purpose	To familiarize the students with the equipment and instrumentation of Fluid Mechanics and Machines							
Course Outcomes								
CO1	Operate fluid flow equipment and instrumentation.							
CO2	Collect and analyse data using fluid mechanics principles and experimentation methods.							
CO3	Determine the coefficient of discharge for various flow measurement devices.							
CO4	Calculate flow characteristics such as Reynolds number, friction factor from laboratory measurements.							
CO5	Analyze the performance characteristics of hydraulic pumps.							
CO6	Analyze the performance characteristics of hydraulic turbines.							

List of Experiments:
1. To verify the Bernoulli's Theorem.
2. To determine coefficient of discharge of an orifice meter.
3. To determine the coefficient of discharge of Venturimeter.
4. To determine the coefficient of discharge of Notch.
5. To find critical Reynolds number for a pipe flow.
6. To determine the friction factor for the pipes.
7. To determine the meta-centric height of a floating body.
8. Determination of the performance characteristics of a centrifugal pump.
9. Determination of the performance characteristics of a reciprocating pump.
10. Determination of the performance characteristics of a gear pump.
11. Determination of the performance characteristics of Pelton Wheel.
12. Determination of the performance characteristics of a Francis Turbine.
13. Determination of the performance characteristics of a Kaplan Turbine.
14. Determination of the performance characteristics of a Hydraulic Ram.

Note: At least ten experiments are required to be performed by students from the above list and two may be performed from the experiments developed by the institute.

	B. Tech. (4th Semester) Mechanical Engineering						
MC-902A	**Constitution of India**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**0**	**0**	**-**	**75**	**25**	**100**	**3 Hrs.**
Purpose	To know the basic features of Constitution of India						
	Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.						
CO2	To know about fundamental duties and federal structure of Constitution of India.						
CO3	To know about emergencyprovisions in Constitution of India.						
CO4	To know about fundamental rights under constitution of India.						

UNIT I

Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
Scheme of the fundamental rights

UNIT II

The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT III

Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT IV

Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom

under Article 19.

Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
1. Constitution of India. Prof. Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

Bachelor of Technology (Mechatronics Engineering)
(Credit Based)
SCHEME OF STUDIES/EXAMINATIONS (Modified) *w. e. f.* 2019-20 onwards
Semester–III

S. No.	Course No.	Course Title	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hours)
						Major Test	Minor Test	Practical	Total	
1	#BS-201A	Optics & Waves	3:0:0	3	3	75	25	0	100	3
2	BS-204A	Higher Engineering Mathematics	3:0:0	3	3	75	25	0	100	3
3	#ES-203A	Basic Electronics Engineering	3:0:0	3	3	75	25	0	100	3
4	MTC-201	Thermal Engineering	3:0:0	3	3	75	25	0	100	3
5	MTC-203	Applied Engineering Mechanics	3:1:0	4	4	75	25	0	100	3
6	MTC-205	Theory of Machines-I	3:1:0	4	4	75	25	0	100	3
7	ES-211LA	Basic Electronics Lab	0:0:2	2	1	0	40	60	100	3
8	MTC-207	Applied Engineering Mechanics Lab	0:0:2	2	1	0	40	60	100	3
9	MTC-209	Theory of Machines-I Lab	0:0:2	2	1	0	40	60	100	3
10	*MTC-211	Industrial Training-I	2:0:0	2	-	-	100	-	100	
11	**MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3
		Total	23:2:6	31	23	450	270	180	900	

Note:

*1. * MTC-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 qualify.*

*2.**MC-901A is a mandatory credit-less course in which the students will be required to get passing marks in the major test.*

3. Students are allowed to use programmable scientific calculator during examination.

Bachelor of Technology (Mechatronics Engineering)
(Credit Based)
SCHEME OF STUDIES/EXAMINATIONS (Modified) *w. e. f.* 2019-20 onwards
Semester–IV

S. No.	Course No.	Course Title	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hours)
						Major Test	Minor Test	Practical	Total	
1	#ES-204A	Materials Engineering	3:0:0	3	3	75	25	0	100	3
2	MTC-202	Digital Electronics	3:0:0	3	3	75	25	0	100	3
3	MTC-204	Fluid Mechanics and Heat Transfer	3:0:0	3	3	75	25	0	100	3
4	MTC-206	Production Technology-I	3:0:0	3	3	75	25	0	100	3
5	MTC-208	Theory of Machines-II	3:1:0	4	4	75	25	0	100	3
6	MTC-210	Fluid Mechanics and Heat Transfer Lab	0:0:3	3	1.5	0	40	60	100	3
7	MTC-212	Theory of Machines-II Lab	0:0:3	3	1.5	0	40	60	100	3
8	MTC-214	Digital Electronics Lab	0:0:2	2	1	0	40	60	100	3
9	*MC-902A	Constitution of India	3:0:0	3	-	75	25	-	100	3
		Total	18:1:8	27	20	375	245	180	800	

Note:

1. *MC-902A is a mandatory credit-less course in which the students will be required to get passing marks in the major test.
2. Students are allowed to use programmable scientific calculator during examination.
3. All the students have to undergo six weeks industrial training after 4th semester and it will be evaluated in 5th semester.
4. #The courses are common with B. Tech. Mechanical Engineering.

BS – 201A	Optics and Waves						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3h
Purpose	To introduce the fundamentals of wave and optics for the applications in Engineering field.						
Course Outcomes							
CO 1	Familiarize with basic phenomenon used in propagation of waves.						
CO 2	Introduce the fundamentals of interference, diffraction, polarization and their applications.						
CO 3	To make the students aware to the importance of Laser in technology.						

Unit - I

Waves: Travelling waves, Characteristics of waves, Mathematical representation of travelling waves, General wave equation, Phase velocity, Light source emit wave packets, Wave packet and Bandwidth, Group velocity and real light waves.

Propagation of light waves: Maxwell's equations, Electromagnetic waves and constitutive relations, Wave equation for free-space, Uniform plane waves, Wave polarization, Energy density, the pointing vector and intensity, Radiation pressure and momentum, Light waves at boundaries, Wave incident normally on boundary, Wave incident obliquely on boundary: law of reflection, Snell's law and reflection coefficients.

Unit - II

Interference: Principle of Superposition, Conditions for Sustained interference, Young's double slit experiment, Division of wave-front: Fresnel's Biprism and its applications, Division of amplitude: Interference due to reflected and transmitted light, Wedge-shaped thin film, Newton's rings and its applications, Michelson Interferometer and its applications.

Unit – III

Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit, Plane transmission diffraction grating: theory, secondary maxima and secondary minima, width of principal maxima, absent spectra, overlapping of spectral lines, determination of wavelength; Dispersive power and resolving power of diffraction grating.

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, Biquartz polarimeter.

Unit – IV

Laser: Stimulated Absorption, Spontaneous and Stimulated Emission; Einstein's Coefficients and its derivation, Population Inversion, Direct and Indirect pumping, Pumping schemes, Main components of Laser, Gas lasers (He-Ne, CO_2), Solid state lasers (Ruby, Neodymium, semiconductor), Dye laser, Characteristics of Laser, Applications of Laser.

Text/Reference Books:
1. P.K. Diwan, Applied Physics for Engineers, *Wiley India Pvt. Ltd*., *India*
2. N. Subrahmanyam, B. Lal, M.N. Avadhanulu, A Textbook of Optics, *S. Chand & Company Ltd*., *India.*
3. A. Ghatak, Optics, *McGraw Hill Education (India) Pvt. Ltd., India*.
4. E. Hecht, A.R. Ganesan, Optics, *Pearson India Education Services Pvt. Lt., India.*

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

BS-204A	HIGHER ENGINEERING MATHEMATICS						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	-	-	3	75	25	100	3 h
Purpose	The objective of this course is to familiarize the prospective Engineers with Laplace Transform, partial differential equations which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution. More precisely, the objectives are as under:						

Course Outcomes	
CO 1	Introduction about the concept of Laplace transform and how it is useful in solving the definite integrals and initial value problems.
CO 2	To introduce the Partial Differential Equations, its formation and solutions for multivariable differential equations originated from real world problems.
CO 3	To introduce the tools of numerical methods in a comprehensive manner those are used in approximating the solutions of various engineering problems.
CO 4	To familiar with essential tool of Numerical differentiation and Integration needed in approximate solutions for the ordinary differential equations.

UNIT-1

Laplace Transform
Laplace Transform, Laplace Transform of Elementary Functions, Basic properties of Laplace Transform, Laplace transform of periodic functions, finding inverse Laplace transform by different methods, Convolution theorem, solving ODEs by Laplace Transform method.

UNIT-2

Partial Differential Equations
Formation of Partial Differential Equations, Solutions of first order linear and non-linear PDEs, Charpit's method, Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function and particular integral method.

UNIT-3

Numerical Methods-1
Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method, Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

UNIT-4

Numerical Methods-2
Numerical Differentiation using Newton's forward and backward difference formulae, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules, Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations.

Textbooks/References:

1. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993. AICTE Model Curriculum in Mathematics.
2. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall, 1998.
3. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
4. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
8. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
9. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
10. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
11. Erwin Kreyszig and Sanjeev Ahuja, Applied Mathematics-II, Wiley India Publication, Reprint, 2015.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

B. Tech (3rd Semester)							
ES-203A		Basic Electronics Engineering					
Lecture	Tutorial	Practical	Credits	Major Test	Minor Test	Total	Time (Hrs)
3	0	0	3	75	25	100	3
Purpose :	To provide an overview of electronic devices and components to Mechanical engineering students.						
Course Outcomes							
CO 1	To introduce the basic electronics devices along with their applications.						
CO 2	To become familiar with basic operational amplifier circuits with applications and oscillators.						
CO 3	To understand the fundamentals of digital electronics.						
CO 4	To become familiar with basic electroniccommunication system.						

UNIT-I

Semiconductor Devices and Applications: Introduction to P-N junction Diode and V-Icharacteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. BJT structure, its input-output and transfer characteristics, BJT as a Common Emitter amplifier, frequency response and bandwidth.

UNIT-II

Operational amplifier and its applications: Introduction to operational amplifiers, inverting, non-inverting and differential modes, basic parameters of Op-amp, Op-amp in open loop configuration, study of practical op-amp IC 741, Op-amp applications: adder, subtractor, scale changer, averaging amplifer,comparator, integrator and differentiator.

Timing Circuits and Oscillators: IC 555 timer pin diagram: Astableand mono-stable operation, Barkhausen's criteria for oscillations, R-C phase shift and Wein bridge oscillators using BJT and Op-Amp and their frequency of oscillation.

UNIT-III

Digital Electronics Fundamentals : Difference between analog and digital signals, Booleanalgebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- maps, Logic ICs, half and full adder, multiplexers, de-multiplexers, flip-flops, basic counters.

UNIT-IV

Electronic Communication Systems: The elements ofcommunication system,
Transmission media: wired and wireless, need of modulation, AM and FM modulation schemes, Mobile communication systems: cellular concept and block diagram of GSM system.

Text Books:
1. Integrated Electronics, Millman&Halkias (Mc-Graw Hill)
2. Electronics Devices & Circuit Theory, RL Boylestead& L Nashelsky (PHI)

Reference Books:

1. Modern Digital Electronics, R P Jain, Tata McGraw Hill.

2. Electronic Communication Systems, G. Kennedy, McGraw Hill, 4th Edition

Note: The paper setter will set the paper as per the question paper templates provided.

MTC-201				Thermal Engineering			
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
3	0	0	3	75	25	100	3h
Purpose	To introduce the fundamentals of thermal engineering to the students for applications in Engineering field.						
Course Outcomes							
CO 1	Introduction of basic concepts of thermodynamics.						
CO 2	Introduction and application of laws of thermodynamics						
CO 3	Discussion on the concept of entropy.						

UNIT I

Basic Concepts: Thermodynamics: Macroscopic and Microscopic Approach, Thermodynamic System and control volume, Thermodynamic properties processes and cycles, homogeneous and heterogeneous systems, thermodynamic equilibrium, quasi static process, work transfer, PdV work or displacement work, path function and point function, other types of work transfer, free expansion with zero work transfer, net work done by a system, heat transfer.

UNIT II

Zeroth Law of Thermodynamics and First Law of Thermodynamics: Zeroth law of thermodynamics. Comparison of thermometers, ideal gas, gas thermometers, Celsius temperature scale, electrical resistance thermometer, thermo couple1st law for a closed system undergoing a cycle, 1st law for a closed system undergoing a change of state, energy- a property of the system, different forms of stored energy, specific heat at constant volume, enthalpy, specific heat at constant pressure, energy of an isolated system, perpetual motion machine of the first kind (PMM1).

UNIT III

First Law applied to flow processes and Second Law of Thermodynamics: Control volume, steady flow process, mass balance and energy balance in a simple steady flow process, mass balance, energy balance, , some examples of steady flow process, nozzle and diffuser, throttling device, turbine and compressor, heat exchanger, Introduction to second law of thermodynamics, energy reservoirs, heat engines, Kelvin- Planck statement of second law, Clausius Statement for second law, refrigerator and heat pump, heat pump and electric resistance heater, equivalence of Kelvin-Plank and Clausius statements, reversibility and irreversibility, causes of reversibility, irreversibility due to lack of equilibrium, heat transfer through a finite temperature difference, lack of pressure equilibrium within the interior of the system or between the system and the surroundings, free expansion, irreversibility due to dissipative effects, friction, paddle wheel work transfer, transfer of electricity through a resistor, types of irreversibility, conditions for irreversibility.

UNIT IV

Entropy: Introduction, the inequality of Clausius, the property of entropy, temperature and entropy plot, entropy change in irreversible process, entropy principle, applications of entropy principle, transfer of heat through finite temperature difference, mixing of two fluids, maximum work obtainable from two finite bodies at temperatures T1 and T2. Maximum work obtainable from a finite body and a TER, processes exhibiting external mechanical irreversibility, isothermal dissipation of work, adiabatic dissipation of work, entropy transfer with heat flow.

TEXT BOOKS:
1. Engineering Thermodynamics – C P Arora, Tata McGraw Hill
2. Engineering Thermodynamics – P K Nag, Tata McGraw Hill

REFERENCE BOOKS:
1. Thermal Science and Engineering – D S Kumar, S K Kataria and Sons
2. Engineering Thermodynamics -Work and Heat transfer – G F C Rogers and Maghew Y. R. Longman

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

MTC-203				Applied Engineering Mechanics			
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
3	1	0	4	75	25	100	3h
Purpose	To understand the basic concepts and principles of mechanics and their applications to solve engineering problems.						
Course Outcomes							
CO 1	To understand the basic concepts of mechanics and various forces applied in engineering problems.						
CO 2	To study various types of forces like co-planar, parallel and concurrent forces.						
CO 3	To learn about the Moment of inertia, centroid and centre of gravity.						
CO 4	To study various types of dynamics of the engineering problems.						

UNIT-I

Basic Concepts: Matter, Particle and body, space, time, motion and trajectory, Newtons laws of motion, scalar and vector quantities, Mass, Force and Weight, Tension and compression, System of forces, Equilibrium, Resultant and Equilibrant, Principle of transmissibility, Dimension and units, Dimensional Homogeneity.

Co-Planar Forces: Introduction, Parallelogram law of forces, resolution of forces, theorem of resolved parts, resultant of Coplanar-concurrent forces, triangle law of forces, polygon law of forces, free body diagram.

UNIT-II

Moment of force and Parallel Forces: Moment of a force, graphical representation of moment, varigon's theorem: law of moment, principle of moments, resultant of coplanar, Non-concurrent force system, parallel forces, couple, general conditions of equilibrium.

Lifting Machines:

Basic concepts and Definitions, Reversible and irreversible Machine, Law of Machine, Levers, Pulleys: Fixed and Movable, System of Pulleys, Simple wheel and axle, Differential wheel and axle, differential pulley block, winch crabs, inclined plane, screw jack, differential screw jack, worm amd worm wheel.

UNIT-III

Centre Points: Centroid and centre of Gravity

Centre of gravity and centroid, location of centroid/centre of gravity, Pappus-Guldinus Theorem.

Moment of Inertia: Area and Mass

Moment of Inertia and Radius of gyration, Moment of Inertia of lamina of different shapes, Mass moment of Inertia, Mass moment of inertia for specified cases, product of inertia, Principal axis and principal moment of inertia.

UNIT-IV

Projectiles:

Terms related to projectile motion, equation of projectile path, projection on an inclined plane.

Impulse, Momentum, Work and Energy: Force, impulse and momentum, motion of lift, motion of connected bodies, D'Alembert's Principle, Work, Power and Energy, Work-Energy Principle, Conservation of Mechanical Energy, Hamilton's Principle, Work done by a spring.

Text Books:

1. Engineering Mechanics (statics and Dynamics) By Dr. D.S. Kumar, S.K.Kataria & Sons.
2. Engineering Mechanics, D.S. Bedi, Khanna Book Publishing Co. (P) Ltd., Delhi
3. Engineering Mechanics, R. S. Khurmi, S.Chand Publishing
4. A Textbook of Engineering Mechanics, R.K. Bansal, Laxmi Publications
5. Engineering Mechanics, Sharma, Pearson

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

MTC-205				Theory of Machines-I			
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
3	1	0	4	75	25	100	3h
Purpose	To study and understand about basic elements and mechanisms used in machines.						
Course Outcomes							
CO 1	Discussions an simple mechanisms and their applications						
CO 2	Understand and learn about velocity and acceleration determination in mechanisms						
CO 3	Discussions on Simple harmonic motion and its applications						
CO 4	Learn and understand about friction and power transmission						

UNIT I

Simple Mechanisms: Introduction, kinematic link or element, types of links, structure, difference between a machine and a structure, kinematic pair, types of constrained motions, classification of kinematic pairs, kinematic chain, types of joint in a chain, mechanism, number of degrees of freedom for a plane mechanism, application of Kutchbach criterion for plane mechanism, Grubler's criterion for plane mechanism, inversion of mechanism, types of kinematic chain, four bar chain or quadric cycle chain, inversion of four bar chain, single slider crank chain, double slider crank chain, inversions of double slider crank chain.

Velocity in mechanisms: Relative velocity methods, introduction, relative velocity of two bodies moving in straight lines, motion of a link, velocity of a point on a link by relative velocity method, velocities in slider crank mechanism, rubbing velocity at a pin joint, forces acting in a mechanism, mechanical advantage.

UNIT II

Acceleration in mechanisms: introduction, acceleration diagram, acceleration of a point on a link, acceleration in the slider crank mechanism, Cariole's component of acceleration.

Simple Harmonic Motion: Introduction, Velocity and Acceleration of a Particle Moving with Simple Harmonic Motion, Differential Equation of Simple Harmonic Motion, Terms Used in Simple Harmonic Motion, Simple Pendulum, Laws of Simple Pendulum, Closely-coiled Helical Spring. Compound Pendulum, Centre of Percussion, Bifilar Suspension, Trifilar Suspension (Torsional Pendulum).

UNIT III

Mechanism with lower pairs: Introduction, pantograph, straight-line motion mechanisms, exact straight line motion mechanisms made up of turning pairs, Peaucellier mechanism, Hart's mechanism, exact straight line motion consisting of one sliding pair Scott-Russell's mechanism, approximate straight line motion mechanisms, Watt's mechanism, modified Scott Russel mechanism, Grasshopper mechanism, Tchebicheff's mechanism, Roberts mechanism, straight line motions of engine indicators, Simplex indicator, cross-by-indicator, Thompson indicator, Dobbie Mc Innes indicator, Steering gear mechanism, Davis steering gear, Ackerman steering gear, Universal or Hooke's joint, ratio of shaft velocities, maximum and minimum speeds of driven shaft, condition for equal speeds of the driving and driven shafts, angular acceleration of the driven shaft, maximum fluctuation of speed, double Hooke's joint.

Friction: Introduction, Types of friction, friction between un-lubricated surfaces, friction between lubricated surfaces, limiting friction, laws of static friction, laws of kinetic or dynamic friction, laws of solid friction, laws of fluid friction, coefficient of friction, limiting angle of friction, angle of repose, minimum force required to slide a body on a rough horizontal plane, friction of a body lying on a rough inclined plane, efficiency of a inclined plane, screw friction, screw jack, torque required to lift the load by a screw jack, torque required to lower the load by a screw jack, efficiency of a screw jack, maximum efficiency of a screw jack, over hauling and self locking screws, efficiency of a self locking screws, frction of a V thread, friction in journal bearing-friction circle, friction of pivot and collar bearing, flat pivot bearing, conical pivot bearing, trapezoidal or truncated conical pivot bearing, flat collar bearing, friction clutches, single disc or plate clutch, multiple disc clutch, cone clutches, centrifugal clutch,

UNIT IV

Belt rope and chain drives: Introduction, selection of a belt drive, types of belt drives, types of belts, types of belt drives, velocity ratio of belt drive, velocity ratio of compound belt drive, slip of belt, creep of belt, length of an open belt drive, length of crossed belt drive, power transmitted by a belt, ratio of driving tensions for flat belt drive, determination of angle of contact, centrifugal tension, maximum tension in the belt, condition for the transmission of maximum power, initial tension in the belt, V belt drive, advantages and disadvantages of V belt drive over the flat belt drive, ratio of driving tension for V belt, rope drive, fiber ropes, advantages of fiber rope drives, sheaves for fiber ropes, wire ropes, ratio of driving tensions for a rope drive, chain drives, advantages and disadvantages of chain drive over belt or rope drive, terms used in chain drive, relation between pitch and pitch circle diameter, relation between chain speed and angular velocity of sprocket, kinematic of chain drive, classification of chains, hoisting and hauling chains, conveyor chains, power transmitting chains, length of a chain.

TEXT BOOKS & REFEENCES:
1. Theory of machines: S. S. Rattan, Tata McGraw HillPublications
2. Theory of machines : R S Khurmi, S Chand Publications
3. Theory of Mechanism and Machines: JagdishLal, Metropolitan BookCo.
4. Mechanism synthesis and analysis: A.H. Soni, McGraw HillPublications.
5. Mechanism: J.S.Beggs.
6. Mechanics of Machines: P.Black, PergamonPress.
7. Theory of Machines: P.L.Ballaney, KhannaPublisher.

ES- 211LA	Basic Electronics Lab						
L	**T**	**P**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
0	**0**	**2**	**1.0**	**60**	**40**	**100**	**3h**
Purpose	**To give hands on experience to students with electronic devices**						
	Course Outcomes						
CO1	To introduce students with CRO						
CO2	To familiarize students with characteristics of Diode and transistor						
CO3	To implement Zener diode as a voltage regulator						
CO4	Measurement of displacement using LVDT						

LIST OF EXPERIMENTS

1. To study CRO
2. To plot the VI characteristics of PN junction diode
3. To plot the VI characteristics of Zener diode.
4. To study the half and full wave rectifier
5. To study the Bridge rectifier.
6. To plot the VI characteristics of transistor in CB mode
7. To plot the VI characteristics of transistor in CE mode
8. To study Zener diode as a voltage regulator
9. To study RC oscillator
10. To study single stage CE amplifier
11. To study LVDT for linear displacement

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NOTE: A student has to perform at least ten experiments. Seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

MTC-207			Applied Engineering Mechanics Lab				
L	**T**	**P**	**Credit**	**Minor Test**	**Practical**	**Total**	**Duration of Exam (Hrs.)**
0	0	2	1	40	60	100	3h
Purpose	To understand the basic concepts and principles of mechanics and their applications to solve engineering problems.						
Course Outcomes							
CO 1	Learn and understand about about centroid and mass moment of inertia						
CO 2	Understand application of triangle law and polygon law of forces and determine resultant force.						
CO 3	Understand application of SFD and BMD						

Note: Student will be required to perform total of 8 experiments. 7 experiments will be from the below given list and rest experiments will be designed based upon the curriculum.

List of Experiments

1. To verify law of moments using bell crank lever.
2. To verify triangle law and polygon law for coplanar forces.
3. To determine moment of inertia of flywheel using flywheel apparatus.
4. To determine Centroid for various shapes.
5. Determine mechanical advantage of a screw jack.
6. Study differential wheel and axle of an automobile.
7. Study shear force and bending moment for a beam under various types of loading.
8. Experiment to determine SFD and BMD for a beam under point loading.
9. Study stress strain diagrams for brittle and ductile materials.

MTC-209			Theory of Machines-I Lab				
L	T	P	Credit	Minor Test	Practical	Total	Duration of Exam (Hrs.)
0	0	1	1	40	60	100	3h
Purpose	To study and understand about basic elements and mechanisms used in machines and demonstrate few of them.						
Course Outcomes							
CO 1	Discussions an simple mechanisms and their applications						
CO 2	Understand and learn about velocity and acceleration determination in mechanisms						
CO 3	Discussions on Simple harmonic motion and its applications						
CO 4	Learn and understand about friction and power transmission						

NOTE: Student will be required to perform total of 10 experiments. 7 experiments will be from the below given list and rest experiments will be designed based upon the curriculum.

LIST OF EXPERIMENTS

1. To determine the modulus of rigidity of the material of a closed coil helical spring and the stiffness of a spring
2. To determine the value of coefficient of friction for a given pair of surfaces using friction apparatus
3. To determine the modulus of rigidity of horizontal shaft
4. To determine experimentally the ratio of the cutting time to idle time (cutting stroke to idle stroke) of the crank and slotted lever (QRM)/ Whitworth and compare the result to theoretical values plot the following
   - θ v/s X (displacement of slider).
   - θ v/s velocity.
   - θ v/s Acceleration and to compare the values of velocities (Take angles θ =45˚, 90˚, 135˚, 225˚, 270˚ &335˚, ω = 1rad/s)
5. To determine the value of coefficient of friction between the screw and nut of the jack, while:
   - Raising the load
   - Lowering the load
6. To draw experimentally a curve of the follower-displacement v/s cam-angle. Differentiate the above curve to get velocity and acceleration plot and compare the values with those obtained analytically.
7. To determine the coefficient of friction between belt and pulley and plot a graph between $\log_{10} T_1/T_2$ v/s, θ.
8. To determine the displacement, velocities, & accelerations of the driven shaft of a Hooke's joint for a constant speed of the driver shaft.
9. Study of bifilar and trifilar suspension system
10. Study of the inversions of the single slider crank mechanism.

MTC-211				Industrial Training-I			
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
2	0	0	-	-	100	100	3h
Purpose	Get acquainted with real time industry environment						
Course Outcomes							
CO 1	To understand and learn about various processes going on in industry theoretically and practically.						
CO 2	To improve communication skills by preparing a report for the training done and make a presentation of the same.						

Student will submit summer training report for 4 to 6 week industrial training for his/her assessment. The evaluation will be made based upon the report submitted by student and presentation of work done in industry during the specified period.

MC-901A	Environmental Sciences						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

	B.Tech. (4th Semester)						
ES-204A	**MATERIALS ENGINEERING**						
Lecture	**Tutorial**	**Practical**	**Credits**	**Major Test**	**Minor Test**	**Total**	**Time (Hrs.)**
3	**0**	**0**	**3**	**75**	**25**	**100**	**3**
Purpose:	To understand internal structure- properties relationship of different types of materials and learn about Metallographic analysis and Characterization.						
	Course Outcomes						
CO 1	To understand the Crystal structures and deformation mechanism in various materials.						
CO 2	To study various types of phase diagrams, TTT curve and Iron carbon diagram. To learn about different heat treatment processes.						
CO 3	To learn about the failure mechanisms like Creep and Fatigue and designation of materials.						
CO 4	To study Basics of Metallography and Basic Principle involved in the working of various types of Material characterization techniques.						

UNITI

Crystallography: Review of Crystal Structure, Space Lattice, Co-ordination Number ,Number of Atomsper Unit Cell, Atomic Packing Factor; Numerical Problems Related to Crystallography.

Imperfection in Metal Crystals: Crystal Imperfections and their Classifications, Point Defects, Line Defects, Edge & Screw Dislocations, Surface Defects, Volume Defects.

Introduction to Engineering materials and Standard Materials Designation: Introduction to Engineering materials, Steel Terminology, Standard Designation System for Steels, Indian Standard specifications for steels as per BIS: Based on Ultimate Tensile Strength and based on Composition, AISI-SAE standard designation for Steels and Aluminium Alloys

UNIT II

Phase Diagrams: Alloy Systems, Solid solutions, Hume Rothery's Rules, Intermediate phases, Phase Diagrams, Gibbs Phase Rule, Cooling curves, The Lever Rule, binary phase diagrams, Applications of Phase Diagrams, Phase Transformation, Micro constituents of Fe-C system, Allotropic Forms of Iron ,Iron-iron carbide phase diagram, Modified Iron Carbon Phase Diagrams, Isothermal Transformation, TTT Curve,

Heat Treatment: Heat treatment of steels, Annealing, Normalising, Hardening, Tempering, Case Hardening, Ageing, Aus tempering and Mar tempering, Surface Hardening, Mass Effect, Equipments for Heat Treatment, Major Defects in Metals or Alloys due to faulty Heat treatment.

UNIT III

Deformation of Metal: Elastic and Plastic Deformation, Mechanism of Plastic Deformation, Slip; Critical Resolved Shear Stress, Twinning, Conventional and True Stress Strain Curves for Polycrystalline Materials, Yield Point Phenomena, Bauschinger Effect, Work Hardening.

Failure of Materials: Fatigue, Fatigue fracture, fatigue failure, Mechanismof Fatigue Failure, Fatigue Life calculations ,Fatigue Tests, Theories of Fatigue.

Creep: Creep Curve , Types of Creep, Factors affecting Creep, Mechanism of Creep, Creep Resistant Material, Creep Fracture, Cre ep Test, Stress Rupture test.

UNITIV

Introduction to Metallography: Metallography, Phase analysis, Dendritic growth, Cracks and other defects Corrosion analysis, Intergranular attack (IGA), Coating thickness and integrity, Inclusion size, shape and distribution, Weld and heat-affected zones (HAZ), Distribution and orientation of composite fillers, Graphite nodularity, Intergranular fracturing

Materials Characterization Techniques: Characterization techniques suchas X-Ray Diffraction (XRD), Scanning Electron Microscopy, transmission electron microscopy, atomic force microscopy, scanning tunneling microscopy, Atomic absorption spectroscopy.

Text Books:
1. Material Science by S.L.Kakani, New Age Publishers.
2. The Science and Engineering of Materials, Donald R. Askeland , Chapman & Hall.
3. Fundamentals of Material Science and Engineering by W. D. Callister, Wiley.
4. FundamentalofLightMicroscopyandElectronicImagingbyDouglasB.Murphy, Kindle Edition 2001
5. Materials Science and Engineering, V. Raghvan
6. Phase Transformation in Metals and Alloys,D. A.Porter &K.E. Easterling

Reference Books:
7. Material Science by Narula, TMH
8. Metallographic Handbook by Donald C. Zipperian, Pace Technologies, USA.
9. Robert Cahn Concise Encyclopedia of Materials Characterization, SecondEdition:2nd
   Edition (Advances in Materials Science and Engineering) Elsevier Publication 2005.
10. Smart Materials and Structures by Gandhi and Thompson, Chapman and Hall.

Note: The paper setter will set the paper as per the question paper templates provided.

MTC-202	Digital Electronics					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hour
Purpose	To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.					
Course Outcomes						
CO 1	To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions					
CO 2	To introduce the methods for simplifying Boolean expressions					
CO 3	To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits					
CO 4	To introduce the concept of converters and memories					

UNIT I FUNDAMENTAL CONCEPTS, NUMBER SYSTEM & CODES

Fundamental Concepts: NAND and NOR operations, Exclusive-OR and Exclusive-NOR, Boolean Algebra
Number Systems and Codes: Number Systems, Binary Number Systems, Signed Binary Numbers, Binary Arithmetic, 2's Complement Arithmetic, Octal Number Systesm, Hexadecimal Number System, Codes, Error detecting and correcting codes.

UNIT II COMBINATIONAL LOGIC DESIGN

Standard representation for logic functions, K-map representation, Simplification using K-map, Minimization of logic functions specified/not specified in minterm/maxterms, Don't care conditions, Design Examples.

Multiplexer and their use in combinational design, Demultiplexers/decoders and their use in combinational design, Adders and their use as subtractors, BCD Arithmetic, Digital Comparators, Parity Generators/Checkers, Code Converters

UNIT III SEQUENTIAL LOGIC DESIGN

Flip-flops - SR, JK, D, T Flip Flops, Excitation table, Clocked Flip Flop Design
Registers, Applications of Registers – Ring Counter, Sequence Generator. Ripple or Asynchronous Counters, Synchronous Counters

UNIT IV DIGITAL DEVICES & SEMICONDUCTOR MEMORY

A/D and D/A Converters: Digital to Analog converters- Weighted Resistor, R-2R Ladder, Specifications of D/A Converters. Analog to digital Converters – Quantization and Encoding, Flash Type, Successive Approximation, Dual Slope A/D Converter.
Semi Conductor Memories – Memory Organisation and Operation, Classification and characteristics of Memories, Read-only Memory, Read and Write Memory

TEXT BOOKS
1.   R P Jain, Modern Digital Electronics, 4th Edition, TMH
REFERENCES
1.   Anand Kumar, Fundamental of Digital Circuits, 2nd Edition, PHI-2009
2.   Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus

MTC-204				Fluid Mechanics and Heat Transfer			
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
3	0	0	3	75	25	100	3h
Purpose		To understand the basic concepts and principles of Fluid mechanics and Heat Transfer and their applications to solve engineering problems.					
Course Outcomes							
CO 1		To understand the basic concepts of fluid mechanics with properties of fluid.					
CO 2		To study various types of pressure and forces with their measurements.					
CO 3		To learn about the Thermal conduction and steady state conduction.					
CO 4		To study conduction with heat generation.					

UNIT-I

Properties of Fluids: Introduction, Properties of fluids, Viscosity, Thermodynamic properties, compressibility and bulk modulus, surface tension and capillarity, vapour pressure and cavitation.

Pressure and Its Measurements: Fluid pressure at a point, Pascal's Law, Pressure variation in a fluid at rest, Absolute, Gauge, atmospheric and Vacuum pressures, Measurement of pressure with manometers and mechanical gauges, Simple manometers, Differential manometers, Pressure at a point in compressible fluid with isothermal process, adiabatic process and temperature Lapse-Rate.

UNIT-II

Hydrostatic Forces on surfaces: Introduction, total pressure and centre of pressure, vertical plane surface sub-merged in liquid, horizontal plane surface sub-merged in liquid, inclined plane surface sub-merged in liquid, Curved surface sub-merged in liquid, total pressure and centre of pressure on lock gates.

Buoyancy and Floatation: Introduction, Buoyancy, Centre of Buoyancy, Meta-centre, Meta-centric height with analytical and Experimental method, conditions of equilibrium of a floating and submerged bodies with their stability, Oscillation (Rolling) of a floating body, Numerical.

UNIT-III

Basic concepts of Heat Transfer

Thermodynamic system and Surroundings, thermodynamic property, temperature, heat and thermal equilibrium, thermodynamics versus heat transfer, basic laws governing heat transfer, modes and basic laws of heat transfer, steady and unsteady heat transfer, significance of heat transfer.

Fourier equation and thermal conductivity

Fourier equation, thermal resistance, Thermal conductivity of materials, General Heat conduction equation with Cartesian, Cylindrical and Spherical coordinates with General one-dimensional conduction equation, initial and boundary conditions, guarded hot plate method.

UNIT-IV

Steady State Conduction:

Conduction though a lane wall, conduction through a composite wall, heat flow between surface and surroundings: cooling and heating of fluids, conduction through a cylindrical wall, multilayer cylindrical wall and sphere, shape factor, effect of variable conductivity, critical thickness of insulation, multi dimensional steady conduction: analytic solution, graphical method and finite difference method.

Conduction with heat generation: Plane wall with uniform heat generation, dielectric heating, cylinder with uniform heat generation in solid and hollow (with different cases) cylinder, heat transfer through the piston crown, nuclear fuel elements with and without cladding, sphere with uniform heat generation, hollow sphere with inside surface insulated.

Text Books:

1. A Textbook of Fluid Mechanics and hydraulic machine, R.K. Bansal, Laxmi Publications
2. Heat & Mas Transfer, Dr. D. S. Kumar, KATSON Books.
3. Fluid Mechanics, Sadhu Singh, Khanna Books, Delhi
4. Fluid Mechanics, Modi & Seth, Standard Publishers
5. Fluid Mechanics, Hydraulics and Hydraulic Machines, KR Arora, Standard Publishers Distributors
6. Fundamental of Heat and Mass Transfer, M.Thirumaleshwar, Pearson
7. Computational Heat Transfer and Fluid Flow, Murlidhar & Sunder Rajan, Narosa
8. Thermal Engineering, M.L. Mathur & F.S. Mehta, Jain Publications
9. A Course in Heat & Mass Transfer, V.M. Domkundwar, Dhanpat Rai & Co.

MTC-206	Production Technology-I						
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
3	0	0	3	75	25	100	3h
Purpose	To introduce the fundamentals of processes adopted for machining of materials.						
Course Outcomes							
CO 1	Discussion on geometry of cutting tools and principles of metal cutting						
CO 2	Learn and understand economics of metal cutting						
CO 3	To know about jigs and fixtures and their application						
CO 4	To know about various measuring devices and their applications.						

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus

UNIT I

Geometry of cutting tools and Principles of metal cutting: Introduction, classification of cutting tools, single point cutting tools, tool nomenclature systems, positive and negative rake tools, drill geometry, elements of machining, classical metal machining processes, chip formation and types of chips, basic mechanism of chip formation, forces on the chip, velocity relationships, theories on mechanics of metal cutting, due to Ernst- Merchant, Lee and Shaffer theory, Palmer and Oxley theory, thermal aspects of machining.

UNIT II

Theory of machinability & mechanics of Multi-Point cutting tools: Evaluation of machinability, tool life, tool life plots, types of tool failure, flank wear, variables influencing the tool failure, chip formation, cutting forces and power consumption, surface finish, economics of machining: Element of machining cost, analysis for optimum cutting speed, problems on economics of machining, tooling economics, machines economics and optimization. Milling cutters: conventional milling and climb milling, chip cross section in milling, power required in milling, forces and torque in drilling, power requirement in broaching.

UNIT III

Jigs and Fixtures & Tool layout for Turrets: Tool engineering, tool design, types of tools, usefulness of jigs and fixtures, principles of jigs and fixture design, locating and clamping, locating devices, types of clamping devices, drilling jigs: elements of a jig, elements of a milling fixtures, materials for Jigs and fixtures, economics of jigs and fixtures. Introduction, characteristics of turret lathes, difference between turret and capstan, main parts of turrets, universal chucking equipment, universal bar equipment.

UNIT IV

Linear and angular measurements and Comparators: Direct reading instruments, micrometers, differential micrometers, bench micrometers, Vernier calipers, Vernier height guage, slip gauges, measurement of angles, sprit level, auto- collimator, measurement of tapers, external taper, dovetail angle, comparator-mechanical comparator, dial guage, principle of mechanical comparator, electrical comparator, optical comparator, working principle of an optical comparator, optical flat as comparator, checking height of a component, pneumatic comparator, working principle of a pneumatic comparator.

TEXT BOOKS:
1. Production Engineering and Science: Dr. PC Pandey and Dr. CK Sharma, Standard publishers Distributors
2. Manufacturing science: Ghosh and Malik, E.W.Press

REFERENCE BOOKS:
1. Principles of metal cutting: Sen and Bhattacharya, New CentralBook.
2. Metal cutting principles: Shaw, MIT PressCambridge
3. Manufacturing analysis: Cook,Adisson-Wesley
4. Modern machining processes: Pandey and Shan, Tata McGraw HillPublications

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus

MTC-208				Theory of Machines-II			
L	T	P	Credit	Major Test	Minor Test	Total	Duration of Exam (Hrs.)
3	1	0	4	75	25	100	3h
Purpose	To study and understand about basic elements and mechanisms used in machines.						
Course Outcomes							
CO 1	Discussion on geometry of cutting tools and principles of metal cutting						
CO 2	Learn and understand economics of metal cutting						
CO 3	To know about jigs and fixtures and their application						
CO 4	To know about various measuring devices and their applications.						

UNIT I

Toothed wheels and gear trains: Introduction, friction wheels, advantages and disadvantages of gear drive, classification of toothed wheels, terms used in gears, condition for constant velocity ratio of toothed wheels-law of gearing, velocity of sliding of teeth, forms of teeth, cycloidal teeth, involute teeth, effect of altering the centre distance on the velocity ratio for involute teeth gears, comparison between involute and cycloidal gears, systems of gear teeth, standard proportions of gear systems, length of path of contact, length of arc of contact, contact ratio (or number of pairs of teeth in contact), interference in involute gears, minimum number of teeth on the pinion in order to avoid interference, minimum number of teeth on the wheel in order to avoid interference, minimum number of teeth on a pinion for involute rack in order to avoid interference, types of gear trains, simple gear train, compound gear train, design of spur gears, reverted gear train, epicyclic gear train, velocity ratio of epicyclic gear train (Sun and planet wheel), epicyclic gear train with bevel gears, torques in epicyclic gear trains.

UNIT II

Brakes and balancing of rotating masses: Introduction, materials for brake lining, types of brakes, single block or shoe brake, pivoted block or shoe brake, double block or shoe brake, simple band brake, differential band brake, band and block brake, internal expanding brake, braking of a vehicle, dynamometer, types of dynamometers, classification of absorption dynamometers, prony brake dynamometer, rope brake dynamometers, classification of transmission dynamometers, epicyclic-train dynamometers, belt transmission dynamometer-froude or throneycraft transmission dynamometer, torsion

Dynamometer, Bevis Gibson flash light torsion dynamometer.

Balancing of rotating masses, balancing of single rotating mass by a single rotating mass, balancing of single rotating masses by two masses rotating in different planes, balancing of several masses rotating in the same plane, balancing of several masses rotating in different planes.

UNIT III

Gyroscopic couple and precessional motion & automatic control: Precessional angular motion, gyroscopic couple, effect of gyroscopic couple on an aero plane, terms used in naval ship, effect of gyroscopic couple on naval ship during steering, effect of gyroscopic couple on naval ship during pitching, effect of gyroscopic couple on naval ship during rolling, stability of a four wheel drive moving in a curved path, stability of a two wheel vehicle taking a turn,

Introduction, open and closed lop control, terms used in automatic control of systems, types of automatic control systems, block diagram, lag in response, transfer function, overall transfer function, transfer function for a system with viscous damped output, open loop transfer function, closed loop transfer function.

UNIT IV

Longitudinal and transverse vibrations: Introduction, Terms Used in Vibratory Motion, Types of Vibratory Motion, Types of free Vibrations, Natural frequency of free Longitudinal Vibrations, Natural frequency of free Transverse Vibrations, Effect of Inertia of the Constraint in Longitudinal and Transverse Vibrations, Natural frequency of free Transverse Vibrations Due to a Point Load Acting Over a Simply Supported Shaft, Natural frequency of free Transverse Vibrations Due to Uniformly Distributed Load Over a Simply Supported Shaft, Natural frequency of free Transverse Vibrations of a Shaft fixed at Both Ends and Carrying a Uniformly Distributed Load, Natural frequency of free Transverse Vibrations for a Shaft Subjected to a Number of Point Loads.

TEXT BOOKS:

1. Theory of machines: S. S. Rattan, Tata McGraw HillPublications
2. Theory of machines : R S Khurmi, S Chand Publications

REFERENCE BOOKS:

1. Theory of Mechanism and Machines: JagdishLal, Metropolitan BookCo.
2. Mechanism synthesis and analysis: A.H. Soni, McGraw HillPublications.
3. Mechanism: J.S.Beggs.
4. Mechanics of Machines: P.Black, PergamonPress.
5. Theory of Machines: P.L.Ballaney, KhannaPublisher.

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus

MTC-210			Fluid Mechanics and Heat Transfer Lab				
L	T	P	Credit	Minor Test	Practical	Total	Duration of Exam (Hrs.)
0	0	3	1.5	40	60	100	3h
Purpose	To understand various principles adopted in heat transfer and fluid mechanics						
Course Outcomes							
CO 1	To demonstrate and verify Bernoulli's principle						
CO 2	To practically determine pipe fitting losses and buoyant force						
CO 3	Learn the process of determination of heat flow in conduction and convection						

NOTE: Student will be required to perform total of 8 experiments. 7 experiments will be from the below given list and rest experiments will be designed based upon the curriculum.

LIST OF EXPERIMENTS

1. To verify Bernoulli's theorem experimentally
2. To determine friction losses in various types of pipe fittings
3. To calculate flow of fluid using orifice meter. Find out coefficient of discharge for the given orifice meter
4. To calculate the buoyant force using hydrostatic tank
5. To calculate heat flow rate in conduction through composite wall
6. To calculate heat transfer rate in convection using pin fin apparatus
7. Determine heat exchanger effectiveness.
8. To demonstrate Pascal's law.

MTC-212				Theory of Machines-II			
L	T	P	Credit	Minor Test	Practical	Total	Duration of Exam (Hrs.)
0	0	3	1.5	40	60	100	3h
Purpose	To study and understand about basic elements and mechanisms used in machines.						
Course Outcomes							
CO 1	Learn about MOI and practically verify the same for flywheel						
CO 2	Learn and understand gyroscopic effect and whirling of shaft						
CO 3	Understand the working of transmission unit and braking of an automobile						

NOTE: Student will be required to perform total of 8 experiments. 7 experiments will be from the below given list and rest experiments will be designed based upon the curriculum.

LIST OF EXPERIMENTS

1. To determine experimentally, the moment of inertia of a flywheel and axle compare with theoretical values.
2. To find out critical speed experimentally and to compare the whirling speed of a shaft with theoretical values.
3. To find experimentally the Gyroscopic couple on motorized gyroscope and compare with applied couple.
4. To calculate the torque on a planet carrier and torque on internal gear using epicyclic gear train and holding torque apparatus.
5. To study the different types of centrifugal and inertia governors and demonstrate anyone.
6. To study the automatic transmission unit.
7. To study the differential types of brakes.
8. To find experimentally frequency of simple pendulum.

MTC-214			Digital Electronics Lab				
L	T	P	Credit	Minor Test	Practical	Total	Time
0	0	2	1	40	60	100	3
Purpose			To learn the basic methods for the design of digital circuits and systems.				
Course Outcomes							
CO 1			To Familiarization with Digital Trainer Kit and associated equipment.				
CO 2			To Study and design of TTL gates				
CO 3			To learn the formal procedures for the analysis and design of combinational circuits.				
CO 4			To learn the formal procedures for the analysis and design of sequential circuits				

NOTE: Student will be required to perform total of 8 experiments. 7 experiments will be from the below given list and rest experiments will be designed based upon the curriculum.

LIST OF EXPERIMENTS

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
3. Design and realize a given function using K-Maps and verify its performance.
4. To verify the operation of Multiplexer and De-multiplexer.
5. To verify the operation of Comparator.
6. To verify the truth table of S-R, J-K, T, D Flip-flops.
7. To design and verify the operation of 3-bit asynchronous counter.
8. Study of Encoder and Decoder.
9. Study of A/D Converter.
10. Study of D/A Converter

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.
8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books

1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency**.**

Reference Books:

1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

Bachelor of Technology (Textile Engineering) (Credit Based)
Scheme of Studies/Examination (Modified)
Semester III (w.e.f. session 2019-2020)

Sr. No.	Course No./Code	Subject	L:T:P	Hours/Week	Credits	Major Test	Minor Test	Practical	Total	Duration of Exam (Hrs)
						Examination Schedule (Marks)				
1	PCC-TEX-201A	Textile Fibre – I	3:1:0	4	4	75	25	0	100	3
2	PCC-TEX-203A	Yarn Manufacturing-I	3:1:0	4	4	75	25	0	100	3
3	PCC-TEX-205A	Fabric Manufacturing-I	3:1:0	4	4	75	25	0	100	3
4	PCC-TEX-207A	Textile Chemical Processing-I	3:1:0	4	4	75	25	0	100	3
5	PCC-TEX-209LA	Textile Fibre - I Lab	0:0:2	2	1	-	40	60	100	3
6	PCC-TEX-211LA	Yarn Manufacturing-I Lab	0:0:2	2	1	-	40	60	100	3
7	PCC-TEX-213LA	Fabric Manufacturing-I Lab	0:0:2	2	1	-	40	60	100	3
8	PCC-TEX-215LA	Textile Chemical Processing-I Lab	0:0:2	2	1	-	40	60	100	3
Total				24	20	300	260	240	800	
9	*MC-901A	Environmental Sciences	3:0:0	3	-	75	25	0	100	3

*MC-901A is a mandatory credit-less course in which the students will be required to get passing marks in the major test.

Bachelor of Technology (Textile Engineering) (Credit Based)
Scheme of Studies/Examination(Modified)
Semester IV (w.e.f. session 2019-2020)

S. No.	Course No./Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs)
						Major Test	Minor Test	Practical	Total	
1	PCC-TEX-202A	Textile Fibre – II	3:1:0	4	4	75	25	0	100	3
2	PCC-TEX-204A	Yarn Manufacturing-II	3:1:0	4	4	75	25	0	100	3
3	PCC-TEX-206A	Fabric Manufacturing-II	3:1:0	4	4	75	25	0	100	3
4	PCC-TEX-208A	Textile Chemical Processing-II	3:1:0	4	4	75	25	0	100	3
5	PCC-TEX-210LA	Yarn Manufacturing-II Lab	0:0:2	2	1	-	40	60	100	3
6	PCC-TEX-212LA	Fabric Manufacturing-II Lab	0:0:2	2	1	-	40	60	100	3
7	PCC-TEX-214LA	Textile Chemical Processing-II Lab	0:0:2	2	1	-	40	60	100	3
		Total		22	19	300	220	180	700	
8	*MC-902A	Constitution of India	3:0:0	3	-	75	25	0	100	3

*MC-902A 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.

PCC-TEX-201A
TEXTILE FIBRE – I

L T P
3 1 -

Note:
Question no. 1 is objective type fifteen subparts covering all the four units. Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.

UNIT-I

Introduction: Fibre, textile fibre, staple fibre, continuous filaments, classification of textile fibres, essential and desirable properties of textile fibres, comparision of natura and manmade fibers.

Cotton - cultivation and harvesting practices, concept of cotton varieties, ginning, grading, morphological structure of cotton, chemical composition of cotton, physical and chemical properties of cotton fibre.

UNIT-II

Cultivation, production, physical and chemical properties and end uses of: Jute, Flax, Hemp and Ramie.

UNIT-III

Silk - Production of silk (raw), morphological structure of silk, chemical composition, physical and chemical properties of silk, various varieties of silk, types of thrown silk , silk degummimg.

Wool -Sheep rearing, wool shearing, wool classification by fleece, grading, morphological structure, chemical composition, physical and chemical properties of wool, wool felting.

UNIT-IV

Regenerated fibers– Introduction to regenerated fibres, degree of polymerization, polymer preperation and spinning process, physical and chemical properties of viscose rayon, acetate, triacetate fibers.

Discuss modified viscose rayon, cuprammonium rayon, a brief introduction of protein regenerated fibers: casein, corn fibre, groundnut fiber.

Suggested Text Books & References:

1) Kozłowski R.M.,"Handbook of Natural Fibre", 1st Edition,Wood Head Publication, 2012.

2) Jindal R., Jindal A.,"Textile Raw Material", 1st Edition, Abhishek Publications,   Chandigarh, 2007.

3) Lewin M.,"Handbook of Fiber Science And Technology (International Fiber Science and Technology)", CRC Press.

4) Gupta V. B. and Kothari V. K., "Manufactured Fiber Technology", Chapman & Hall,   London, 1997.

5) Kothari V.K.,"Textile Fibers: Developments and Innovations", IAFL Publication, 2000.

6) Simpson W S., Crawshaw G., "Wool: Science and Technology",Woodhead Textile Series, 2002.

7) Mishra S.P., "A text Book of Fiber Science and Technology", New Age International (P) Ltd.

8) Moorthy S.H.V.,"Introduction to Textile Fibers", Woodhead Textile Series, 2015.

9) Ghol E.P.G., Valensky., "Textile Science", CBS Publishers & Distributors, 2nd Edn Reprint-(2005).

10) Bernard P C., "Textile Fiber to Fabric", McGraw Hill Book Co.

11) Morton W.E & Hearle J.W.S., "Physical Properties of Textile Fibers", Textile Institute, U.K.

12) Kothari V.K., "Progess in Textiles: Science & Technology" Vol-2, IAFL Publication New Delhi.

13) Cook G., "Hand Book of Textile Fibers", Vol-1&2, Woodhead Publication.

14) Eichhorn S., Hearle J.W.S., Jaffe M ., Kikutani T., "Handbook of Textile Fibre Structure" , Vol. I., Wood Head Publication, 2009.

15) https://nptel.ac.in/courses/116102026/24 (21st May, 2019).

PCC-TEX-203A
YARN MANUFACTURING – I

L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total   100 Marks
Time: 3 Hrs

Note:
Question no. 1 is objective type fifteen subpartscovering all the four units.Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.

UNIT-I
Mixing & Blending
Objectives of mixing and blending, Formulation of cotton mixing – scientific bale management, Different Blending methods with their advantages and disadvantages.
Tinting & Application of additional spin finish for manmade fibres.

UNIT-II
Opening and Cleaning
Need for opening and cleaning, Objective of blowroom, Various types of opener and cleaner – construction and working, Lap forming mechanism, Blow room accessories, Selection of blow room line for different cotton and man-made fibres, Production and cleaning efficiency level attainable in blowroom, Causes of lap defects and their remedies, Modern developments in blowroom.

UNIT-III
Carding
Objective, Comparison of lap feed and flock feed system. Principle of carding, stripping and brushing action, Design and construction of carding machine, Flexible and metallic card clothing, Processing of man-made fibres on carding, Optimization of process and machine parameters of carding, Autolevelling in card. Modern developments in carding, Calculations pertaining to draft and production.

UNIT-IV
Drafting
Objective, Fundamental concept of Ideal drafting, Actual drafting, Working principles of draw frame including constructional details, Weighting in draw frame, Draft distribution, Different types of drafting roller arrangements, Relation between drafting & doubling, Drafting irregularities, Autolevelling, modern developments in draw-frame, Calculations pertaining to draft and production.

Suggested Text Books & References:
1. Klein, W., "Manual of Textile Technology: Vol. I. Technology of Short Staple Spinning", – Textile Institute, Manchester, 1998.
2. Klein, W., "Manual of Textile Technology: Vol. II. A practical Guide to Blowroom & Carding", – Textile Institute, Manchester, 2000.
3. Klein, W., "Manual of Textile Technology: Vol. III. A practical Guide to Combing & Drawing", – Textile Institute, Manchester, 1995.
4. Klein, W., "Manual of Textile Technology: Vol. VI. Manmade Fibres and their Processing", – Textile Institute, Manchester, 1994.
5. Oxtoby E, "Spun Yarn Technology", Butterworths, London, 1987.
6. Salhotra, K.R.and Chattopadhayay (Eds.), R., "Course Material of Pilot Programme on Spinning : Blowroom and Card", NCUTE Publication, 1998.
7. Salhotra K R, "Spinning of Man Made Fibres and Blends on Cotton Spinning System",The Textile Association, Mumbai, 1989.
8. Foster G A R, "Manual of Cotton Spinning", Vol. I –IV, The Textile Institute,Manchester, 1958.
9. Khare A R, "Elements of Blowroom, Carding and Drawframe", Sai book Centre,Mumbai,1999.
10. Lawrence C A, "Fundamental of Spun Yarn Technology" CRC Press, USA,2003.
11. Booth J E, "Textile Mathematics", Part II, Textile Institute, Manchester, 1978.

FABRIC MANUFACTURING – I

L T P
3 1 -

Sessional : 25 Marks
Exam: 75 Marks
Total   100 Marks
Time: 3 Hrs

Note: *Question no. 1 is objective type fifteen subpartscovering all the four units.Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.*

UNIT-I
Winding: Objectives, types of packages, types of winding machines, Basic features of a winding machine, uniform build up of cones, Mechanical and electronic type yarn clearer. Yarn tensioners: Additive, multiplicative, combined and compensating type. Patterning: Reasons and remedies. Yarn fault classifying systems. Basic features of auto winders like Autoconer, Barbar colmman, Murata etc. Basic features of automatic winding machines, stop motions in winding machine, types of warp packages.
Pirn winding: Objectives, types of pirns, , basic feature of pirn winding, yarn path on pirn winding machine, yarn traversing system, different automation and standard winding parameters.

UNIT-II
Warping: Objectives, classification of warping, beam warping, sectional warping, conditions for warping, comparison of beam warping with sectional warping, basic features of warping machine, beaming, head stock, relation between section height and cone angle, drum storage capacity, different types of creels, leasing systems.
Sizing: Objectives, Classification and features of sizing methods and sizing machines, stresses on warp yarn during weaving, sizing parameters-size concentration, size percentage, size add-on, features of conventional slasher sizing machine, sizing ingredients, size preparation.Starch, modification of starch, polyvinyl alcohol, carboxyl methyl cellulose, acrylics, binders, lubricants and other additives, sizing of spun yarns, sizing of filament yarn, principle of different non conventional sizing techniques.

UNIT-III
Drawing in: Object of drawing in, importance, different types of heald wires, different types of drop wires, reed, reed count, drawing in order of plain weave, drawing in order of twill weave, drawing in order of satin weave, automation in drawing in, knotting and gaiting.
Weaving: General loom elements, Classification of looms, Different motions of looms: Primary, secondary and auxiliary motions.
Shedding: Different types of shedding with advantage and disadvantages, geometry of shedding, heald reversing motion, shedding motion principles-open shed, closed shed, semi open shed, Loom timing diagram, early shedding, late shedding, split shedding or staggering of shed, asymmetric shedding, lease rods, back rest, effect of shed timing and back rest settings on properties of fabrics.

UNIT-IV
Picking: Types of conventional picking: over picking, under picking and parallel picking. Different type of picking accessories and their functions. Picking timing such as late picking and early picking, reasons of false picking and shuttle fly.
Beating: Function of beating. Kinematics of sley, sley eccentricity ratio, effects of sley eccentricity on beat up force and timing available for shuttle passage, accelerating force on sley, mechanics of beat up, bumping of loom, effect of yarn irregularity on pick spacing.
Calculations: Production, efficiency, Calculation**s** related to winding, warping and sizing.

Suggested Text Books & References:
1.   Talukdar, M.K., "An Introduction to Winding and Warping", Textile Trade Press, Mumbai.
2.   Ajgaonkar, D.B., "Sizing, Materials, Methods and Machines", Textile Trade Press, Mumbai, 1982.
3.   Banerjee, P.K., "Industrial Practices in Yarn winding", NCUTE Publication, 1999.
4.   Ramsbottom, "Warp Sizing Mechanisms", Columbia Press, Manchester, 1965.
5.   Ormerod, A., "Modern Preparation and Weaving Machinery", Butterworths, 1983.
6.   Aitken,"Automatic Weaving", Columbia Press, Manchester, 1969.
7.   Bennet, G.A., "An Introduction to Automatic Weaving", Columbia Press, Manchester, 1958.
8.   Gorder, V and Volkov, P., "Cotton Weaving", Mir Publications, Moscow, 1987.
9.   Sengupta, R., "Yarn Preparation Vol.-I & II", Mahajan Publishers, Ahmedabad, 1970.
10. Singh, R.B.,"Modern Weaving Calculation, Vol-I Preparatory", Mahajan Book Distributor, Ahmedabad, 1994.
11. SITRA Report on Work Methods of Conewinder Tenters.
12. BTRA Report on Winding.
13. BTRA Report on Warping and sizing.
14. Lord and Mohemad,"Conversion of Yarn to Fabric".
15. Hougton," Hand Book of Cotton Warp Sizing".

PCC-TEX-207A
TEXTILE CHEMICAL PROCESSING – I

L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total   100 Marks
Time: 3 Hrs

Note:
Question no. 1 is objective type fifteen subpartscovering all the four units.Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.

UNIT-I

Introduction: Sequence of chemical processing of textiles. Natural and added impurities in textiles.

Preparatory Processes:

Singeing: Objective, types of singeing, details of various singeing methods with advantages and disadvantages. Evaluation method. Singeing machines.

Desizing: Objective, types, method details and mechanism of removal of starch in various methods. Efficiency of desizing.

Scouring: Objectives, mechanism of removal of impurities, recipe and controlling parameters involved. Scouring of natural, manmade and blended textiles. Evaluation of scouring efficiency. J-Box and kier machines.

UNIT-II

Bleaching: Objectives of bleaching. Hypochlorite and Hydrgen peroxide bleaching methods and their mechanism of action. Controlling parameter involved. Efficiency of bleaching.

Mercerization: Objectives, mechanism related to various physical and chemical changes in cotton during mercerisation. Process parameters involved in each method. Assessment of efficiency of mercerization: Barium activity number, its determination and interpretation. Different types of Mercerising machines.

Heat setting: Objectives and mechanism of heat setting. Different methods of heat setting and their effectiveness. Heat setting conditions and controls. Heat setting of polyester, nylon, acetate and their blends. Evaluation of degree of heat setting.

UNIT-III

Dyeing technology of natural and manmade textiles with Direct, Reactive, Vat, Insoluble Azoic, Sulphur, Solubilised vat, Acid, Metal-complex, Basic and Disperse dyes.

Dyeing machineries: Loose fibre, yarn and package dyeing machines. Jigger, winch, jet and HTHP beam dyeing m/cs. Padding mangles.

UNIT-IV

Wool Processing: Briefidea about wool setting and milling.

Silk Processing: Brief idea about Degumming.

Suggested Text Books & References:
1. Shenai, V.A. "Technology of Textile Processing, Technology of Bleaching and Mercerising", Vol. 3,Sevak Publisher, Bombay,1996.
2. Shenai, V.A., "Technology of Textile Processing, Chemistry of Textile Auxillaries", Vol. 5, Sevak Publisher, Bombay, 1976.
3. Shenai, V.A., "Technology of Textile Processing, Chemistry of Dyes and Principles of dyeing", Vol. 2, Sevak Publisher, Bombay, 1977.
4. Koushik C.V and Jasico A. J., "Chemical Processing of Textile, Preparatory Process and Dyeing", NCUTE.
5. Marsh, J.T., "Mercerising", Chapman Publication, London, 1951.
6. Trotman, E.R.,"Textile Technology and Dyeing of Textile Fibres", GriffinPublication, London, 1970.
7. Shenai, V.A.,"Principle and practice of Dyeing", SevakPublisher,Bombay.
8. Shenai, V.A.,"Fundamentals of Principles of Textile Wet processing", Sevak Publisher, Bombay.
9. Datye,K.V.andVaidya, A.A., "Chemical processing of Synthetic Fibres and Blends", WileyPublication, New York, 1984.
10. Prayag.C.R."Dyeing of silk and Manmade Fibre".
11. Prayag, C.R.,"Bleaching, Mercerising and Dyeing of Cotton".
12. Chakraborty J. N, "Fundamentals and Practices in Colouration of Textiles", Woodhead Publishing India, 2009.
13. https://nptel.ac.in/courses/116102016/ (31 May, 2019)

PCC-TEX-209LA

TEXTILE FIBRE – I LAB

L T P
- - 2

Practical/Viva 60 Marks
Sessional: 40 Marks
Total   100 Marks
Time: 3 Hrs.

At least 7 experiments are to be performed by each student.

List of Experiments:

Physical and Chemical identification of following textile fibre(s)

1.   Identification of cotton
2.   Identification of wool
3.   Identification of silk
4.   Identification of viscose
5.   Identification of bast fibers
6.   Identification of polyester
7.   Identification of nylon
8.   Identification of acrylic
9.   Identification of polypropylene
10.   Identification of physical structure of fiber by XRD, SEM, NMR
11.   Identification of chemical structure of fiber by

Identification of fibers in blend and % of fiber content in blend

1.   Analysis of P/C blended fabric
2.   Analysis of P/V blended fabric
3.   Analysis of P/W blended fabric
4.   Analysis of W/C blended fabric
5.   Analysis of N/W blended fabric
6.   Analysis of L/C blended fabric
7.   Analysis of L/S blended fabric
8.   Analysis of P/W blended fabric
9.   Analysis of W/A blended fabric
10.   Analysis of S/W blended fabric
11.   Analysis of C/V blended fabric

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute

2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.

3. Trend of technological developments in National & International perspective

PCC-TEX-211LA

YARN MANUFACTURING – I LAB

L T P
- - 2

Practical/Viva 60 Marks
Sessional: 40 Marks
Total   100 Marks
Time: 3 Hrs.

At least 7 experiments are to be performed by each student.

List of Experiments:

Mixing

1. To study the different techniques of Mixing and Blending.
2. To study the application of spin finish and antistatic agents during mixing.

Opening & Cleaning

3. Study of general outline of opener and clearer machine employed in a modern Blowroom line.
4. Calculation of speeds of different machine parts for Cotton and Synthetic fibres, Blow/inch of Kirschner beater, Production calculation of blow room. Carding
5. To illustrate the working principle of carding machine.
6. To study the change places and speed of different parts of a carding machine for Cotton and Synthetic fibres.
7. Calculation of the speed, individual draft & total draft and production of carding machine.

Drawframe

8. To study the working principle and important settings of drawframe machine.
9. Calculation of the total draft and its distribution in draw frame machine.
10. Study of drafting arrangement and top roller weighting system of draw frame machine.

Note: The above experiment should be conducted and shall be decided on factors like:

3. Facilities installed at Institute
4. Accessibility to industry & nearby institute like IIT Delhi, NITRA Ghaziabad, Textile Committee and NITRA Panipat.
5. Trend of technological developments in National & International perspective.

PCC-TEX-213LA

FABRIC MANUFACTURING-I LAB

L T P
 - - 2

Practical/Viva 60 Marks
Sessional: 40 Marks
Total   100 Marks
Time: 3 Hrs.

At least 7 experiments are to be performed by each student.

List of Experiments:

1. To study the motion transmission system in winding machine.

2. To study the Package stop motion in cone winding machine.

3. Study of precision winding machine.

4. Study of the direct warping machine.

5. Study of the sectional warping machine.

6. To study the passage of yarn on a sizing machine and the features of various parts/ mechanism of the sizing machine.

7. To Study the basic loom mechanism.

8. Study of shedding mechanism.

9. Study of picking mechanism.

10. Study of Beating up mechanism.

Note: The above experiment should be conducted and shall be decided on factors like:

a)   Facilities installed at Institute

b)   Accessibility to industry & nearby institute like IIT Delhi, NITRA Gaziabad, Textile Committee and NITRA Panipat.

c)   Trend of technological developments in National & International perspective.

PCC-TEX-215LA

TEXTILE CHEMICALPROCESSING- I LAB

L T P   **Practical/Viva 60 Marks**
- - 2   **Sessional:**   **40 Marks**
                Total   **100 Marks**
                 Time: **3 Hrs.**

At least 7 experiments are to be performed by each student.

List of Experiments:

1.   Desizing of cotton fabric using various types of desizing agents.
2.   Scouring of Natural fibre in the form of yarn and fabric and find the scouring loss.
3.   Scouring of Polyester/ Cotton /Blends and Wool.
4.   Degumming of Silk and calculation of weight loss percentage.
5.   Bleaching of Natural fibre namely Cotton, jute with
   (a)   Hyperchloride Bleaching
   (b)   Peroxide Bleaching
6.   Bleaching of Polyester /Cotton Blend.
7.   Determination of transmittance, absorbance and concentration of given dye liquor by visible spectrophotometer.
8.   Dyeing of cotton yarn with direct dyes, reactive dyes and basic dyes
9.   Dyeing of wool with direct dyes, basic dyes, and acid dyes.
10.   Understand the color difference in AATCC grey scale (1-5) between standard and batches
   (I) Manully with the comparison of grey scale, and
   (II) by computer color matching machineand interpretation of color spectograph
11.   To conduct practicals as per latest technology/material.

Note: The above experiment should be conducted and shall be decided on factors like:

1.   Facilities installed at Institute
2.   Accessibility to industry & nearby institute like IIT Delhi, NITRA Gaziabad, Textile Committee and NITRA Panipat.
3.   Trend of technological developments in National & International perspective.

MC-901A	Environmental Sciences						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries)

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

PCC-TEX-202A

TEXTILE FIBRE – II

L T P
3 1 -

Sessional: 25 Marks
Exam: 75 Marks
Total   100 Marks
Time: 3 Hrs.

Note:

Question no. 1 is objective type fifteen subparts covering all the four units. Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.

UNIT-I

Introduction: Basic concept of polymer, homopolymer, copolymer, thermoset, thermoplastic, elastomer, momomer, comonomer, oligomer, degree of polymerization, molecular weight and its practical significance, glass transition tenperature, melting point, factors affecting T_g , T_m, Criteria for fiber forming polymers.

Polymerization techniques w.r.t acrylic and polypropylene : bulk, solution, suspension, emulsion, gas phase polymerization, polymerization mechanism :(addition polymerization, condensation polymerization)

UNIT-II

Production of **polyethylene terephthalate** polymer, side reactions during PET synthesis, effect of DEG on polymer and fiber properties, methods to control DEF formation, advantages of TPA over DMT route.

Melt Spinning: polymer feed, melting device, extruder, static mixer, pre filtration, manifold, spin pack, spinneret parameters, quenching chambers parameters, take up & winding. High speed spinning and properties of polyester, Physical & chemical properties of polyester.

UNIT-III

Nylon: Nylon 6 polymer production, parameter in water catalyzed system in caprolactum polymerization,, effect of different parameters on polymerization of nylon 6, continuous polymerization in VK tube, Polymer production of nylon 6,6, fibre formation by melt spinning, Physical and chemical properties, application of nylon fiber.

Acrylic: Polymer production, fiber formation by wet and dry spinning, fiber formation and coagulation variables. Comparitive study of wet and dry spinning process, dry jet wet spinning.

UNIT-IV

Polyolefin: physical and chemical properties of polyethylene and polypropylene fibers, types of polypropylene fiber and their applications.

Drawing & Texturing: Drawing condition, phenomenon of necking, Continuous filament drawing machine, texturising methods, draw texturing process, heat setting.

Suggested Text Books & References:

1) Lewin M., "Handbook of Fiber Science and Technology (International Fiber Science and Technology)", CRC Press.
2) Gupta V B and Kothari V. K., "Manufactured Fiber Technology", Chapman & Hall, London, 1997.
3) Mclntyre J. E., "Synthetic Fibres", 1st Edition, Wood Head Publishing.
4) Deopura B.L., Alagirusamy R., Joshi M.,Gupta B., "Polyesters and Polyamides", Woodhead Publishing in Textiles, CRC, 2008.
5) Kothari V.K., "Textile Fibers: Developments and Innovations", IAFL Publication 2000.
6) Mishra S.P., "A text Book of Fiber Science and Technology", New Age International (P) Ltd.
7) Moorthy, S.H.V., "Introduction to Textile Fibers", Woodhead Textile Series, 2015.
8) Bernard P C., "Textile Fiber to Fabric", McGraw Hill Book Co.
9) Morton W.E & Hearle J.W.S., "Physical Properties of Textile Fibers", Textile Institute, U.K.
10) Kothari V.K., "Progess in Textiles: Science & Technology" Vol-2, IAFL Publication New Delhi.
11) Cook G., "Hand Book of Textile Fibers", Vol-1&2, Woodhead Publication.
12) Vaidya A.A., "Production of Synthetic Fibers" Prentice-Hall of India Pvt Limited.
13) Moncrieff R. W., "Manmade Fibres", LIiffe Publication, The University of California, 1996.
14) Billmeyer F.W., "Textbook of Polymer Science", 3rd edition, Wiley-Blackwell, 1984.
15) Gowarikar V.R., Viswanathan N.V., Sreedhar J., "Polrmer Science", Halsted Press New York, 1986.

TT-204A

YARN MANUFACTURING-II

L T P	Sessional:	25 Marks
3 1 -	Exam:	75 Marks
	Total	100 Marks
	Time:	3 Hrs.

Note: *Question no. 1 is objective type fifteen subparts covering all the four units. Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.*

UNIT-I
Combing
Objective, Different combing preparatory process for lap preparation – Sliver lap, Ribbon lap and Unilap machine, Different types of comber, Combing cycle of rectilinear cotton comber, Timing diagram for combing operation, Configuration of fibre feed and its effect on quality of product, noil percentage and fractionation efficiency of comber, Influence of type of feed on noil extraction and cleanliness of sliver, Calculation pertaining to draft, production and noil percentage.

UNIT-II
Speed frame
Objective, Working principle of speed frame, Construction and working of important parts, Mechanism of drafting, twisting and winding, Basic principle of designing of cone drum, Differential motions & Building motions, Common defects in roving packages, their causes and remedies, Processing of man-made fibres on speed frame , Recent development in speed frame. Calculations pertaining to draft, TPI and production, twist multiplier and roving twist.

UNIT-III
Ring frame
Objective, Principle and mechanism involved in drafting, twisting and winding, Ordinary and high draft systems, Rising and falling lappets, balloon control rings, Design and types of spindle, ring and traveler, Concept of twist multiplier and yarn contraction due to twisting, types of builds, Mechanism of package formation, Causes and remedies to control end breaks, Recent developments in ring frame, Concept of average mill count and 20's conversion.

UNIT-IV
Doubling
Objective and terminology, Requirement of feed package for yarn plying, Systems of doubling (dry &wet) study of ring doublers, Two for one twister (TFO)- objective & working principle, Calculation of draft, TPI and production of ring frame & doubling frame.

Suggested Text Books and References:

1. Klein, W., "Manual of Textile Technology: Vol. I. Technology of Short StapleSpinning", – Textile Institute, Manchester, 1998.
2. Klein, W., "Manual of Textile Technology: Vol. III. A practical Guide to Combing & Drawing", – Textile Institute, Manchester, 1995.
3. Klein, W., "Manual of Textile Technology: Vol. IV. A practical Guide to Ring Spinning", – Textile Institute, Manchester, 1995.
4. Klein, W., "Manual of Textile Technology: Vol. VI. Manmade Fibres and their Processing", – Textile Institute, Manchester, 1994.
5. Salhotra K R, "Spinning of Man Made Fibres and Blends on Cotton Spinning System",The Textile Association, Mumbai, 1989.
6. Salhotra, K.R., Alagirusamy, R. and Chattopadhayay R.(Eds.), "Course Material of Pilot Programme on Spinning: Ring Spinning, Doubling and Twisting", NCUTE Publication, 2000.
7. Chattopadhyay, R., and Rengasamy (Eds.), "Course Pilot Programme on Spinning: Drawing Combing and Roving", NCUTE Publication, 1999.
8. Oxtoby, E. "Spun Yarn Technology". Butterworths, London.
9. Khare A R, "Elements of Combing", Sai book center, Mumbai, 1999.
10. Khare A R "Elements of Ring Frame and Doubling", Sai book Centre, Mumbai, 1999.
11. Lawrence C A, "Fundamental of Spun Yarn Technology" CRC Press, USA,2003.
12. Booth J E, "Textile Mathematics", Part II, Textile Institute, Manchester, 1978.
13. https://nptel.ac.in/courses/116102038/ (31st May, 2019)

FABRIC MANUFACTURING-II

L T P	Sessional:	25 Marks
3 1 -	Exam:	75 Marks
	Total	100 Marks
	Time:	3 Hrs.

Note:

Question no. 1 is objective type fifteen subparts covering all the four units.Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.

UNIT-I

Secondary motion

Take up motion: Negative take up, positive take up, five wheel take up motion, seven wheel take up motion, electronic take up.

Let Off Motion: Objective, negative let off motion, positive let off motion- basic requirements, tension control mechanism, electrical let off motion, warp tension variation.

UNIT-II

Auxilliary motion: Objective, classification.

Weft Stop motion: objective, side weft fork motion, centre weft fork motion.

Warp Stop motion: objective, mechanical warp stop motion, electrical warp stop motion.

Warp Protecting motion: objective, loose reed warp protecting motion, fast reed warp protecting motion, electromagnetic warp protecting motion.

Weft mixing motion, Mutiple box motion, 4×1 drop box motion, preparation of pattern cards, pick at will motion.

UNIT-III

Automatic looms: basic features, advantages over plain looms, classification of automatic looms, weft feeling mechanism, mechanical weft feeler, electronic weft feeler, optical weft feeler, pirn changing mechanism, shuttle changing mechanism, bobbin loader mechanism.

Dobby Shedding: Main parts of dobby loom, types of Dobby, negative dobby, single, double lift single jack dobby, double lift double jack dobby, design and peg plan for dobbies, positive dobby, electronic dobby, types of shed formed in dobby

UNIT-IV

Jacquard Shedding: Principle parts of jacquard machine, types of jacquard, types of shed formed in jacquard, single lift single cylinder jacquard, double lift single cylinder jacquard, double lift double cylinder jacquard, harness building, harness ties, design ties, card cutting, card lacing

Calculations: Production, efficiency, Calculation**s** related to weaving.

Suggested Text Books & References

1. Marks and Robinson,"Principles of Weaving".Textile Institute,Manchester,1986.
2. Thomas fox,"Mechanism of Weaving",Bombay Universal Publishing Co,1993.
3. Lord and Mohemad,"Conversion of Yarn to Fabric",Merrow Publishing Co.Ltd, England,1988.
4. Aswani,K.T.,"Plain Weaving Mechanism",Mahajan Publishers,Ahmedabad,1996.
5. Aswani,K.T.,"Fancy Weaving Mechanism",Mahajan Publisher,Ahmedabad,1990.
6. Sengupta,R.,"Weaving Calculations",Taraporwala Sons,Bombay 1990.
7. Banerjee,N.N.,"Weaving Mechanism Vol,-I & Vol.II",West Bengal,1994.
8. Rai,Hasmukh,"Fabric Forming",S.S.M.Institute,Kuomarapalyam Tamil Nadu,1996.
9. Talukdar,M.K.,"Modern Weaving Technology",NICTAS,Ahmedabad,1998.
10. Rapier Looms,WIRA Research & Technical Service Manual for industry.
11. Kharwani,P.A.,"Weaving I shuttle looms",NCUTE Publication,1999.
12. Khatwani,P.A.,"Weaving II Shuttleless Looms",NCUTE Publication,1999.
13. Khatwani,P.A."Filament Weaving", NCUTE Publication,2000.

PCC-TEX-208A

TEXTILE CHEMICAL PROCESSING - II

L T P
3 1 -

Sessional: 25 marks
Exam: 75 marks
Total: 100 marks
Time: 3Hrs

Note:
Question no. 1 is objective type fifteen subparts covering all the four units.Eight more questions will be set in the question paper i.e. two from each unit. The students will be required to attempt Question no. 1 compulsorily and one question from each unit.

UNIT-1

Printing: Introduction to printing methods block, screen and roller printing. Advantages and disadvantages of each method. Various styles of printing like Direct, Discharge and Resist styles on natural, man-made and blended textiles.Ingredients of print paste with their details. Classification and mechanism of working of thickeners.

Transfer Printing: Types, mechanism of transfer printing and machineries.

Pigment Printing: Mechanism and recipe details of pigment printing.

UNIT-II

Finishing:

Mechanical Finishes: Calendaring - its types, construction and function of various calendaring m/cs. Sanforizing - method, mechanism and machineries involved. Sueding /raising, Napping and Shearing finishes, Foam finishing technology.

Chemical Finishes: Problem of creasing, anti-crease finish on cotton. Drawback and advantages associated with use of various anti-crease chemicals. Water repellency and water repellent finishes on cotton. Evaluation of water repellency. Flame proofing and its evaluation. Softeners and their application.Silk Finishing: Weighting of silk and Scroop finish.

UNIT-III

Developments in preparatory and dyeing: Continuous pre-treatment and Continuous dyeing. Mass coloration principle, technology and different methods, Tie and dye, Batik printing.

UNIT-IV

Ecofriendly processing and Effluent generated from textile processing and its treatment.

Fastness properties: Light fastness, rubbing fastness, Sublimation fastness, Perspiration fastness, Washing fastness properties evaluation.

Suggested Text Books and References

1. Shenai, V.A., "Technology of Textile Processing Vol. 2,3,4,6, and 10", Sevak Publisher, Bombay.
2. Koushik C.V and Jasico A. J., Chemical Processing of Textile, Preparatory Process and Dyeing, NCUTE.
3. R.S.Prayag, "Technology of Textile Printing", Shree J.Printers, 1999.
4. Marsh, J.T., "An Introduction to Textile Finishing", Chapman Publication, London, 1948.
5. Trotman, E.R. "Textile Technology and Dyeing of Textile Fibres". Griffin Publication, London, 1970.
6. Shenai, V.A. "Principle and Practice of Dyeing", Sevak Publisher, Bombay.
7. Datye, K.V. and Vaidya, A.A., "Chemical Processing of Synthetic Fibres and Blends", Wiley Publication, New York
8. Prayag, C.R., "Bleaching, Mercerising and Dyeing of Cotton", Dharwar, Karnataka, India, 1990.
9. Vankar, Padma, "Textile Effluents", NCUTE Publication, 2001.
10. Prayag R.S, "Textile Finishing'', 1994.
11. V.A.Shenai, "Technology of Finishing", Sevak Publication, 1996.
12. V. A Shenai, "Technology of Printing", Sevak Publications, Mumbai, 1990.

PCC-TEX-210LA

YARN MANUFACTURING-II LAB

L T P
- - 2

Practical/Viva 60 Marks
Sessional: 40 Marks
Total   100 Marks
Time: 3 Hrs.

At least 7 experiments are to be performed by each student.

List of Experiments:

Combing

1. To the study the different methods of lap formation in combing preparatory.

2. To study the combing cycle of a rectilinear cotton comber.

Speedframe

3. To study the drafting, twisting and winding zone of speed frame.

4. To study the building motion in speed frame.

5. Calculation of break draft constant, draft constant and twist constant and productionof speed frame.

Ringframe

6. To demonstrate the working principle of a ringframe.

7. To study the different components of drafting system and twisting system.

8. Calculation pertaining to gearing, speed, constant, draft and production.

Doubling

9. To show the passage of yarn in doubling machine and demonstrate the working principle.

Note: The above experiment should be conducted and shall be decided on factors like:

a) Facilities installed at Institute

b) Accessibility to industry & nearby institute like IIT Delhi, NITRA Gaziabad, Textile Committee and NITRA Panipat.

c) Trend of technological developments in National & International perspective.

PCC-TEX-212LA

FABRIC MANUFACTURING-II LAB

L T P
- - 2

Practical/Viva 60 Marks
Sessional: 40 Marks
Total   100 Marks
Time: 3 Hrs.

At least 7 experiments are to be performed by each student.

List of Experiments:

1. Study of take up motion.

2. Study of negative let-off system

3. Study of positive let-off system.

4. Study of Warp protection motion (both loose reed and fast reed).

5. Study of warp stop motion.

6. Study of weft stop motion.

7. Study of pirn changing mechanism.

8. Study of multiple box motion.

9. Study of dobby mechanism.

10. Study of jacquard mechanism.

Note: The above experiment should be conducted and shall be decided on factors like:

a)   Facilities installed at Institute

b)   Accessibility to industry & nearby institute like IIT Delhi, NITRA Gaziabad, Textile Committee and NITRA Panipat.

c)   Trend of technological developments in National & International perspective.

PCC-TEX-214LA

TEXTILE CHEMICAL PROCESSING-II LAB

At least 7 experiments are to be performed by each student.

List of Experiments:

1. Conduct practicals on Conventional and latest machines (Preparatory / dyeing / Finishing).

2. Conduct practicals on Recent developed methods of dyeing using different type of dyes

    (a)   Natural

    (b)   Synthetic

    (c)   Blends

3. Dyeing of cotton yarn with vat, reactive and sulphur in a sample pot dyeing machine.

4. Dyeing of cotton fabric with vat, reactive and sulphur dyes in laboratory jigger machine.

5. Calibration of dyeing and recipe prediction with the help of CCM.

6. Study of fastness to washing and rubbing with the help of CCM.

7. Reproduction of shade with the aid of computer as well as visual methods.

8. Printing with kerosene and synthetic based thickeners. Evaluate the printing with qualitative and quantitative methods on different materials.

9. Conduct practical with transfer printing technique on different materials.

10. Quantitative analysis of different textile blends in fibre, yarn and fabric form.

Note: The above experiment should be conducted and shall be decided on factors like:

1. Facilities installed at Institute

2. Accessibility to industry & nearby institute like IIT Delhi, NITRA Gaziabad, Textile Committee and NITRA Panipat.

3. Trend of technological developments in National & International perspective.

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

KURUKSHETRA UNIVERSITY, KURUKSHETRA (K.U.K) – 136119, HARYANA, INDIA

Bachelor of Technology (Chemical Engineering)
Credit-Based Scheme of Studies/Examination(Modified)
Semester III(w.e.f. session 2019-2020)

S. No.	Course Code	Subject	L:T:P	Hours/ Week	Credits	Examination Schedule (Marks)				Duration of Exam (Hrs.)
						Major Test	Minor Test	Practical	Total	
1.	ES-CHE-201A	Chemical Engineering Thermodynamics-I	3:1:0	4	3	75	25	0	100	3
2.	BS-CH-203A	Chemistry-II	3:0:0	3	3	75	25	0	100	3
3.	PC-CHE-203A	Chemical Engineering Process Calculations	3:1:0	4	4	75	25	0	100	3
4.	PC-CHE-205A	Fluid Flow	3:0:0	3	3	75	25	0	100	3
5.	BS-209A	Advance Mathematics	3:1:0	4	3	75	25	0	100	3
6.	PC-CHE-207A	Unit Processes	3:0:0	3	3	75	25	0	100	3
7.	BS-CH-209LA	Chemistry-II (Lab)	0:0:3	3	1.5	0	40	60	100	3
8.	PC-CHE-211LA	Fluid Flow Lab	0:0:3	3	1.5	0	40	60	100	3
	Total			27	22	450	230	120	800	
9.	*MC-902A	Constitution of India	3:0:0	3	-	75	25	0	100	3
10.	SIM-201A*	Seminar on Summer Internship	2:0:0	2	0	0	50	0	50	

*Note: 1. *MC-902A is a mandatory credit-less course in which the students will be required to get passing grade.

2. SIM-201A* 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.

3. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.

4. Electronics gadgets including Cellular phones are not allowed in the examination.

Bachelor of Technology (Chemical Engineering)
Credit-Based Scheme of Studies/Examination(Modified)
Semester IV(w.e.f. session 2019-2020)

S. No.	Course Code	Subject	L:T:P	Hours/ Week	Credits	Major Test	Minor Test	Practical	Total	Duration of Exam (Hrs)
						Examination Schedule (Marks)				
1	HM-902A	Fundamentals of Management	3:0:0	3	3	75	25	0	100	3
2	PC-CHE-204A	Heat Transfer	3:1:0	4	4	75	25	0	100	3
3	PC-CHE-206A	Mechanical Operations	3:0:0	3	3	75	25	0	100	3
4	PC-CHE-208A	Numerical Methods in Chemical Engineering	3:1:0	4	3	75	25	0	100	3
5	ES-CHE-212A	Material Technology	3:0:0	3	3	75	25	0	100	3
6	PC-CHE-214LA	Heat Transfer (Lab)	0:0:3	3	1.5	0	40	60	100	3
7	PC-CHE-216LA	Mechanical Operations (Lab)	0:0:3	3	1.5	0	40	60	100	3
		Total		23	19	375	205	120	700	
8	MC-901A	Environmental Sciences	3:0:0	3	0	75	25	0	100	3

Note:

1. Students be encouraged to go to 6-8 weeks summer internships mandatory during the summer break after the completion of fourth semester exams.
2. MC-901A is a mandatory credit-less course in which the students will be required to get passing marks to qualify.`
3. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
4. Electronics gadgets including Cellular phones are not allowed in the examination.

ES-CHE-201A	CHEMICAL ENGINEERING THERMODYNAMICS-I						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
3	1	-	75	25	100	3	3
Purpose	To understand the basics of thermodynamics and P-V-T behavior, Laws of Thermodynamics, Thermodynamics relations, concept of Power and Refrigeration cycle.						
Course Outcomes							
CO1	To Introduce with the basics of thermodynamics and P-V-T behavior.						
CO2	To familiarize with the Laws of Thermodynamics.						
CO3	To familiarize with the concept of Thermodynamics relations.						
CO4	To familiarize with the concept of Power and Refrigeration cycle.						

Unit I

Introduction and P-V-T behavior: Concept of Work and heat, C_p, C_v, open system and closed system, extensive and intensive properties, Internal Energy, enthalpy, entropy, P-V-T behavior of Pure Fluids- Virial equations, cubic equations, generalized correlations, Throttling process, Joules Thompson coefficient.

Unit II

Laws of thermodynamics: Laws of thermodynamics Energy equations for close system and steady flow processes, Limitations of first law, carnot cycles, concept of available energy and dead state availability and irreversibility.

Unit III

Thermodynamics relations: Maxwell relations, Helmholtz and Gibbs function, Tds equations, clausiusclapeyron equation.

Unit IV

Power and Refrigeration cycle: Rankine cycle, Air standard cycles, vapour compression cycle, otto cycle, Brayton cycle, refrigerant and their properties, Liquifaction of gases, generation of power from heat.

Books Recommended:

1. Y.V.C. Rao, Chemical Engineering Thermodynamics, University Press.
2. Smith & van Ness, Introduction to Chemical Engineering Thermodynamics, McGraw Hill.
3. B. Bhattacharyya and S. C. Bera, Engineering Thermodynamics and Fluid Mechanics, New Age International Publishers.
4. Radha Krishnan, Fundamentals of Engineering Thermodynamics, PHI Publishers.
5. P.K. Nag, Engineering Thermodynamics, Tata McGrew Hill.

Note: The Examiner will be given the question paper template to set the question paper.

BS-CH-203A			CHEMISTRY – II				
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
3	-	-	75	25	100	3	3
Purpose	To familiarize with the basic knowledge of Organic reactions and mechanism Chemistry of Hydrocarbons, Chromatographic analysis methods, Kinetic of a chemical reaction and chemical Equilibrium of the processes.						
Course Outcomes							
CO1	To understand the basic knowledge of organic reactions and mechanism, substitution and addition of electrophilic, nucleophillic, free radical and chemistry of hydrocarbons.						
CO2	To familiarize with the various Chromatographic analysis methods.						
CO3	To introduce the Kinetic of a chemical reaction.						
CO4	To give in-depth knowledge of chemical Equilibrium of the processes.						

UNIT I

Classification of Organic Reactions: Types of mechanism, types of reactions, Reaction intermediates, the mechanism ofthe following type of reactions. substitution - Electrophiilic, nucleophiilic, fee radical, Addition- Electrophilic, nucleophillic, free radical Elimination-Elimination (E_1 and E_2 type) Rearrangement, Migration with electron (electrophillic).

Chemistry of Hydrocarbons: Sources, preparation and uses of alkanes, alkenes, alkynes, cracking & reforming aromatic hydrocarbons, concept of aromaticity (Huckel rule, 4n+2) rule) and directive effect.

UNIT II

Chromatography: Introduction, classification, solid, Liquid chromatography (LSC, TLC, Liquid - Liquid Chromatography(LLC), Column, GPC, HPLC, Gas-Liquid Chromatography (GLC).

UNIT III

Chemical Kinetics: Rate expression of reactions of various orders, rate mechanism, kinetics of complex reactions,molecularity, order of reaction, concept of energy barrier and activation energy theories of reaction rates, Arhenius equation.

UNITIV

Chemical Equilibrium: Equilibrium constant, Factors affecting, Ka, Kp, Standard free energy and equilibrium constant, homogeneous and heterogeneous chemical equilibria, Le Chtelier's principle and its applications' Relation between Kp and Kc.

Books Recommended:

1. Advanced organic chemistry (Reaction Mechanism and structure) by JerryMarch (Willey Eastern 3rd edition)
2. Text Book of Organic Chemistry by R'K' Bansal' (T'M'H')
3. Organic Chemistry by Morrison, Bayd (P'H'L')
4. Chromatography by B'K' Sharma (Goel Publishing' Merrut')
5. Organic Chemistry Vol' I By I'L' Finar (ELBS)'
6. Schaum's solved Problems series,Organic Chemistry(T'M'H')
7. Organic Reaction Mechanism, 3rdedition(T.M.H')by R.K.Bansal.

Note: The Examiner will be given the question paper template to set the question paper.

PC-CHE-203A	CHEMICAL ENGINEERING PROCESS CALCULATIONS						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
3	1	-	75	25	100	4	3
Purpose	To familiarize with the concept of units, their dimensions and conversions, stoichiometric and composition relations, various Gas laws, Material balance and Energy balance.						
Course Outcomes							
CO1	To introduce the basic concept of units, their dimensions and conversions, stoichiometric and composition relations.						
CO2	To understand the various Gas laws and Henry's Law, Humidity and use of humidity charts for engineering calculations.						
CO3	To familiarize with the concept of Material balances for systems with and without chemical reactions, species and elemental balance.						
CO4	To familiarize with the concept of Steady state energy balance for systems with and without chemical reactions, Enthalpy-concentration charts; Degrees of freedom in steady state processes, Unsteady state material and energy balance.						

Unit I

Units and Dimensions: Introduction-Units, their dimensions and conversions, Dimensional consistency of equations, Dimensional and dimensionless constants, Mass and volume relations, Stoichiometric and composition relations, Excess reactants, Degree of completion, Conversion, Selectivity and Yield.

Unit II

Gas Law and Humidity: Gas laws-Ideal gas law, Dalton's Law, Amagat's Law, and Average molecular weight of gaseousmixtures. Vapour pressure-Effect of temperature on vapour pressure, Vapour pressure plot (Cox chart), Vapour pressures of miscible and immiscible liquids and solutions, Raoult's Law and Henry's Law. Relative Humidity and percent saturation; Dew point, Dry and Wet bulb temperatures; Use of humidity charts for engineering calculations

Unit III

Material Balance: Material balances for systems with and without chemical reactions, species and elemental balance.Analysis of systems with by-pass, recycle and purge. Heat capacity of gases, liquids and solutions, Heat of fusion and vaporization.

Unit IV

Energy Balance: Steady state energy balance for systems with and without chemical reactions; Calculations and application of heat of reaction, combustion, formation, neutralisation and solution; Enthalpy-concentration charts; Degrees of freedom in steady state processes, solution of simultaneous material and energy balance problems using flow sheeting codes; Unsteady state material and energy balance.

Books Recommended:
1. D.M. Himmelblau, Basic Principles and calculations in Chemical Engineering, Printice-Hall.
2. O.A. Hougen, K.M.Watson & R.A.Ragatz, Chemical process principles, John Willey & sons.
3. D. P. Tiwari, Chemical Calculation,Vrinda Publications (Zalgaon).
4. S. N. Saha, Chemical Engineering process calculation, Dhanpat Rai publication.
5. Bhatt and Vora, Stoichiometry, Nirali Publications.
   Note: The Examiner will be given the question paper template to set the question paper.

PC-CHE-205A			FLUID FLOW				
Lecture	Tutorial	Practical	Theory	Sessional	Credits	Total	Time
3	-	-	75	25	3	100	3
Purpose	Application of fluid, fluid forces, pressure measurement in fluid, energy.To understand the concept and losses, friction factor and various flow measuring devices.						
Course Outcomes							
CO1	To understand the fundamental concepts of fluids, Classification of fluid-forces, Pressure measurement by manometers, Types of flow, velocity distribution for laminar flow in conduits, Reynold's number and its significance.						
CO2	To understand the concept of Conservation of mass, momentum and energy, Euler's equation. Energy losses.						
CO3	To familiarize with the basic equations of fluid flow and flow measuring devices.						
CO4	To familiarize with the flow of incompressible fluids in conduits.						
CO5	To familiarize the concept of hydrodynamic boundary layer and dimensional analysis by Rayleigh's and Buckingham's method.						
CO6	To familiarize with the flow past immersed bodies and transportation of fluids.						

UNIT I

Introduction: Fluid, Properties of fluid, Classification of fluids, Newton's law of viscosity, Rheological classification of fluids, Pressure and temperature dependence, Types of flow, Lines to describe the flow, Application of fluid flow in Chemical Engineering.

Fluid Statistics and Its Applications: Hydrostatic equilibrium, parametric equation, Hydrostatic equilibrium in centrifugal field; Concept of atmospheric, gauge and absolute pressure, manometers, pressure measurement by simple and differential manometer.

UNIT II

Basic Equations of Fluid Flow and Flow Measuring Devices: Basic equations of fluid flow: Continuity equation, equation of motion, Flow measurement using Venturimeter, Orificemeter, Rotameter & Pitot Tube.

Flow of Incompressible Fluids in Conduits: Shear stress distribution, Relation between skin friction and wall shear, The friction factor; Laminar flow through circular pipe, on inclined plane, through annular space; Relation between average and maximum velocity, Major and Minor Loses, Darcy Weisbach equation, Friction factor chart.

UNIT III

Boundary Layer and Dimensional Analysis: Concept of hydrodynamic boundary layer, Growth over a flat plate, Different thickness of boundary layer, Fundamental dimensions of quantities, Dimensional homogeneity, Dimensional analysis by Rayleigh's method and Buckingham's method, Dimensionless numbers.

UNIT IV

Flow Past Immersed Bodies And Transportation Of Fluids: Drag and drag coefficient, Flow through beds of solids, Motion of particles through fluids, Introduction to fluidization, Pipes and tubing's, Joints and fitting Major and minor losses, Different types of valves, Pumps: Centrifugal pump, Performance of centrifugal pumps.

Books Recommended:
1. J.M. Coulson and J.F. Richardson, Chemical Engineering, Vol-1, Pergamon.
2. W.L. McCabe and J.C. Smith, Unit Operations of Chemical Engineering, McGraw Hill.
3. A.K. Jain, Fluid Mechanics, Khanna publishers, New Delhi.
4. Jagdish Lal, Hydraulics & Fluid Mechanics, Metro-polliton Books Co. Pvt. Ltd. Delhi
5. D. S. Kumar, Fluid Mechanics, S. K. Kataria& Sons.

Note: The Examiner will be given the question paper template to set the question paper.

BS-209A	Advance Mathematics						
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Credits**	**Time**
3	1	-	75	25	100	3	3
Purpose	To provide the conceptual knowledge of Engineering mathematics						
Course Outcomes							
CO1	To study various fundamental concepts of Fourier series and Fourier Transformation.						
CO2	To study and understand the functions of a complex variables.						
CO3	To study the Probability Distributions.						
CO4	To study the linear programming problem formulation.						

UNIT – I

Fourier Series: Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms: Fourier integrals, Fourier transforms, Fourier cosine and sine transforms.
Properties of Fourier transforms, Convolution theorem, Perseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

Functions of a Complex Variables: Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity. Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification &rotation, inversion & reflection, Bilinear).

UNIT-III

Probability Distributions: Probability, Baye's theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV

Linear Programming: Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

1. Higher Engg. Mathematics : B.S. Grewal
2. Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1. Complex variables and Applications : R.V. Churchil; Mc. Graw Hill
2. Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3. Operation Research : H.A. Taha.
4. Probability and Statistics for Engineer : Johnson. PHI.

Note: The Examiner will be given the question paper template to set the question paper.

PC-CHE-207A	UNIT PROCESS						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
3	-	-	75	25	100	3	3
Purpose	To make student able to understand about various unit operations.						
Course Outcomes							
CO1	To familiarize with the Alkylation process.						
CO2	To understand the concept of hydrogenation.						
CO3	To familiarize with the Sulfonation.						
CO4	To familiarize with the halogenations and nitration.						

UNIT-I

ALKYLATION: Products derived from alkylation, types of alkylation, factors controlling alkylation, flow street for alkylaryl sulfonates, sulfuric acid alkylation for petroleum industry equipment for alkylation-kellogg cascade alkylater.

UNIT - II

HYDROGENATION: Products derived from hydrogenation, types of hydrogenation, factors controlling hydrogenation, equipment for hydrogenation, apparatus and rnaterial of construction, high pressure autoclave, shaking autoclave, flow sheet for synthesis of methanol from carbon rnonoxide and hydrogen, Hydrogenation of oil.

UNIT - III

SULFONATION: Sulfonation and sulfonating agents, physical and chemical factors in sulfonation, mechanism of desulfonation, Industrial equipment and techniques, batch surfonation kettle, ball mill sulfonator, flowsheet for manufacture of anthraquinone sulphonate ethanol from methylene.

UNIT-IV

HALOGENATION: Products derived by halogenation, types of halogenation, mechanism of dehalogenation, Design and construction of equipment for halogenations, flow sheets for manufacture of chroroacetic acid, monochroroacetic acid & chloral.

NITRATION: Products derived from nitration, types of nitration, process equipment for nitration, batch nitration, continuous nitration, schmidt nitration of propane.

BOOKS RECOMMENDED:

1. Unit Processes in Organic synthesis by P.H. Groggins (MGH)
2. Chemical Technology by Merk and Hahn (MGH)
3. Chemical Egg. Dev., NT, Madras (Organic)-ll Centre.

Note: The Examiner will be given the question paper template to set the question paper.

BS-CH-209LA	CHEMISTRY- II LAB						
Lecture	Tutorial	Practical	Practical	Sessional	Total	Credits	Time
-	-	3	60	40	100	1.5	3
Purpose	To make student able to identify and quantify organic compounds.						
Course Outcomes							
CO1	Students will be able to perform preliminary tests to identify organic compounds.						
CO2	Students will be able to analyze functional groups of organic compounds and prepare derivatives.						
CO3	Students will be able to determine kinetics of reaction by method of half- life period.						
CO4	Students will be able to determine the activation energy for reaction by integral and differential method.						

Identification of organic compounds :

1. Preliminary tests (elemental analysis, Ignition, colour, odour and determination of physical constants)

2. Functional group analysis.

3. Preparation of derivatives, Organic Acids, Aldehydes, Ketones, Amides, .Phenols, amines, Carbohydrates, Hydrocarbons.

4. Preparation of aspirin, 2,4, 6- tribromo aniline, picric acid from phenol, iodoform, S benzyl isothiourounim chloride.

Quantitative organic analysis:

1. Estimation of phenol, aniline, formaldehyde.

2. To determine kinetics of reaction between ethyl acetate and sodium hydroxide at room temp. by method of half-life period.
3. To determine the activation energy for reaction between ethyl acetate and sodium hydroxide by integral and differential method.

Books Recommended:

1. A. I. Vogel, Qualitative Organic analysis (ELBS) Longman.

2. Satish Aggarwal& R.C. Aggarwal, Advanced organic analysis, Pargati Prakashan.

3. G. Mann, Practical Organic Chemistry, Longman

PC-CHE-211LA	FLUID FLOW LAB						
Lecture	Tutorial	Practical	Practical	Sessional	Total	Credits	Time
-	-	3	60	40	100	1.5	3
Purpose	To provide practical knowledge for the application of flow measurement devices, calibration of flow measurement device, pressure drop in pipe flow, determination of equivalent length of various fittings in pipe line.						
Course Outcomes							
CO1	Students will be able to use various flow measurement devices to measure flow rates.						
CO2	Students will be able to calibrate flow measurement device.						
CO3	Students will be able to determine pressure drops in pipe flow.						
CO4	Students will be able to determine equivalent length of various fittings in pipe line.						

List of Experiments:

1. Flow measurement by Venturimeter.

2. Flow measurement by Orifice meter.

3. Calibration of Rotameter.

4. Flow measurement by V-notch.

5. Pressure drop in pipe flow.

6. Verification of Bernoulli's Theorem.

7. Determine friction factor in pipes of different material.

8. Flow measurement by Pitot tube.

9. To obtain the equivalent length of various fittings.

MC-902A	Constitution of India					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	-	-	75	25	100	3 Hrs.
Purpose	To know the basic features of Constitution of India					
Course Outcomes						
CO1	The students will be able to know about salient features of the Constitution of India.					
CO2	To know about fundamental duties and federal structure of Constitution of India.					
CO3	To know about emergency provisions in Constitution of India.					
CO4	To know about fundamental rights under constitution of India.					

UNIT-I

1. Meaning of the constitution law and constitutionalism, Historical perspective of the Constitution of India. Salient features and characteristics of the Constitution of India.
2. Scheme of the fundamental rights

UNIT - II

3. The scheme of the Fundamental Duties and its legal status. The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States.
4. Parliamentary Form of Government in India – The constitution powers and status of the President of India

UNIT - III

5. Amendment of the Constitutional Powers and Procedure. The historical perspectives of the constitutional amendments in India.
6. Emergency Provisions: National Emergency, President Rule, Financial Emergency. Local Self Government – Constitutional Scheme in India.

UNIT-IV

7. Scheme of the Fundamental Right to Equality. Scheme of the Fundamental Right to certain Freedom under Article 19.

8. Scope of the Right to Life and Personal Liberty under Article 21.

Text Books
  1. Constitution of India. Prof.Narender Kumar (2008) 8th edition. Allahabad Law Agency.
Reference Books:
  1. The constitution of India. P.M. Bakshi (2016) 15th edition. Universal law Publishing.

   Note: The Examiner will be given the question paper template to set the question paper.

HM - 902A	Fundamentals of Management						
L	T	P	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	75	25	100	3 Hour
Purpose	To enhance the knowledge about the basic management concepts so that engineers can apply their managerial skills.						
	Course outcomes						
CO1	An overview about Business Environment and its Components.						
CO2	Understand the concept of Financial Management and its importance.						
CO3	Enabling the students to know about the hiring and guiding the work force by the understanding of Human Resource Management.						
CO4	To understand the concept of economical production aspects of Management.						

UNIT 1

Business Environment: Concept, nature and objectives of business, social responsibility of business, Constituent of Business Environment; Economic, Social, Political, Legal and technological. Definition, Nature and Significance of Management, Henry Fayol's Principles of Management, Functions of Management.

UNIT 2

Financial Management: Introduction of Financial Management, Objectives of Financial Decisions, Financial Planning-Tools of financial planning, Management of working capital, factors affecting requirements of working capital. Capital Structure decisions. Features of appropriate capital structure. Sources of finance.

UNIT 3

Personnel Management: Personnel Management-Meaning, Nature and importance, Functions of Personnel Management (a) Managerial Functions and (b) Operative functions. Job Analysis; Meaning and importance; Process of Job Analysis, Job Description and Job Specification. Human Resource Development-Meaning and Concept.

UNIT 4

Production Management: Production Management: Definition and objectives. Plant Location: Ideal plant location, Factors affecting plant location. Plant Layout: Ideal plant layout, Factors affecting Plant layout. Work Measurement: Meaning Objectives and Essentials of work measurement. Production Control: meaning and Importance of production control and steps involved in production control, Nature, scope and importance of Marketing Management, Modern Marketing concepts. Role of marketing in economics development. Marketing Mix. Marketing Information System. Meaning, nature and scope of International Marketing.

Suggested Books:

- Charunilam , "Business Environment" , Himalaya Publishing House
- Harold, Koontz & Cyriol ,"Mangement" , MGH
- Principles of Personnel Management-Edwin B.PhilpoMGH
- Cundiff &Stiff , "Basic Marketing" PHI

Note: The Examiner will be given the question paper template and will have to set the question paper according to the template provided along with the syllabus.

PC-CHE-204A	HEAT TRANSFER						Time
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Credits**	
4	1	-	75	25	100	4	3
Purpose	To understand the basic concept and applications of various modes of heat transfer, boiling & condensation, Evaporation and types of Heat exchangers.						
Course Outcomes							
CO1	To understand the concept of basic equations of steady state condition in slab, cylinder and sphere, Critical thickness of insulation, Use of transient temperature charts and lumped system analysis.						
CO2	To understand the basic concept of convection, boiling & condensation						
CO3	To familiarize with the concept of various types of Heat exchangers.						
CO4	To familiarize with the concept of Radiation and Evaporations.						

UNIT I

Introduction: Basis equation - one dimensional, two dimensional and three dimensional, Steady state condition in slab, cylinder and sphere, Critical thickness of insulation. Finned surfaces, Transient conduction Analytical solution for slabes, Use of transient temperature charts for slabs, cylinders and sphere and lumped system analysis.

UNIT II

Convection: Concept of free and forced convection. Dimensional Analysis.Empirical correlations for free and forcedconvection for various shapes.

Boiling & Condensation: Film wise and drop wise condensation, Laminar film condensation on a vertical plate, Film condensation on tubes, Boiling regimes, Bubble growth and nucleate boiling.

UNIT III

Heat Exchangers: Basic types of heat exchanges, Overall heat transfer coefficient, log mean temperature difference, Effectiveness and NTU methods for heat exchanger analysis.

UNIT IV

Radiation: Black body radiation, radiation properties, concept of shape factor, Radiation exchange in enclosure with black surface.

Evaporators: Types of evaporators, Single & Multiple effect evaporators, calculations for surface area requirement. Methods of feeding.

Books Recommended:

1. W. L. McCabe & J. C. Smith, Unit operations of chemical engineering, McGraw Hill Book Company, New Delhi
2. J. P. Holman, Heat Transfer, McGraw Hill Book Company, New Delhi.
3. M. L. Oziski, Heat Transfer, McGraw Hill International Editions.
4. A. J. Chapman, Heat, Macmillan Indian, Delhi.
5. D. S. Kumar, Heat and Mass Transfer, S.K. Kataria and Sons, Delhi. .
6. Kirk, D. Hegen, Heat Transfer with Applications, Prentice Hall International. Inc., New Jercy.

Note: The Examiner will be given the question paper template to set the question paper.

PC-CHE-206A			MECHANICAL OPERATIONS				
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
3	-	-	75	25	100	3	3
Purpose	To understand the concept of unit operation and their role in chemical engineering industries, Types of mechanical operations, various size reduction techniques.						
Course Outcomes							
CO1	To Introduce the concept of unit operation and their role in chemical engineering industries, Types of mechanical operations, Particle size and shape, Measurement and analysis, various size reduction techniques.						
CO2	To familiarize with the concept of various methods of mixing of solids, Size enlargement: scope and applications and techniques, Filtration.						
CO3	To understand the concept of Drag force, Settling velocity of a particle in a fluid, Stoke's law, Elutriation, Classifiers, Thickeners, Gravity separation, concept of relative velocity.						
CO4	To familiarize with the concept of Storage of Solids, Flow of solids by gravity, Transport of solids, particle collection systems.						

UNIT I

Introduction to Unit operations: Introduction to unit operation and their role in chemical engineering industries, Types of mechanical operation, Particle size and shape, Particulate mass, Size and shape distributions, Measurement and analysis, Concept of average diameter, Screening, types of screens, effectiveness of screens, particle separation efficiency. Mixing of solids, blending, kneading, etc., Filtration: classification of filters, theory of filtration, cake resistance.

UNITII

Size Reduction and Size Enlargement of Solids: Size reduction, Crushing, Grinding and ultrafine grinding and selection of equipment, Laws of grinding. Construction and working principle of mostly used equipments, viz., Jaw crushers, gyratory crushers, hammer mill, crushing rolls, ball mills, and fluid energy mills. Size enlargement: scope and applications, size enlargement techniques, Agglomeration and compaction.

UNITIII

Drag force and Separation of solid particles: Flow around' single particle, Drag force & drag coefficient, Settling velocity of a particle in a fluid, Stoke's law, Elutriation, Classifiers, Hindered & free settling of particles, Thickeners, Gravity separation, concept of relative velocity.

UNIT IV

Storage, Handling & Transport of Solids: Storage of Solids, Flow of solids by gravity, Transport of solids by screw/ belt conveyors, pneumatic conveyors, cyclones, Bag filters, Electrostatic precipitators; particle collection systems.

Books Recommended:

1. J. M. Coulson & J. F. Richardson, Chemical Engineering, Vol. II, Pergamon press.
2. G. G. Brown, Unit Operations, Asia publishing House.
3. A. S. Foustetal, Principle of Unit Operations, John Wiley.
4. W. L. McCabe & J. C. Smith, Unit Operations of Chemical Engineering,McGraw Hill.
5. B. C. Bhattacharya & C. M. Narayanan, Mechanical Operations for Chemical Engineers,Khanna publishers.

Note: The Examiner will be given the question paper template to set the question paper.

PC-CHE-208A	Numerical Methods in Chemical Engineering						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
4	1	-	75	25	100	3	3
Purpose	To understand the concept of types of errors, Eigen values and Eigen vectors of matrices, Non-linear algebraic equations, Function evaluation, Ordinary differential equations						
Course Outcomes							
CO1	To Introduce the concept of error, linear algebraic equations						
CO2	To familiarize with the Eigen values and Eigen vectors of matrices, non-linear algebraic equations						
CO3	To understand the Linear Regression, Interpolation and Extrapolation Technique						
CO4	To familiarize with the Ordinary Differential Equations						

UNIT-I

Errors: Classification, significant digits and numerical stability.
Linear algebraic equations: Cramer's rule, Gauss Elimination and LU Decomposition Gauss-Jordan elimination,
Gauss-Seidel and Relaxation Methods.

UNIT-II

Eigen values and eigenvectors of matrices: Faddeev Leverrier's Method, Power Method
Non linear algebraic equations: Single variable successive substitutions (Fixed Point Method), Multivariable successive substitutions, single variable Newton-Raphson Technique, Multivariable Newton-Raphson Technique.

UNIT-III

Function evaluation: Least squares curve-fit (Linear Regression), Newton's interpolation formulae (equal intervals), Newton's Divided Difference Interpolation Polynomial, Lagrangian Interpolation Unequal intervals), differentiation formulae, Integration formulae or Quadratures (Trapezoidal, Simpson's 1/3 and 3/8 rules), Extrapolation Technique of Richardson and Gaunt

UNIT-IV

Ordinary differential equations: Initial value problems; ode-ivps The Finite difference Technique

TEXT BOOKS

1. Numerical methods with programming in 'C', T. Veerarajan, and T. Ramachandran, TMGH(2007).
2. Numerical Methods for Scientists and Engineers ,SankaraRao K, 3rd edition PHI, New Delhi, (2007).

REFERENCE BOOKS:

1. Numerical Methods for Engineers, S.C. Chapra and R.P. Canale, 5th Edition, TMGH, New Delhi, 2007.
2. Numerical Methods in Engineering and Science, B.S. Grewal, and,J.S. Grewal, 6th Ed,Khanna Pub.2004.
   Note: The Examiner will be given the question paper template to set the question paper.

ES-CHE-212A	MATERIAL TECHNOLOGY						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
3	0	-	75	25	100	3	3
Purpose	To understand the concept and applications of material science, Crystal Geometry, Isothermal transformations, Heat Treatment, Corrosion and its Prevention, various polymers						
Course Outcomes							
CO1	To Introduce the material science, classification of engineering materials.						
CO2	To understand the concept of Isothermal transformations (TTT Curves); Heat Treatment methods.						
CO3	To familiarize with the Corrosion and its Prevention.						
CO4	To familiarize with the typical engineering materials.						

Unit I

Introduction: Introduction to material science, classification of engineering materials, Crystal Geometry And StructureDetermination, Crystal Imperfections: Point imperfections, Line imperfections-edge and screw dislocations, Surface imperfections.

Unit II

Isothermal transformations (TTT Curves); Heat Treatment methods: Isothermal transformations (TTT Curves); Heat Treatment: Annealing Normalizing, Hardening, Martempering, Austempering, Hardenability, Quenching, Tempering, Carburising, Cyaniding, Nitriding, Flame hardening.

Unit III

Corrosion and its Prevention: Corrosion and its Prevention: Direct corrosion, Electro-chemical corrosion, Galvanic cells,High temperature corrosion, Passivity, Factor influencing corrosion rate, Control and prevention of corrosion-modification of corrosive environment, Inhibitors, Cathodic protection, Protective coatings, glass lining, lead lining, FRP lining.

Unit IV

Engineering Materials: Typical Engineering Materials: Ferrous metals, Non ferrous metals and alloys – Aluminum and its alloys, Copper and its alloys, Alloy steels Alloys for high temperature service, Ceramic materials – Structure of ceramics, Polymorphism, Speciality glasses and refractories, properties and applications. Polymers: Classifications, comparison and properties, of various polymers and their relationship with chain structure. Grey and white cast iron- properties, applications,Uses.

Books Recommended:

1. V. Raghawan, Material Science & Engineering, Prentice Hall.
2. O.P. Khanna, Material Science,DhanpatRai Publications, New Delhi.
3. S. K. HajraChoudhury, Material Science and Processes, 2nd Edition, Indian BookDistributing Co.,1982.
4. R. L. Timings, Kemal Ahmet, EngineeringMaterial,Vol. I&II., Longman Publisher.
5. V.L. Van Vlack, Material of Engineering: Concepts and Application,Addison Wesley.
   Note: The Examiner will be given the question paper template to set the question paper.

PC-CHE-214LA	HEAT TRANSFER LAB						
Lecture	Tutorial	Practical	Practical	Sessional	Total	Credits	Time
-	-	3	60	40	100	1.5	3
Purpose	To providepractical knowledgeof the application of different modes of heat transfer theory, heat transfer through composite walls, pipe and rod						
Course Outcomes							
CO1	Student will be able to determine heat transfer coefficient.						
CO2	Student will be able to determine Filmwise and Dropwise condensation.						
CO3	Student will be able to determine LMTD, Thermal conductivity, Emissivity.						
CO4	Student will be able to determine Stefan Boltzman constant.						

LIST OF EXPERIMENTS:

1. To determine total thermal resistance and total thermal conductivity of composite wall.
2. To determine the thermal conductivity of insulating powder.
3. To find out heat transfer coefficient of vertical cylinder in natural convection.
4. (a) To study the unsteady state heat transfer and compare theoretical vs. practical value of response
   (b) To determine the convective heat transfer coefficient.
5. (a) To determine the heat flow rate through the lagged pipe for known value of thermalconductivity of lagging material.
   (b) To plot the temperature distribution across the lagging material.
6. To calculate LMTD for parallel and counter flow in double pipe heat exchanger.
7. To find average heat transfer coefficient for dropwiseand filmwise condensation and findthe overall heat transfer.
8. To study the temperature distribution along the length of a pin fin under natural convection heat transfer.
9. To study the temperature distribution along the length of a pin fin under forced convection heat transfer.
10. To find the emissivity of the test plate surface at various temperature and compare with the actual reported value.
11. To determine the thermal conductivity of metal rod.
12. (i) To demonstrate super thermal conductivity heat pipe and to compare its working with that of best conductor
13. (ii) To plot temperature vs. time response of three pipes
    (iii) Temperature distribution along length of three members at different time intervals can be plotted and nearly isothermal temperature distribution in case of heat pipe.
14. To find out the Stefan Boltzmann constant.
15. To find heat transfer coefficient for heated pipe and air is forced to flow through it for different air flow.

PC-CHE-216LA	MECHANICAL OPERATIONS LAB						
Lecture	Tutorial	Practical	Theory	Sessional	Total	Credits	Time
-	-	3	60	40	100	1.5	3
Purpose	To provide the practical knowledge for the application of theories of Drag coefficient, Sedimentation, size reduction, grinding, screen analysis, separation of particles from air, filtration of slurry, Elutriation and the pressure drop in packed bed.						
Course Outcomes							
CO1	Students will be able to know the concept of Drag coefficient, Sedimentation, Size reduction.						
CO2	Students will be able to know the principle and working of grinding in a ball mill, separation of dust particles from air and filtration of slurry.						
CO3	Students will be able to know the solid separation techniques and size distribution of particles						
CO4	Students will be able to determine the pressure drop in a packed bed.						

LIST OF EXPERIMENTS:

1. Drag coefficient: Determination of drag coefficient from the plot of drag coefficient Vs modified Reynolds No. and verify Stroke's law.

2. To carry out Batch Sedimentation.

3. Size reduction: To determine the efficiency of the roll crusher for crushing a material of known working index.

4. Grinding in a Ball Mill:

   (a)   To determine the critical speed, work index, Bond's law, Rittenger's law, Kick's law.

   (b) To determine the surface area generation for the given amount of feed.

5. Screen Analysis: To analyze sample for size distribution using sieve shaker.

6. Separation of dust particles from air:

   (a) To study the performance of given cylinder (efficiency vs. dp).

   (b) To study the effect of inlet gas velocity on overall efficiency.

   (c) To study the effect of solid concentration or dp or Drop.

7. Packed bed: Determination of pressure drop packed bed

8. Filtration of slurry: To calculation specific cake resistance and medium resistance in plate and frame filter press.

9. Elutriation: To analyze given sample of sand using Elutriator.

MC-901A				Environmental Sciences			
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	0	75	25	100	3 Hrs.
Purpose	To learn the multidisciplinary nature, scope and importance of Environmental sciences.						
Course Outcomes (CO)							
CO1	The students will be able to learn the importance of natural resources.						
CO2	To learn the theoretical and practical aspects of eco system.						
CO3	Will be able to learn the basic concepts of conservation of biodiversity.						
CO4	The students will be able to understand the basic concept of sustainable development.						

UNIT 1

The multidisciplinary nature of environmental studies, Definition, Scope and Importance, Need for public awareness, Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.
(b) Water Resources: Use & over-utilization of surface & ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food Resources: World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy Resources: Growing energy needs, renewable & 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 lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem. Sturcture 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 and (d) Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban /Rural Industrial/Agricultural, Study of common plants, insects and birds, Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

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 of global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity, Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts, Endangered and endemic species of India, Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Definition: Cause, 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- cause, 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 IV

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, 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, Human population and the Environment, Population growth, variation among nations, Population explosion-Family Welfare Programme, Environment and human health. Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies, Drugs and their effects; Useful and harmful drugs, Use and abuse of drugs, Stimulant and depressan drugs, Concept of drug de-addiction, Legal position on drugs and laws related to drugs.

Suggested Books

- Environmental Studies- Deswal and Deswal. Dhanpat Rai and Co.
- Environmental Science and Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India.
- Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
- Environmental Science- Botkin and Keller. 2012. Wiley , India

Note: The Examiner will be given the question paper template to set the question paper.

BFSI- 301: Fundamental of Computer and E-Commerce

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of 4 short answer questions of four marks each. All questions shall carry equal marks.

Introduction to Computer: characteristics, Components, Types; History of computers: Generations of computer; Computer Memory: types, Software and Hardware; Operating Systems: Concept functions and types. Computer Language: - Low level, High Level Language; Computer Network:-LAN, WAN, MAN. Introduction to Internet: Concept, application and scope, WWW, E-mail, video conferencing.

MS-Office- MS-Word: Starting Word, new documents, entering text, changing text, aligning, underlining, and justifying text. Tables – creation, adding rows and columns, splitting, and combining cells, Borders. Saving, closing, and operating documents. Power Point (Presentation software): Basic concept of presentation software, Introduction to Ms-Excel: working with spreadsheet, Basic commands and Functions.

E-Commerce: An introduction, Comparison between Traditional commerce and Ecommerce, Advantages & disadvantages of E-commerce; applications and scope of E-commerce.

Suggested Readings:

1. Saxena : A first Course in Computers.
2. P.K. Sinha : Computer Fundamental
3. R.K. Taxali : PC Software for Windows

BFSI- 302: Accounting for Banking and Insurance Companies

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions of four marks each. All questions shall carry equal marks.

Banking: legal definition of banking; types of banks operating inIndia. Banking Business: model and accounting. The provisions relating to capital, reserve, liquidity norms (Capital Reserve Ratio & Statutory Liquidity Ratio); Main Characteristics of a Bank's Book-KeepingSystem; Preparation and analysis of Books of Accounts; Analysis of balance sheet of a banking company.

Insurance- Various Types ofInsurance; basis of insurance premium, considerations for annuities granted, claims, surrender value, bonus, paid-up policy, re-insurance and agents balances; Computation of "premium income," "claims expense" and "commission expense"in thecase of an insurance company;Preparation and analysis of books of Accounts of life insurance and general insurance business.

Suggested Readings

1. NaliniPraveTripathy, Prabir Pal, 'Insurance theory and practice' TMH 2007.
2. Justin Paul and Padmalatha Suresh, 'Management of Banking and financial services' TMH 2009.
3. M. RavathySriram and P.K. Bamanan, 'Core banking solution' PHI 2008
4. Jyotsna Sethi and Nishevan Bhatia, 'Elements of Banking and Insurance' PHI 2008.
5. VijayaragavanIyengar, 'Introduction to Banking' Excel Books Pvt. ltd. 2007.
6. Viganim, BML, 'Banking, law and practice' Konak Publication 2005 Gupta, R.L. &Ramaswmy, Advanced Accountancy, Volume I&II, Sultan Chand & Sons
7. Maheshwari, S.N., Advanced Accounting, Vikas Publishing House; publications, 2009

BFSI- 303: Fundamentals of Insurance

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions of four marks each. All questions shall carry equal marks.

Contents

Introduction: Need of security against economic difficulties, Risk and uncertainty; Social security and insurance. Definition, nature and function of insurance, Insurance V/s Investment ,

Evolution of insurance, Types of insurance; Growth of insurance in India; Role of Insurance in Developing economies like India.

Insurance Contract: General and Specific Principles of Insurance.

Brief history of Insurance industry in India; Enactment of Insurance Act,1938. Nationalization

of Life Insurance Companies in1955. Nationalization of General Insurance Companies in1972.

Malhotra Committee Report – Opening up of Insurance sector to Private Companies in2000.

Objective of Setting up of Insurance Regulatory and Development Authority in1999. IRDA Act

1999 – Organization, guidelines for life & Non-life insurance.

Types of Life Insurance policies/products in India. Classification of General insurance: Fire insurance, Marine insurance, Social insurance, Personal insurance, Motor insurance, and miscellaneous insurance. Claim settlement procedure in insurance.

Distribution channels in insurance industry: qualifications, remunerations, role, and code of conduct.

Suggested Readings:

1. Huebner S.S. and Kennerth Black Jr.:Life Insurance (Prentice Hall Inc.)
2. Meher Robert, L. : Life Insurance; Theory and Practice; Business Publications, Texas
3. Karampal, B.S.Bodla,and Mahesh Garg, 'Insurance Management-Principles and Practice', Deep & DeepPublication,2006.
4. M.N.Mishra, 'Insurance-Principles and practice,' S. Chand and co. Ltd.,2003
5. NaliniPraveTripathy, Prabir Pal, 'Insurance theory and practice' TMH2007.
6. Neelam C. Gulati, 'Principles of Insurance Management', Excel Books,2007

BFSI- 304: Retail Banking and Operations-I

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions of four marks each. All questions shall carry equal marks.

Retail Banking: Introduction to retail banking and importance of retail line of business, Evolution of retail banking in India, Dimensions of retail banking, and role of retailing within the bank operations. Application of retailing in banking: Wholesale banking, meaning and distinction between retail banking and wholesale banking.

Retail Products Overview - Customer requirements, Products development process, Liabilities and Assets Products / Description of Liability products, Description of Asset Products, Approval process for retail loans, Credit scoring and its process, requisites for credit scoring.

Delivery Channels - Branch, Extension counters, ATMs, POS, Internet Banking, M-Banking. Important asset products- home loan, personal loan, agriculture loan, vehicle loan and educational loan;

Credit / Debit Cards - Credit Vs Debit Cards, Eligibility, Purpose, Billing Cycle, Credit Points; Loan - Eligibility, Purpose, Disbursement, Prepayment issues, Repayments / Collection.

Suggesting Reading:

- Retail Banking in India: P Aggarwal.
- Retail Banking for CAIIB Examination: IIBF (Indian Institute of Banking and finance).
- Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons.
- Cox, David, Elements of Banking; John Murray.
- Mehta, R.R.S., Fundamental of Banking; Himalaya Publiching House Co.
- Nigam, B.M.L., Banking Law and Practice, Konark Publishers.

BFSI- 305: Business Environment

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Business Environment- Micro and Macro Indicators. Risk Assessment and Management in Business Environment. Globalisation- Trends and Challenges. Economic Reforms in India- Phases and Current State. Industrialisation Trends in India and Industrial Policies. Performance of SME sector in India and Institutional Support for it. Public Sector Performance and Reforms in India. Global Trade and India- Trends and Challenges. Fiscal and Monetary Policies in India and their Impact on country and corporate sector.

Suggested readings

- Sundram, KPM, Datt, G and Mahajan, A, Indian Economy, S Chand.
- Misra, SK and Puri, VK, Indian Economy, Himalaya publications.
- Worthington, I and Britton, C, The Business Environment, Prentice Hall.
- Cherunillam, F, Business Environment, Himalaya Publishers.

BFSI- 306: Mutual Fund Operations - II

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Max. Marks: 100
Theory: 80
Practical: 20

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Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Investor and Distributor Processes and Payouts, Customer Profile on the Basis of Mutual Fund Scheme, Purchase, Payment Process and Accepted Payment Methods, Payment Channels, Redemption and Systematic Transactions, After Sales Activities- Handling Customer Queries, Post Sale Customer Services, Shareholders Account, Cancellation of Mutual Funds, Learning How to Interact With Customers, Carry Out Rule-Based Transactions in Line With Customer-Specific Guidelines/Procedures/Rules and Service Level Agreements.

Handling Monetary Transactions, Handling Non-Monetary Transactions Ability to Quantify Various Risk Factors Methods to Compute Various Ratios to Calculate Risk-Adjusted Returns, Techniques to Comprehend Impact of Various Economic and Financial Factors on Mutual Fund Market.

SEBI's Role and Relevant Regulations- SEBI Act 1992.

Suggested Readings
1. The Rise Of Mutual Funds: An Insider's View, By Matthew P. Fink Oxford University Press, 2008
2. Common Sense On Mutual Funds, John C. Boglewiley, 2010
3. Scientific Investment Analysis, Austin Murphy Quorum Books, 2000 (2nd Edition)
4. Mutual Fund Performance During Up And Down Market Conditionsby Rao, S. P. Uma MaheswarReview of Business, Vol. 22, No. 1, Spring 2001
5. Commandments of Mutual Fund Investing, Thomas, Robert R.; Musar, Richard Cjournal Of Accountancy, Vol. 188, No. 2, August 1999
6. David Blake, *Financial Market Analysis.*

BFSI- 401: Entrepreneurship

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Max. Marks: 100
Theory: 80
Practical: 20

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Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Banking: legal definition of banking; types of banks operating inIndia. Banking Business: model and accounting. The provisions relating to capital, reserve, liquidity norms (Capital Reserve Ratio & Statutory Liquidity Ratio); Main Characteristics of a Bank's Book-KeepingSystem; Preparation and analysis of Books of Accounts; Analysis of balance sheet of a banking company.

Insurance- Various Types ofInsurance; basis of insurance premium, considerations for annuities granted, claims, surrender value, bonus, paid-up policy, re-insurance and agents balances; Computation of "premium income," "claims expense" and "commission expense"in thecase of an insurance company;Preparation and analysis of books of Accounts of life insurance and general insurance business.

Suggested Readings

1. NaliniPraveTripathy, Prabir Pal, 'Insurance theory and practice' TMH 2007.
2. Justin Paul and Padmalatha Suresh, 'Management of Banking and financial services' TMH 2009.
3. M. RavathySriram and P.K. Bamanan, 'Core banking solution' PHI 2008
4. Jyotsna Sethi and Nishevan Bhatia, 'Elements of Banking and Insurance' PHI 2008.
5. VijayaragavanIyengar, 'Introduction to Banking' Excel Books Pvt. ltd. 2007.
6. Viganim, BML, 'Banking, law and practice' Konak Publication 2005 Gupta, R.L. &Ramaswmy, Advanced Accountancy, Volume I&II, Sultan Chand & Sons
7. Maheshwari, S.N., Advanced Accounting, Vikas Publishing House; publications, 2009.

BFSI- 402: Investment Management

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Max. Marks: 100
Theory: 80
Practical: 20

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Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Investment management: nature, scope, objectives, types of investors, alternative forms of investment, investment process, investment vs. gambling, investment vs. speculation, Capital market: Meaning, structure, types - New issue market, Secondary market operations, Functions of stock exchanges, SEBI role, Valuation of bonds and shares, risk – kinds, measures of risk and return, Fundamental and Technical analysis, Portfolio management, Mutual funds.

Suggested readings:

1. Prasanna Chandra, Investment analysis and portfolio management.
2. R.P. Rustagi, Investment analysis and portfolio management.
3. Bhalla, Investment analysis
4. S. Kevin, Security analysis and Portfolio management
5. Donald Fisher and Ronald Jordan, Security analysis and Portfolio management

BFSI- 403: Life Insurance Operations

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Contents

Introduction to Life Insurance: Nature and uses of Life Insurance; Life Insurance as a collateral, as a measure of financing business continuation, as a protection to property, as a measure of investment. Principles of Life Insurance: General principles and Specific principles.

Types of Life Insurance policies/products in India.

Proposal and application form, warranties, medical examination, policy construction and delivery, policy provision, lapse revival, surrender value, paid-up policies, maturity, nomination and assignment. Suicide and payment of insured amount; Loan to Policy-holders.

Life Insurance Risk: Factors governing sum assured; Methods of calculating economic risk in life insurance proposal. Measurement of risk and mortality tables; Calculation of premium and Bonuses; Treatment of sub-standard risks.

Life Insurance products:Traditional / Unit Linked Policies; Individual and GroupPolicies;With Profit and Without Profit/Whole Life Products, Interest sensitiveproduct;Term

Assurance/Annuities, Endowment Assuranceetc.
Insurance Documents; PolicyConditions; Group Insurance; Life Insurance Marketing; Post - Issue Matters

Lapse of the Policy due to Non-Payment of Premium.Revival of the LapsedPolicies.Surrender of the Policy – Payment of surrendervalue.; Assignment of thePolicies.; Settlement of claims – Procedure to befollowed.

Suggested Readings:

1. Huebner, S. S. and Kennerth, Black Jr.- Life Insurance ; Prentice Hall Inc. Englewood Chiffs, New Jersey.
2. Karampal, B.S.Bodla,and Mahesh Garg, 'Insurance Management-Principles and Practice', Deep & DeepPublication,2006.
3. M.N.Mishra, 'Insurance-Principles and practice,' S. Chand and co. Ltd.,2003
4. NaliniPraveTripathy, Prabir Pal, 'Insurance theory and practice' TMH2007.
5. Neelam C. Gulati, 'Principles of Insurance Management', Excel Books,2007

BFSI- 404: Currency Flows and FPI Investments

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Max. Marks: 100

Theory: 80

Practical: 20

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Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

International Monetary Systems: Historical Background and structure. Meaning of foreign currency flow, various modes of foreign investment: Foreign Direct Investment (FDI), Foreign Institutional Investors (FIIs), Foreign Portfolio Investment (FPI) its significance for developing economies like India. Foreign Direct Investment (FDI) Policy, Regulation of Foreign Institutional Investors (FIIs) and Foreign Portfolio Investment (FPI). Currency fluctuation and its impact. Foreign Exchange Market: Nature, Participants and structure. Regional Economic Blocks: BRICS, SAARC, ASEAN, European Union, and their role in Global Business.

Suggesting Reading:

- Bhorali, D. and Sikidar, S.: International Financial Institution and Monetary Management.
- Chaudhary, B.K.: Financing of Foreign Trade and Foreign Exchange.
- Misra, S.K. and Puri, V.K., Indian Economy, Himalya Publisher, 27th Edition.

BFSI- 405: Retail Banking and Operations - II

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Retail Strategies: Tie-up with Institutions for Personal loans / Credit cards / Educational loans, with OEMs / Authorised Dealers for Auto / Vehicle loans, and with Builders / Developers for Home loans; Delivery Channels - Branch, Extension counters, ATMs, POS, Internet Banking, M-Banking. Selling Process in retail products-Direct Selling Agents.

Customer Relationship Management: Role and impact of customer relationship management, Stages in customer relationship management process; Loan process and the relevant accounting including EMI computation.

Issues of Retail Banking: Securitisation and mortgage based securities; Trends in retailing- New products like Insurance, Demat Services, SIPs, online/Mobile Banking, Asset Management services, Growth of e-banking.

Recovery of Retail loans- defaults, Rescheduling and Recovery Process.

SARAFAST Act, DRT Act, Lok Adalat forum, Recovery Agents- RBI guidelines.

Suggested Readings:
 1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons.
 2. Cox, David, Elements of Banking; John Murray.
 3. Mehta, R.R.S., Fundamental of Banking; Himalaya Publiching House Co.
 4. Nigam, B.M.L., Banking Law and Practice, Konark Publishers.
 5. Retail Banking in India: P Aggarwal.
 6. Retail Banking for CAIIB Examination: IIBF (Indian Institute of Banking and finance).

BFSI- 406: Operations of NBFCs in India

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Max. Marks: 100

Theory: 80

Practical: 20

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Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

Contents

Concept of NBFCs, Role of NBFCs in developing economy like India, Different committers related to NBFCs, Guidelines for NBFCs, Incorporation of NBFC, Challenges for NBFCs, Difference between banks and NBFCs, Types of NBFCs and their role,
Regulation of NBFCs in India.
 Profile of selected large NBFCs: HDFC, LIC Housing Finance, Power Finance Corporation Limited; Shriram Transport Company limited; Bajaj Finance Limited; M & M Financial Services limited; Muthoot Finance Limited; Cholamandalam Investment and Finance co ltd. L&T Finance ltd.
Objectives, Source of funds & functions of:

- Asset Finance Company(AFC)
- Investment Company (IC)
- Loan Companies (LC)
- Infrastructure Finance Company (IFC)
- Systemically Important Core Investment Com
- Infrastructure Debt Fund (IDF-NBFC)
- Non-Banking Financial Company – Micro Finance Institution (NBFC-MFI)
- Non-Banking Financial Company – Factors (NBFC-Factors)

Suggested Readings:

- Non-Banking Financial Companies (NBFCs) in India: Functioning & Reforms: Jafor Ali Akhan.
- Non Banking Financial Companies: Indian Institute of Banking & Finance.
- Manual Of Non-Banking Financial Companies :Bharat Law Book House.

B.VOC (RETAIL MANAGEMENT)

SEMESTER - 1

Sr. No.	Paper Code	Nomenclature	Credit Hours	Max External Marks	Max Internal Marks	Total Marks
1	BVRM - 101	FUNDAMENTAL OF MANAGEMENT	5	80	20	100
2	BVRM -102	BASICS OF MARKETING	5	80	20	100
3	BVRM -103	RETAIL CONCEPTS AND PRINCIPLES	5	80	20	100
4	BVRM -104	BUSINESS COMMUNICATION AND SOFT SKILLS	5	80	20	100
5	BVRM-105	FUNDAMENTALS OF COMPUTER	5	80	20	100
6	BVRM-106	HINDI/ ENGLISH	5	80	20	100
7	BVRM- 107	VOCATIONAL PRACTICE	2	-	50	50
		Total				650

B.VOC (RETAIL MANAGEMENT)

SEMESTER - II

Sr. No.	Paper Code	Nomenclature	Credit Hours	Max External Marks	Max Internal Marks	Total Marks
1	BVRM -201	**MANAGERIAL ECONOMICS**	5	80	20	100
2	BVRM - 202	**BUSNIESS STATISTICS**	5	80	20	100
3	BVRM - 203	**PRINCIPLES OF ACCOUNTING**	5	80	20	100
4	BVRM - 204	**RETAIL ORGANSATIONAL BEHAVIOUR**	5	80	20	100
5	BVRM - 205	**STORE OPERATIONS**	5	80	20	100
6	BVRM - 206	**E-TAILING**	5	80	20	100
7	BVRM-207	**COMPREHENSIVE VIVA-VOCE**	2	-	50	50
		Total				650

Note: At the end of the 2nd semester, students are required to undergo Summer Training of 6 to 8 Weeks duration in a business/commercial enterprise of repute .Students are also required to submit a report (carrying 100 marks) by September 30,the marks shall be carried to the 3rd semester

B.VOC (RETAIL MANAGEMENT)

SEMESTER - III

Sr. No.	Paper Code	Nomenclature	Credit Hours	Max External Marks	Max Internal Marks	Total Marks
1	BVRM - 301	RETAIL PLANNING	5	80	20	100
2	BVRM - 302	RETAIL LOGISTICS AND SUPPLY CHAIN	5	80	20	100
3	BVRM - 303	RETAIL INSTITUTIONAL FRAMEWORK AND ECOSYSTEM IN INDIA	5	80	20	100
4	BVRM - 304	INTRODUCTIONS TO INFORMATION TECHNOLOGY IN RETAIL	5	80	20	100
5	BVRM - 305	BUSINESS RESERCH METHODOLOGY	5	80	20	100
6	BVRM - 306	INDIAN BUSINESS ENVIRONMENTS	5	80	20	100
7	BVRM - 307	SUMMER TRAINING REPORT (EXTERNAL EVALUATION)	2		50	50
		Total				650

B.VOC (RETAIL MANAGEMENT)

SEMESTER - IV

Sr. No.	Paper Code	Nomenclature	Credit Hours	Max External Marks	Max Internal Marks	Total Marks
1	BVRM - 401	RETAIL BUSINESS ENVIRONMENT	5	80	20	100
2	BVRM - 402	MALL MANAGEMENT	5	80	20	100
3	BVRM - 403	RETAIL ETHICS	5	80	20	100
4	BVRM - 404	MANAGING HUMAN RESOURCE IN RETAIL	5	80	20	100
5	BVRM - 405	RETAIL FINANCE MANAGEMENT	5	80	20	100
6	BVRM - 406	RETAIL BANKING	5	80	20	100
7	BVRM - 407	COMPREHENSIVE VIVA – VOCE	2			50
		Total				**650**

Note: At the end of the 4th semester, students are required to undergo Summer Training of 6 to 8 Weeks duration in a business/commercial enterprise of repute .Students are also required to submit a report (carrying 100 marks) by September 30,the marks shall be carried to the 5th semester .

B.VOC (RETAIL MANAGEMENT)

SEMESTER - V

Sr. No.	Paper Code	Nomenclature	Credit Hours	Max External Marks	Max Internal Marks	Total Marks
1	BVRM - 501	STRATEGIC MANAGEMENT	5	80	20	100
2	BVRM - 502	RETAIL BRAND MANAGEMENT	5	80	20	100
3	BVRM - 503	RETAIL MARKETING COMMUNICATION	5	80	20	100
4	BVRM - 504	INTERNATIONAL RETAILING	5	80	20	100
5	BVRM - 505	MIS IN RETAILING	5	80	20	100
6	BVRM - 506	RETAIL SUCCESS STORIES	2		50	50
7	BVRM - 507	SUMMER TRAINING REPORT	2			50
		Total				600

B.VOC (RETAIL MANAGEMENT)

SEMESTER - VI

Sr. No.	Paper Code	Nomenclature	Credit Hours	Max External Marks	Max Internal Marks	Total Marks
1	BVRM - 601	LAWS GOVERNING RETAILING IN INDIA	5	80	20	100
2	BVRM - 602	ENTREPRENUERSHIP DEVELOPMENT	5	80	20	100
3	BVRM - 603	RETAIL ANALYTICS	5	80	20	100
4	BVRM - 604	RETAIL CUSTOMER RELATIONSHIP MANAGEMENT	5	80	20	100
5	BVRM - 605	RETAIL SERVICE MANAGEMENT	5	80	20	100
6	BVRM - 606	RETAIL OUTLET VISITS AND CASE DEVELOPMENT	2			50
7	BVRM - 607	COMPREHENSIVE VIVA-VOCE	2			50
		Total				600

TOTAL MARKS OF ALL SEMESTERS

SEMESTER WISE	MARKS
SEMESTER 1	650
SEMESTER 2	650
SEMESTER 3	650
SEMESTER 4	650
SEMESTER 5	600
SEMESTER 6	600
AGGREGATE MARKS	**3800**

SEMESTER - 1

BVRM - 101   **FUNDAMENTALS OF MANAGEMENT**

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Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

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Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising of 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Management – nature and process, scope and process of management, managerial roles and skills, Approaches to management – classical, human relations and behavioral, systems and contingency approach; Functions of Management: Planning– concept, purpose and process of planning and types of planning; Decision making – nature and process, behavioral aspects of decision making, group decision making; Organizing- elements of organizing – division of work, departmentalization, distribution of authority, coordination; Organizational structure and design; leadership – nature and significance, leadership styles, behavioral and situational approaches to leadership, leadership theories; Management control – nature, purpose and process of controlling, Types of control system, prerequisites of effective control system, resistance to control, controlling techniques;Social audit.

SUGGESTED READINGS:

1. Weihrich, Heinz and Harold Koontz, **Essential of Management**: A Global Perspective, Tata McGraw Hill Education, New delhi

2. Griffin, Ricky W: **Management**, Biztantra, New Delhi

3. Rao, VSP, Management, Excel Books, New Delhi

4. Stoner, Freeman and Gilbert, Jr. Management, Pearson Education, New Delhi

BVRM – 102   **BASICS OF MARKETING**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Concepts of Marketing: - Marketing Environment, Marketing Mix, STP (segmenting, targeting and positioning) approach to marketing; Marketing Information System: Meaning and Components of Marketing Research; Consumer Behavior: Meaning and Importance of study for Marketers. Product – Meaning, levels and product Mix; New Product development:Product Life Cycle, Branding and Packaging decision; Pricing: Meaning, procedure for setting a price; Distribution Channels: Levels and Roles; Management of Physical Distribution: Promotion, promotion Mix- A study of advertising, sales promotion, personal selling, direct marketing and public relations.

SUGGESTED READINGS:

1. Mc Carthy; E.J. : **Basic marketing** -A Managerial Approach
2. Rama Swamy : Marketing Management & Nama Kumari
3. Kotler, Philip : **Marketing Management Analysis Planning and Control.**
4. Still and Cundiff : Basic Marketing. 5. Stanton et. al. : Marketing Management.

BVRM - 103 **RETAIL CONCEPTS AND PRINCIPLES**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Definition, nature and importance of retailing in the Indian economy: functions of retailers, classification of retailers; Concept of organized retail: difference between organized retailing and unorganized retailing; Non store retailing and service retailing, stages of the customer buying process, types of consumer buying behavior, factors affecting buying decision process, consumer decision-making procedure in retail perspective;Store Location: meaning, types of retail locations and factors for choosing a location; Store layout and Design: key considerations in store layout, factors of design decisions, importance of layout, steps for designing layout; The Retailing Organizations: Organization structures and HR functions in these organizations; Retail Merchandising: Meaning, the process of merchandise planning, merchandise budget, methods of merchandise procurement, controlling the merchandise.

SUGGESTED READINGS:

1. Pradhan,Swapna. Retailing Management,Tata McGraw-Hill Publishing Company Ltd.
2. Sheikh,Arif.Fatima,Kaneez. Retail Management, Himalaya Publishing House Pvt. Ltd.
3. Cox, Roger. Brittan Paul. Retailing- An Introduction,Pearson Education
4. Bajaj, Chetan. Tuli,Rajnish. Srivastava Nidhi V. Retail Management, Oxford University Press.
5. Hasty, Ron. Reardon, James. Retail Management, The McGraw-Hill Companies, Inc

BVRM - 104   BUSINESS COMMUNICATION AND SOFT SKILLS

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Business Communication – Nature and process, forms of communication, role of communication skills in business, communication networks and barriers to communication; Communication Skills: Listening skills – cognitive process of listening, barriers to listening, reading skills, speaking skills, public speaking, voice modulation and body language. Written Communication: Types, structures and layout of business letters: preventative letters – sales letters, claim letters, employment letters, writing memo, notice and circular; Business Reports : Purpose and types, framework of business reports, presentation of reports, brochures, issuing notice and agenda of meeting and recording of minutes of meetings.

SUGGESTED READINGS:

1. Koneru, Arun, Professional Communication, Tata McGraw Hill, New Delhi
2. Monipally, M.M., Business Communication Strategies, Tata McGraw Hill, New Delhi
3. Das, Biswajit and Ipseeta Satpathy, Business Communication and Personality Development, Excel Books, New Delhi
4. McGrath, E.H., Basic Managerial Skills for All, Prentice Hall of India, New Delhi.

BVRM - 105　　　　　　**FUNDAMENTALS OF COMPUTER**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Introduction – Digital and analog computers, evolution of digital computers, major components of a digital computer, hardware, software, firmware, middleware and freeware, computer applications; Input devices, output devices, printers, plotters, other forms of output devices; main memory, secondary memory and backup memory; Decimal number system, binary number system, conversion of a binary number to decimal number, conversion of a decimal number to a binary number, addition of binary numbers, binary subtraction, hexadecimal number system and octal number system; Introduction to Operating System, functions, types, structure, memory management; file management system; Computer applications in different segments of society (education, banks, business etc.)

SUGGESTED READINGS:

1. Gill, Nasib, Computer Fundamental and Internet
2. Saxena, Computer Applications in Management, Vikas Publication, New Delhi
3. B. Ram, Computer Fundamentals, New Age Publications, New Delhi
4. Rajaraman, V., Computer Fundamentals, PHI, New Delhi.

Hindi
(BVRM-106)

<u>उद्देश्य :</u> प्रस्तुत प्रश्न–पत्र का उद्देश्य वाणिज्य एवं प्रबन्धन से–जुड़े विद्यार्थियों को राजभाषा /राष्ट्रभाषा हिन्दी का व्यावहारिक ज्ञान प्रदान करना है, ताकि वे जनसामान्य तक अपनी बात, उनकी अपनी भाषा में, समझा सकें ।

राजभाषा अधिनियम, राष्ट्रपति के अध्यादेश तथा केन्द्रीय सरकार की हिन्दी शिक्षण –योजना ।

पत्राचार के विविध रूप (मूल पत्र, पत्रोत्तर, पावती, अनुस्मारक, अर्द्धसरकारी, ज्ञापन, परिपत्र, आदेश, पृष्ठांकन, अन्तःविभागीय टिप्पण, निविदा सूचना, विज्ञापन, प्रेस विज्ञप्ति, प्रेस नोट, प्रतिवेदन)

अनुवाद : स्वरूप, प्रकृति, प्रक्रिया, वर्गीकरण, व्यावहारिक अनुवाद (प्रदत्त अंग्रेजी/हिन्दी अनुच्छेद का अनुवाद), अनुभाषण (आशु अनुवाद)
पल्लवन : परिभाषा, प्रक्रिया और गुण
संक्षेपण : परिभाषा, विधि और गुण

पारिभाषिक शब्दावली (मंत्रालयों, उपक्रमों, निगमों, बैंकों, रेलवे–क्षेत्रा, राडियों तथा दूरदर्शन म प्रयुक्त पारिभाषिक शब्दों और वाक्यांशों का अध्ययन)

निबन्ध–लेखन (निम्नलिखित विषयों में से चार–पाँच विषय दिए जायेंगे, जिनमें से लगभग 300 शब्दों पर आधारित एक निबन्ध लिखना होगा ।)

1. वाणिज्य अध्ययन में हिन्दी की उपयोगिता
2. उपभोक्ता, बाजार और वाणिज्य
3. बैंक और वाणिज्य
4. कुशल प्रबन्धन और वाणिज्य
5. विज्ञापन और वाणिज्य
6. वाणिज्य विकास में कम्प्यूटर की भूमिका
7. श्रमिक असंतोष का उद्योग जगत पर प्रभाव
8. जनसंख्या में वृद्धि का राष्ट्र समृद्धि पर प्रभाव
9. अन्तर्राष्ट्रीय व्यापार और अन्तर्राष्ट्रीय मुद्रा–कोष
10. निजीकरण का भारतीय अर्थव्यवस्था पर प्रभाव
11. वैश्वीकरण और भारतीय उद्योग
12. महंगाई
13. काला धन
14. ऊर्जा संकट
15. लघु उद्योगों का भविष्य

संदर्भ ग्रन्थ
1. प्रयोजनमूलक हिन्दी : राजनाथ भट्ट, हरियाणा साहित्य अकादमी, पंचकूला–2004.
2. अनुवाद विज्ञान : राजमणि शर्मा, हरियाणा साहित्य अकादमी, पंचकूला –2004.
3. प्रामाणिक आलेखन और टिप्पण : त्रियज, राजपाल एण्ड सन्ज, दिल्ली –2005.
4. प्रयोजनमूलक हिन्दी के छः अध्याय, दर्शन कुमार जैन, निधि प्रकाशन, अम्बाला छावनी–1996.

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BVRM- 106: English

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions of four marks each. All questions shall carry equal marks.

Objectives: To extend the students vocabulary and to give them greater familiarity with and Practice in using sentences to make meaningful utterances.

Text book (Prescribed): Developing English Skills edited by P.K. Thakur S.D. Desai and T. J. Purani (Bombay: Oxford University Press) (For intensive study)/

Text Book (Prescribed): Contemporary English Prose, edited by K.P.K. Menon 9Madras: Oxford University Press) (Expect Passages 5, 11 and 13) (For extensive Study).

Vocabulary and Sentence Formation

Items: Vocabulary/Conjunction, Preposition, Articles.Sentence-Formation.

(Involving remediation of common errors in the use in relevant contexts of the definite and indefinite article. Prepositions and tenses and of reported speech active/passive, relative clauses and questions.)

Translation (Hindi to English)
Retranslation (English to Hindi)
Writing Curriculum Vitae.

Synonyms/ Antonyms, Homophones, Prefix, Suffix, one-word substitution.

Objectives: To enables the students to take practice in writing English for Business use, employing their learning of usage.

Paragraph Writing (on topics of business interest)
Writing business letters and application

BVRM – 107   **VOCATIONAL PRACTICE**

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Max Internal Marks: 50

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SEMESTER- II

BVRM - 201   **MANAGERIAL ECONOMICS**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Managerial economics: meaning nature and scope; Objectives of firm, equilibrium, utility, opportunity cost, marginal and incremental principles; Theory of demand: Nature of demand for a product, individual demand, market demand, determinants of demand. Law of demand, Elasticity of demand and its determinants; Theory of Consumer Behavior: Cardinal Utility analysis, indifference curve analysis, applications of indifference curves; Theory of production and costs: The concept of production function, production with one and two variable inputs, theory of cost in short run and long run, revenue function; Theory of firm and market organization: pricing under perfect competition, pricing under monopoly, price discrimination, pricing under monopolistic competition, selling cost, pricing under oligopoly.

SUGGESTED READING

Koutsoyiannis : Modern Microeconomics
Varshney & Maheshwari : Managerial Economics
Mote, Paul & Gupta : Managerial Economics
Ferguson & Gould : Microeconomics

BVRM - 202   **BUSNIESS STATISTICS**

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Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

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Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Measures of Central Tendency and Dispersion: Meaning and objectives of measures of central tendency, different measure viz. arithmetic mean, median, mode, geometric mean and harmonic mean; characteristics, applications and limitations of these measures; measure of variation viz. range, quartile deviation, mean deviation and standard deviation, co-efficient of variation and skewness; Correlation and Regression: Meaning of correlation, types of correlation – positive and negative correlation, simple, partial and multiple correlation, methods of studying correlation; scatter diagram, graphic and direct method; properties of correlation co-efficient, rank correlation, coefficient of determination, lines of regression, co-efficient of regression, standard error of estimate. Index numbers and time series: Index number and their use in business; construction of simple and weighed price, quantity and value index numbers; test for an ideal index number, components of time series viz. secular trend, cyclical, seasonal and irregular variations, methods of estimating secular trend and seasonal indices; use of time series in business forecasting and its limitations, calculating growth rate in time series.

SUGGESTED READINGS:

1. Gupta, S.P. & M.P. Gupta, Business Statistics
2. Gupta, C.B., An Introduction to Statistical Methods
3. Gupta, B.N., An Introduction to Modern Statistics
4. Sancheti, S.C. & V.K. Kapoor, Statistical Methods
5. Ellhans, D.N., Fundamentals of Statistics

BVRM - 203　　　　　　　　**PRINCIPLES OF ACCOUNTING**

<div align="right">

Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

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Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Meaning and scope of accounting, nature of financial accounting principles, basis of accounting; Accounting process – from recording of business transaction to preparation of trial balance ;Depreciation accounting; preparation of final accounts (non-corporate entities) along with major adjustments; Rectification of errors; joint venture accounts; Hire purchase system and accounting; lease and installment purchase system accounting; consignment accounts .

SUGGESTED READINGS:

1. Gupta R.L., Advanced Accounting Vol. I, S. Chand & Sons, New Delhi

2. Grewal T.S. and M.C. Shukla, Advanced Accounting Vol. I, S. Chand & Sons, New Delhi

3. Monga, J.R., Financial Accounting, Margin Paper Bank, New Delhi

4. Maheshwari S.N., Advanced Accounting Vol. I, Vikas Publications.

BVRM – 204   **RETAIL ORGANSATIONAL BEHAVIOUR**

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Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

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Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Organization Behavior: Concept, Meaning and Function of Organization Behavior, Types of Groups, Reason for the Formation of Group, Group Cohesiveness, Group Conflicts, Team Building; Individual Differences; Causes of Individual Differences. Perception: Concept, Perceptual selectivity, Managerial implications of Perception Conflict: Meaning, Process of Conflict, Types of Conflicts:Individual, Group and Organizational Level; Change: Concept, Resistance to Change, Management of Change, Role of Change Agent; Stress – Causes, Effects and Coping Strategies; Power and Politics: Leadership – Concept, Theories, Path Goal Leadership Theory, McGregor's Theory X and Theory Y, Charismatic Leadership, Transformational Leadership, Leadership Styles, Roles and Activities of Leadership, Leadership Skills; Organizational Culture (Definition, Characteristics of an organization's culture, types of culture, role of culture, Negative effects of culture).

 Suggested Reading:

1. Aswathappa, K. Organizational Behavior, HPH, Mumbai, 1997.

2. Chandan, J.S., Organizational Behavior, Vikas Publishing House, Pvt. Ltd.1994.

3. Davis, Keith and Newstrom, J.W., Human Behavior at Work, McGraw Hill, 1985.

4. Griffin, R.W. and Moorhead, G., Organizational Behavior, Houghton Mifflin Co.1

BVRM - 205   **STORE OPERATIONS**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Store Planning: Design and Layout, Retail Merchandising, Pricing in Retailing, Importance of Supply Chain Management in Retailing; Setting up Retail organization, Size and Space allocation, location strategy, Factors affecting the location of Retail, Retail location Research and Techniques, Objective of Good store Design; Store Layout and Space planning, Types of Layouts, role of Visual Merchandiser, Visual Merchandising Techniques, Controlling Costs and Reducing Inventories Loss, Exteriors and Interiors; Store Management: Responsibilities of Store Manager, Store Security, Store Record and Accounting System, Coding System and Material Handling in Stores.

SUGGESTED READING

1 Supply Chain Management – Planning and operation, Chopra, Sunil and Peter Meindl,Prentice Hall.

2 Supply Chain Management- Concepts, Practices and Implementation, Sunil Sharma, Oxford University Press.

3 Essentials of Supply Chain Management, Mohanty R .P. and S.G. Deshmukh, Phonix Publishing.

4 Business Logistics/ Supply Chain Management, Ballou,Donald H. and S.Srivstava Pearson

BVRM - 206　　　　　　　　　　　**E-TAILING**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Introduction – meaning and concept of e-tailing. Planning online business: nature and dynamics of the internet, pure online vs. brick and click business, assessing requirement for an online business, designing, developing and deploying the system, one to one enterprise; Technology for online business – Internet, IT infrastructure; middleware contents: text and integrating e-business applications; mechanism of making payment through internet: online payment mechanism, electronic payment systems, payment gateways, visitors to website, tools for promoting website; plastic money: debit card, credit card; laws relating to online transactions; Applications of e-tailing in manufacturing, wholesale, retail and service sector.

SUGGESTED READINGS:

1. Murty, C.V.S., E-Commerce, Himalaya Publications, New Delhi

2. Kienam, Managing Your E-Commerce business, Prentice Hall of India, N.Delhi.

3. Kosiur, Understanding E-Commerce, Prentice Hall of India, N.Delhi.

4. Kalakota, Whinston, Frontiers of Electronic Commerce, Addison Wesley.

BVRM – 207   COMPREHENSIVE VIVA VOCE

Max Internal Marks: 50

SEMESTER- III

BVRM - 301   **RETAIL PLANNING**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Importance of Retail planning – Types of planning – decision making process – Approaches to decision making – Decision models – Pay off Matrices – Decision trees – Break Even Analysis; Strategy formulation, Finance and Human Resource Mobilization; Operations Planning - Market and Channel Selection -Growth Strategies; Retail Format I: Classification of retailers – Store based Retailers – By Ownership ,Independent store , Chain store ,Franchise store, Price based retailers– discount store; off-price retailer;Factory outlet stores – Close out retailers, single price retailers, warehouse club – Catalog showrooms, By product Line – department store – supermarket – hypermarket; Retail Format II: Specialty retailers – Convenience stores, Non store based Retailer – Direct selling – Direct marketing – catalog marketing – telemarketing – TV home shopping; World Wide Web – Automatic vending – The impact of scalability of store formats.

SUGGESTED READINGS

1. Gibson Vedamani, Retail Management,Functional Principles and Practices,Jaico Books, Second Edition, 2004.

2. Michael Levy and Barton A. Weitz, Retail Management,Tata McGraw Hill, Fifth Edition, 2004.

BVRM - 302   **RETAIL LOGISTICS AND SUPPLY CHAIN**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Retail Logistics: Introduction, Understanding Retail Logistics and its functions; Cross Docking and Reverse Logistics Method, Retail logistics – Dynamic Changes; Retail Supply Chain Management: The Significance of SCM, The Evolution of SCM, Challenges in developing the SCM Relationships in the Supply Chain, Significance of Relationship Management in SCM; Changing Buyer-Seller Relationship, Relationship between Manufacturers and Supplier; The Role of Logistics Service Providers; The Greening of Retail Logistics: Scenario, Environmental effects of retail logistics, Choice of Transportation Mode and Energy Efficiency of Retail Deliveries.

SUGGESTED READINGS

1. Retail Management – Levy and Weitz

2. Channel Management and Retail Management – Meenal Dhotre

3. Retail logistic Management – David Gilbert

4. Retail Management – Ron Hasty and James Reardon

5. The Art of Retailing – A.J. Lamba

6. Retail Management – W. Steward

7. Retail Management – Analysis, Planning and Control – David Walters

BVRM - 303   RETAIL INSTITUTIONAL FRAMEWORK AND ECOSYSTEM IN INDIA

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Retail Institution: Different forms of Retail business organizations- Proprietorship, Partnership firm, Private Company, Public company, Limited Liability Partnership, HUF Firm, Joint ventures etc.; Process of Opening a Retail Store, Legal formality to be taken into consideration (Shop and Establishment Acts); Introduction, Registration of Establishment, Classification of establishment as per local act of state. Operational Rules - opening, closing, working hours, working conditions, holidays as per act. Rules related to employment of child, young person and working women, Health and safety; Enforcement & Inspection, offences and Meaning, Characteristics by Ownership: Independent, Chain, Franchising, Leased, Department, Vertical Marketing System, Consumer-Cooperatives.

SUGGESTED READING

1. Swapna Pradhan- Retailing Management- Text and Cases, Tata McGraw Hill- 2nd edition, 2004.

2. Barry Berman and Joel R Evans- Retailing Management- A Strategic Approach, Prentice Hall of India, 8th Edition, 2002.

3. James R. Ogden, Denise Ogden- Integrated, Retail Management- Biztantra 2005.

BVRM - 304   INTRODUCTION TO INFORMATION TECHNOLOGY IN RETAIL

Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Information and Communication Technology (ICT), Information systems; E-World- Computer Architecture: Input Hardware- Processing & Memory Hardware, Storage Hardware, Output Hardware, Communication Hardware; Operating Systems: Concept of operating system WINDOWS and its versions; Windows XP: Managing files & folders, Windows Explorer - Understanding computer customization, configuring screen, mouse, Printer, System Tools, Customizing windows –Protecting computer Communications: Protocols in Computer communications- Wired & Wireless communication Future of communications - Satellite Based systems - Beyond 3G to 4G Network: Networks-Benefits of networks, types of network: WANs. MANs, LANs, WLANs; Types of LAN, Intranet, Extranet- Virtual Networks, Sharing data and hardware in LAN environment- work group computing & groupware; Telecommuting & Virtual offices Network security Firewalls , Website Management

SUGGESTED READINGS

1. Fundamentals of Computers- P.K. Sinha
2. Computer Today- Suresh K. Basabdra
3. Essential of IT- Deepak Barihoke

BVRM - 305   **BUSINESS RESERCH METHODOLOGY**

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Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

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Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Meaning and nature of research: Significance of research in business decision-making. Identification and formulation of research problem, setting objectives and formulation of hypotheses; Research Design and Data Collection: Research Designs - exploratory, descriptive, diagnostic and experimental; Data Collection; Universe, Survey Population, Sampling and sampling designs; Data Collection Tools - Schedule, questionnaire, interview and observation. Scaling techniques: need for scaling, problems of scaling, types of scales (nominal, ordinal, interval, ratio), differences in rating and ranking scales, reliability and validity of scales, scale construction techniques - arbitrary approach, consensus scale approach (Thurston), item analysis approach (Likert); Interpretation and report writing: meaning of interpretation, techniques and precautions in interpretation and generalization; Report writing - purpose, steps and format of research report and final presentation of the research report.

SUGGESTED READING:

1. Shekharan Uma, Business Research Methods, John Wiley Publications
2. Zikmud, Business Research Methods, Cenage Publications
3. Copper, Business Research Methods, Tata McGraw Hill

BVRM - 306   **INDIAN BUSINESS ENVIRONMENT**

Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Nature, components and determinants of business environment; basic structure of Indian economy and growth trends; basic nature of Indian economic system and its impact on social responsibility of business; Latest Economic Policy (Broad Features). Trend and pattern of industrial growth; industrial licensing policy; Privatization, trends and issues for public sector, RTI Act 2005: Purpose, Right to Information and Obligation of Public Authorities, Exemption from disclosure of information. Development banking finance for corporate Sector – trends pattern and policy; regulation of stock exchanges and the role of SEBI; SEBI guidelines relating to fresh issues of companies; banking sector reforms; challenges facing public sector banks; Trends and patterns of India's foreign trade and balance of payment; latest EXIM policy – main features; policy towards foreign direct investment; role of MNCs; India's policy commitments to multilateral institutions – IMF, World Bank and WTO.

SUGGESTED READING:

1. F. Cherunilum, Business Environment, Himalaya Publishing House, New Delhi.
2. N.K. Sengupta, Government and Business, Vikas, New Delhi.
3. K. Aswathappa, Business Environment for Strategic Management, Himalaya Publishing House, New Delhi.
4. Govt. of India, Economic Survey (latest year).

BVRM – 307   **SUMMER TRAINING REPORT (EXTERNAL EVALUATION)**

Max Marks (External): 50

SEMESTER- IV

BVRM - 401   **RETAIL BUSINESS ENVIRONMENT**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Introduction to Retail Environment: The functions of retailing, Retail formats, Successful Retailing. Theories of Retail Development- Life cycle and phase in growth of retail markets- Business models in retail- other retail models. Opportunity Analysis: Retailing Environment; Economic Environment; Socio demographic change; Technological Environment; Changing Expenditure and shopping pattern; Legal & Ethical issues; Management opportunities; Entrepreneurial opportunities; Retail Change: A Review, Cultural Transformation and Retailing, New Approaches in Retailing, Emerging Themes and Niches, Building for the future: Learning from the past. Retail in India: Evolution and size of retail in India- Drivers of retail change in India; Foreign Direct Investment in retail- Challenges in retail developments in India.

SUGGESTED READINGS

1. Swapna Pradhan- Retailing business environment- Text and Cases, Tata McGraw Hill- 2nd edition, 2004.

2. F. Cherunilum, Business Environment, Himalaya Publishing House, New Delhi.

3. N.K. Sengupta, Government and Business, New Delhi.

4. K. Aswathappa, Business Environment for Strategic Management, Himalaya Publishing House, New Delhi.

BVRM - 402   **MALL MANAGEMENT**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Fundamentals of Mall Management: Introduction to Mall Management, Strategic planning for malls, Aspects in Mall Management, Positioning a Mall, Zoning-formulating the right tenant mix and its placement in a Mall, Facility Management – infrastructure, traffic and ambience management; Mall Operations, Tenant Management, Financial Management, Site Selection, Space Management, Mall Maintenance Management, Aspects in Quality Management, Consumer Buying Behavior, Managing Customers in Mall, Effective Communication, Promotion and Marketing, Commercial Lease.

SUGGESTED READINGS

1. Barry Berman and Joel R Evans- Retailing Management- A Strategic Approach, Prentice Hall of India, 8th Edition, 2002.

2. James R. Ogden, Denise Ogden- Integrated, Retail Management- Biztantra 2005.

3. Gibson G Vedamani- Retail Management- Functional Principles and Practice, Jaico Publishing House, Second edition, 2004.

BVRM - 403   **RETAIL ETHICS**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Retail Ethics: Meaning of ethics; why ethical problems occur in business. Ethical principles in business: Theories of Business Ethics, Globalization and Business Ethics. All alternative to moral principles; Moral issues in Business; Worker's and employee's right and responsibilities; profit maximization Vs social responsibilities. Ethics and Values: Personal Values, Social Values, Moral Values, Spiritual Values , Values Conflict and its Reconciliation ,Values and Behavior; Ethical Egoism, Ethics of Duties, Ethics of Rights and Justice, Feminist Ethics, Psychological Theories of Moral Development: Reflection on Personal Experiences of Moral Development, Social Responsibility of Retailing Business: Arguments for and Against Corporate Social Responsibility : The Indian Perspective

SUGGESTED READINGS:

1. Dr.F.C.Sharma, Business Values & Ethics – Shree Mahavir Book Depot, Nai Sarak, New Delhi.
2. C.S.V Murthy – Business Ethics, Himalya Publishing House.
3. Shina Parkashan – Managerial Ethics – Rajat Publications.

BVRM - 404   **MANAGING HUMAN RESOURCE IN RETAIL**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Introduction Human Resource management : Concept and Fundamentals, Role, Status and competence of HR Manager, HR Policies, Emerging Challenges of Human Resource Management; Workforce diversity; Empowerment; Downsizing; VRS; Human Resource Information System , Acquisition of Human Resource for retail business– Quantitative and Qualitative dimensions; Job analysis, Recruitment, Selection, Test and Interview; Placement and Induction; Training and Development- Identifying Training and Development Needs for change management, Designing; Training Programmes; Role-Specific and Competency Based Training ;Evaluating Training; Effectiveness; Training Process Outsourcing; Management Development; Career Development. Performance Appraisal with Modern techniques, employee wage payments and incentive plans; fringe benefits.

SUGGESTED READINGS:

1. Human Resource Management: Concepts and Issues, by T.N. Chhabra, Dhanpat Rai & Co. New Delhi.
2. Human Resource Management by R. Wayne Mondy, Pearson Publications, Delhi.
3. Human Resource Management by C.B. Gupta.

BVRM - 405   **RETAIL FINANCE MANAGEMENT**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Evolution, Scope and Functions of Finance Managers- Introduction; Scope of Finance; Financial Management System; Finance Functions ; Role of a Finance Manager Objectives of a Firm – Introduction; Profit Maximization; Shareholders' Wealth Maximization (SWM) Financial Planning – Introduction; Meaning of Budget; Types of Budgets; Advantages of Budgeting; Responsibility Accounting Time Value of Money - Introduction; Concept of Time Value of Money; Compounding Method ; Discounting Method Cost of Capital Financial and Operating Leverage – Introduction; Meaning of Financial Leverage; Measures of Financial Leverage; Calculation of Earnings Per Share (EPS) and Return on Equity (ROE), Capital Budgeting Decisions, Capital Structure Theories, Sources of Finance - Short-term Finance ;Long-term Funds, Dividend Policy , Working capital Management of Cash – Introduction ; Motives for Holding Cash; Facets of Cash Management; Cash Planning; Cash Forecasting and Budgeting; Determining the Optimum Cash Balance.

SUGGESTED READING

1. Khan M.Y and.Jain P.K, Financial Management, Text, Problems and Cases - Tata

2. McGraw 2. Pandey I.M , Financial Management, Vikas Publishing House Pvt. Ltd.

BVRM - 406   **RETAIL BANKING**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Introduction- History and definition, role within the bank operations, Applicability of retailing concepts, Wholesale Banking: Retail Products Retail Products Overview - Customer requirements, Products development process, Liabilities and Assets Products/Description of Liability products, Description of Asset Products, Approval process for retail loans, Credit scoring. Important Asset Products-Home Loans - Eligibility, Purpose, Amounts, Margin, Security, Disbursement, Moratorium, Prepayment issues, Repayments/Collection.Auto/Vehicle Loans - Eligibility, Purpose, Amounts, Margin, Security, Disbursement, Moratorium, Prepayment issues and Repayments, Collection; Personal Loans Eligibility, Purpose, Amounts, Credit / Debit Cards - Credit Vs Debit Cards.

SUGGESTED READING:

1. Pratap G Subramanyam, Investment Banking TATA McGraw Hill Latest edition

2. Ranjan Rakesh, Investment Banking Wiley Publication

3. Khatua, Project Management and Appraisal Oxford Publication Latest edition

BVRM – 407   **COMPREHENSIVE VIVA – VOCE**

External Maximum Marks: 50

SEMESTER- V

BVRM - 501   **STRATEGIC MANAGEMENT**

Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Strategic management; Strategic decision making; Process of strategic decision making. Strategy formulation: Company's vision, mission and objectives; Environmental and organizational appraisal, Strategic alternatives and choice; Types of strategies; Corporate strategy, Concept of value chain, core competency, resource base theory and competitive advantage. Strategy implementation: Designing organizational structure and activating strategies; Matching Strategy Evaluation: Strategic evaluation and Control, Strategic and Operational Control; Techniques of evaluation and control.

SUGGESTED READINGS:

1. John A Pearce II and Richard B Robinson Jr., Strategic Management, Strategic Formulation and Implementation.,3rd Edition AITBS Publishers and distributors (Regd.) 1996 Delhi.

2. C. Roland Christerson, Etl. Business policy Text and cases, 6th Edn., 1987, IRWIN Homewook illions.

3. Cuno Pumpin, 'The Essence of Corporate Strategy', 1987 Gower Publishing Company, Ltd., England.

BVRM - 502   **RETAIL BRAND MANAGEMENT**

Max Marks (External): 80
Internal Assessment: 20

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Introduction to Brand- Concept and Importance of Retail Branding; Retail Brand Values; Brands and Consumer Psychology; Retail Branding Terminology- Brand Awareness, Brand Personality, Brand Image, Brand Identity, Brand Loyalty, Brand Extensions and Brand Equity. Major Retail Branding Decisions; Types of Retail Brands- Family versus Individual Brand Names; Multiple Branding; Private versus National Branding. Retail Branding in Specific Sectors- Consumer Market; Industrial Market; Service Brands Retail Branding for International Marketing; Brand Building and Communication; Retail Brand Positioning; Measurement of Retail Brand Equity.

SUGGESTED READINGS

1. Barry Berman and Joel R Evans- Retailing Management- A Strategic Approach, Prentice Hall of India, 8th Edition, 2002.

2. James R. Ogden, Denise Ogden- Integrated, Retail Management- Biztantra 2005.

3. Gibson G Vedamani- Retail Management- Functional Principles and Practice, Jaico Publishing House, Second edition, 2004.

BVRM - 503   RETAIL MARKETING COMMUNICATION

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Communication Process, nature and functions, A Basic Model of communication source, Encoding. Message, Channel, Receiver, Decoding, Noise, Response, Feedback, .Establishing objectives for retail marketing communication programme-The objectives- communications, planning & decision making; Determining Promotional objectives; The retail marketing communications-advertising, Sales Promotion, Personal Selling, Public Relations, Direct Marketing; The process of Public Relations-Developing & Executing the PR Programme and Publicity.

SUGGESTED READINGS

1. Das, Biswajit and Ipseeta Satpathy, Business Communication and Personality Development, Excel Books, New Delhi
2. McGrath, E.H., Basic Managerial Skills for All, Prentice Hall of India, New Delhi
3. Rai, Urmila and S.M. Rai, Business Communication, Himalaya Publishing House, Mumbai

BVRM - 504   **INTERNATIONAL RETAILING**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

International Retailing: Definition, nature, scope and benefits; reasons and motivations underlying International Business; basic modes for entry; process of International retailing; Domestic retailing versus International retailing. Factors influencing International market selection and segmentation, Selection strategies; International retail Planning and control. 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 strategies; International Distribution Channels International distribution policy.

SUGGESTED READINGS

1. Sheikh,Arif.Fatima,Kaneez. Retail Management, Himalaya Publishing House Pvt. Ltd.Cox, Roger. Brittan Paul. Retailing- An Introduction,Pearson Education
2. Bajaj, Chetan. Tuli,Rajnish. Srivastava Nidhi V. Retail Management, Oxford University Press.
3. Hasty, Ron. Reardon, James. Retail Management, The McGraw-Hill Companies, Inc.

BVRM - 505   **MIS IN RETAILING**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Managing Information Systems in Retailing: Introduction, Managing in the Internet Era, Managing Information Systems in retailing-the IT interaction model, Challenges for the manager, what information to build, how much to spend on information systems, what level of capabilities should be created with information systems, how centralized should the services be, what security levels are required, what is technology road-map for the retailing? Business Process Integration with IT: Introduction, Business Process Integration- Business processes-example of a complex process, Motivation for Enterprise Systems, Enterprise Resource Planning systems: finance and accounting module, human resource management module, manufacturing and operations module, sales and marketing module.

SUGGESTED READINGS:

1. Management Information System, Jerome Kanter, Prentice Hall of India.

2. Management Information System, Laudan and Laudan, Prentice Hall of India.

3. Management Information System, James A. O'Brien, Galgotia Publications, Fourth Edition.

4. Management Information System, D. P. Goyal, MacMillan India.

5. Electronic Commerce, Whitely, Mc Graw, Hill

BVRM - 506   **RETAIL SUCCESS STORIES**

  10 case studies assigned by teacher   **Max Marks (Internal): 50**

BVRM - 507   **SUMMER TRAINING REPORT**   **Max Marks (External): 50**

At the end of fifth semester, all students will have to undergo summer training of 6−8 weeks with industrial, business or service organization.

SEMESTER- VI

BVRM - 601   **LAWS GOVERNING RETAILING IN INDIA**

Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

The Sale of Goods Act, 1930: Formation of a Contract, Distinction between Sale and agreement to Sell, Meaning of Goods, Condition and Warranties, Doctrine of Caveat Emptor, Rights of an Unpaid Seller; The Negotiable Instruments Act, 1881: Nature and Types, Holder and Holder in due Course, Negotiation and Assignment; Environment protection act, 1986, Goods and services tax, 2017

SUGGESTED READING:

1. N. D. Kapoor – Mercantile Law.

2. Bhole, Financial Institutions and Markets, Tata McGraw Hill

BVRM - 602   **ENTREPRENUERSHIP DEVELOPMENT**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Concept of Entrepreneur: Entrepreneurship and Intrapreneur, Entrepreneur v/s Manager; Characteristics, Qualities and Pre-requisites of Entrepreneur; theories of Entrepreneurship. importance and relevance of entrepreneurs and entrepreneurship in Economic Development of a Country; Preparing a business plan: introduction, meaning, objectives and significance of business plan, component of business plan, legal formalities and documentation Entrepreneurship Development Programmes and its objectives Role of various institutions in Developing Entrepreneurship in India; SSI: meaning, definition, role of SSI in economic development, policies governing SSI's.

SUGGESTED READINGS:

1. Clarence Danhof. "Observation on Entrepreneurship in Agriculture" in R. Wohl's Change and the Entrepreneur. Harvard University, Cambridge, 1949.

2. Udyamita (in Hindi) by Dr. M.M.P. Akhouri and Dr. S.P. Mishra, pub. By National Institute for Entrepreneurship and Small Business Development (NIESBUD), NSIC-PTC Campus, Okhla.

3. Trainer's Manual on Developing Entrepreneurial Motivation, By M.M.P. Akhouri, S.P. Mishra and R. Sengupta, Pub. By (NIESBUD), NSIC-PTC Campus, Okhla.

BVRM - 603   **RETAIL ANALYTICS**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Retail analytics: Meaning- Functions and special characteristics of Retailer; Retailing, Marketing, Retailer Equation- Marketing concepts applied to retailing-Retailing as a career, Trends in Retailing; Retail Model and Theories of Retail Development, Life cycle and phase in growth of retail markets, Business models in retail. other retail models. Strategic Planning in Retailing: Situation Analysis, Objectives, Need for identifying consumer needs, Overall strategy, feedback and control, consumer decision- making process. Retail in India: Evolution and size of retail in India- Drivers of retail change in India, Foreign Direct Investment in retail, Challenges in retail developments in India; Global retail markets: Strategic planning process for global retailers, Challenges and Threats in global retailing, Factors affecting the success of a global retailing strategy

SUGGESTED READINGS

1. Swapna Pradhan- Retailing Management- Text and Cases, Tata McGraw Hill- 2nd edition, 2004.
2. Barry Berman and Joel R Evans- Retailing Management- A Strategic Approach, Prentice Hall of India, 8th Edition, 2002.
3. James R. Ogden, Denise Ogden- Integrated, Retail Management- Biztantra 2005.
4. Gibson G Vedamani- Retail Management- Functional Principles and Practice, Jaico Publishing House, Second edition, 2004.

BVRM – 604   **RETAIL CUSTOMER RELATIONSHIP MANAGEMENT**

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Retail Customer Relationship Management (R-CRM): Concept, Nature, Scope and Importance of R-CRM. Retail Customer Relationship Marketing: Relationship development process - Planning and implementation of R-CRM programme; Integrating customer data into R-CRM strategy; Data mining and data warehousing for R-CRM; Role of IT & Internet in R-CRM; Customer Retention strategies.

SUGGESTED READINGS

1. Sheikh,Arif.Fatima,Kaneez. Retail Management and CRM, Himalaya Publishing House Pvt. Ltd.Cox, Roger. Brittan Paul. Retailing- An Introduction,Pearson Education
2. Bajaj, Chetan. Tuli,Rajnish. Srivastava Nidhi V. Retail consumer management, Oxford University Press.
3. Hasty, Ron. Reardon, James. Retail Management, The McGraw-Hill Companies, Inc.

BVRM - 605   **RETAIL SERVICE MANAGEMENT**

Max Marks (External): 80
Internal Assessment: 20
Time: 3 Hours

Note: The Examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory comprising 4 questions of 4 marks each. Students are required to attempt five questions of 16 marks each.

Meaning, scope and Unique Characteristics of retail service management and Problems Associated with Services Management on Account of these. Overcoming Challenges Associated with Services Management; Goods-Service Categorization, Types of Services- Core and Supplementary; **Retail 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.

SUGGESTED READINGS

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.

BVRM - 606   **RETAIL OUTLET VISITS AND CASE DEVELOPMENT**

Maximum Internal Marks : 50

Note: Atleast 10 organized retail outlets shall be visited and case (s) thereon developed by each student. These cases shall be presented in the class and will be evaluated by the teacher concerned.

BVRM - 607   **VIVA-VOCE**

Maximum Marks : 50

CENTRE FOR DR. B.R. AMBEDKAR STUDIES
KURUKSHETRA UNIVERSITY KURUKSHETRA
(Established by the State Legislature Act XII of 1956)
("A+" Grade, NAAC Accredited)

Scheme of examination, Syllabi & Courses of Reading for

Post Graduate Diploma in Buddhist Studies (under Credit Based System) w.e.f. 2019-2020

(Annual System)

Scheme of Examinations for Post Graduate Diploma in Buddhist Studies

Paper Code	Nomenclature of the Paper	Theory	Internal Assessment	Total Marks	Hours			Credits
					Lecture	*Tutorial*	*Total*	
BS-101	Buddhist Language (Pāli) and Literature	80	20	100	4	1	5	4
BS-102	History of Buddhism	80	20	100	4	1	5	4
BS-103	Buddhist Philosophy	80	20	100	4	1	5	4
BS-104	Buddhist Ethics	80	20	100	4	1	5	4
BS-105	Dissertation	50 marks = External Evaluation 30 marks = Viva-Voce 20 marks = Study Tour*		100				4
				500				20

Note: Dissertation will be of 50 pages (approximately)

*All candidates are required to attend a study tour (compulsory) related to places associated with Buddhism. Marks of the study tour will be awarded by the teacher Incharge on the basis of students' discipline, participation, learning, etc.

Director

BS-101

Buddhist Language (Pāli) and Literature

Theory Marks: 80

Internal Assessment: 20

Time: 3 hrs.

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 remaining four questions selecting at least one from each Unit. Each question will carry equal marks.

Unit- I

- The origin and Development of Pāli Language.
- Jataka Tales (Saket Jataka, Maccha Jataka, Sujata Jataka).

Unit- II

- Buddhist Literature: Meaning of Tipiṭaka, Origin of Canonical Literature (Pāli Tipiṭaka Literature), and Relevance of Pāli Tipiṭaka Literature.
- Introduction to translated and compiled Canonical Texts (Tripitaka).
  (A) Vinaya-Piṭaka (B) Sutra-Piṭaka (C) Abhidharma-Piṭaka.

Unit- III

- An introduction to Non-Canonical (Anu-Piṭaka) Literature.
- Origin & Development of Pāli Aṭṭhakathā Literature.
- Compilation of Canonical and non-Canonical Literature in other countries.

Unit- IV

- Pāli Vaṃsa Literature: Dīpavaṃsa & Mahāvaṃsa.
- Dhammapada; Verses No. 1, 2, 5, 153, 154, 183, 276, 277, 278, 279

Suggested Readings:

- Bhikshu Dharmarakshit, *Bauddha Dharma Darshan tatha Sahitya*, Varanasi: Nanda-Kishore and Brothers, 1965.
- Law, Bimala Churn, *A History of Pāli Literature,* Varanasi: Indological Book House, 1983.
- Shakya, Uma Datta , *Pāli Vaṃsa Sāhitya Kā Itihās,* Ahmadabad: Reliable Publishing House, 2017.
- Sharma, Ramananda, *Pāli: Bhāshā evam Sāhitya,* Ghaziabad: Pachauri Prakashana, 1998.
- Upadhayaya, Bharat Singh, *Pāli Sāhitya Kā Itihās*, Prayag: Hindi Sahitya Sammelan, 2005.
- Vijay Kumar Singh, Sects in Tibetan Buddhism, DK Printworld, Delhi, 2006.
- Warder, A.K., *Introduction to Pali,* Oxford: The Pali Text Society, 2001.

BS-102

History of Buddhism

Theory Marks: 80

Internal Assessment: 20

Time: 3 hrs.

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 remaining four questions selecting at least one from each Unit. Each question will carry equal marks.

Unit- I

- Sources material of Buddhism:
    - ➢ Literary sources
    - ➢ Archaeological sources
    - ➢ Buddhist foreign travellers accounts.

Unit- II

- Origin of Buddhism: Life and teaching of the Lord Buddha.

- Development of the Sangha (Buddhist views on caste, women)

Unit- III

- History of the Buddhist Councils:
    - ➢ First Buddhist Council.
    - ➢ Second Buddhist Council.
    - ➢ Third Buddhist Council.
    - ➢ Fourth Buddhist Council.

Unit- IV

- Spread of the Buddhism: Sri Lanka, China, Tibet, Japan, Myanmar.

- Buddhist Art & Architecture: Origin & development of Stupa, Vihara, Chaitya and Caves.

Suggested Readings:

- Ahir, D. C., *Buddhism in India: Rediscovery, Revival and Development,* Delhi: Buddhist World Press, 2010.

- Ambedkar, Bhim Rao, *The Buddha and His Dhamma,* Nagpur: Buddha Bhoomi Prakashan, 1997.

- Bapat, P. V., *2500 Years of Buddhism*, Delhi: Publications Division, Ministry of Information and Broadcasting, Govt. of India, 1997.

- Bhadant Sawangi Medhankar, *The Great Buddhist Emperors of Asia,* Nagpur: Buddha Bhoomi Prakashan, 1997

- Khobragade, Munshi N. L., *Bauddhakalin Bharat ka Itihas,* Nagpur: Samta Prakashan, 2002.

- Kosambi, Dharmanand, *Bhagvan Buddha: Jivan aur Darshan,* Allahabad: Lokbharti Prakashan, 2005.

- Lal, Angne, *Bauddha Sanskriti ke Vividh Ayam,* Lucknow: Uttar Pradesh Hindi Sansthan, 2008.

- Legge, J., *Fa-Hien, A Record of Buddhist Kingdoms,* Oxford: Oxford University Press, 1886.

- Mishra, Ramanath, *Bhartiya Murtikala ka Itihas,* Delhi: Granth Shilpi (India) Private Limited, 1978.

- Panthari, Bhagvati Prasad, *Devanampriya Priyadarshi Raja Ashoka,* Lucknow: Uttar Pradesh Hindi Sansthan, 2004.

- Prasad, Om Prakash, *Sanghadhipati Ashoka,* Delhi: Hindi Madhyam Karyanvaya Nideshalaya, Delhi Viswavidyalaya, 1999.

- Rahul Sankrityayan, *Bauddha Sanskriti,* New Delhi: Samyak Prakashan, 2011.

- Rhys Davids, T .W., *The History and Literature of Buddhism*, New Delhi: Munshiram Manoharlal Publishers Pvt. Ltd., 1999.

- Upadhaya, Bharat Singh, *Buddhakālīn Bhūgol*, Prayag: Hindi Sahitya Sammelan, 2000.

- Vijay Kumar Singh, Sects in Tibetan Buddhism, DK Printworld, Delhi, 2006.

Buddhist Philosophy

Theory Marks: 80

Internal Assessment: 20

Time: 3 hrs.

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 remaining four questions selecting at least one from each Unit. Each question will carry equal marks.

Unit- I

- Cattāri Ariyasaccāni (The Four Noble Truths), Ariyo-aṭṭhaṅgiko-maggo (the noble eightfold path), Paṭiccasamuppādo (the theory of Dependent Origination), Nirvana (Nibbāna), Theory of reality.

- Tilakkhaṇaṃ (Three Characteristics of Existence), Āyatana (Twelve Bases or Spheres) and No-Soul theory in Buddhism.

- Shamatha and Vipassana, Two truths.

Unit- II

- Schools of Buddhism: The Sarvastivada (Vaibhasika and Sautrantika); Madhyamika (Sunyavada); Yogacara (Vijnanvada), Vajrayana.

Unit- III

- Introduction to Buddhist Epistemology and Metaphysics.

- Buddhist Logic, Skilful means (Upaya Kaushalya) in Buddhism, Wisdom.

Unit- IV

- Revival of Buddhism In India: Socio-religious movement during the eighteenth and nineteenth centuries in India.

- Movement of the Untouchables in the twentieth century.

- Revival of Buddhism in India with special reference to Angarika Dhammpala.

- Life and contribution of B.R. Ambedkar in Buddhism.
- Engaged Buddhism.

Suggested Readings:

- *A Manual of Abhidhamma (Abhidhammatthasaṅgaho)* (Ed. & Tr.) Nārada Mahāthera, Kuala Lumpur: The Buddhist Missionary Society, 1979.

- *Abhidhammatthasaṅgaho* (Ed. & Tr.) Bhadanta Rewata-Dhamma & Ram Shankar Tripathi, Varanasi: Sampurnananda Sanskrit University, 1991.

- Ambedkar, B.R. *Revolution and Counter Revolution in Ancient India, Dr. Babasaheb Ambedkar Writings and Speeches Vol.III,* Bombay: Higher Education Department, Government of Maharashtra, 1980.

- Ambedkar, B.R. *The Buddha and The Future of his Religion,* Jalandhar: Bhim Patrika Publication, 1975.

- *Ambedkar, Babasaheb, Writings and Speech Vol.XVI* (Ed.) Vasant Moon, New Delhi: Dr. Ambedkar Foundation, Ministry of Social Justice & Empowerment, Government of India, 2014.

- *Ambedkar, Babasaheb, Writings and Speech, Vol.–XVI* Ed. Vasant Moon, Mumbai: The Education Department, Government of Maharashtra, 1998.

- Ambedkar, Bhim Rao, *The Buddha and His Dhamma,* Nagpur: Buddha Bhoomi Prakashan, 1997.

- Das, Bhagwan, *Revival of Buddhism in India and role of Dr. Baba Saheb B.R. Ambedkar*, Lucknow: Dalit Today Prakashan, 1998.

- Jondhale, Surendra & Johannes Beltz, *Reconstructing the World: B.R. Ambedkar and Buddhism in India*, New Delhi: Oxford University Press, 2004.

- Kashyap, Bhikshu Jagdish, *The Abhidhamma Philosophy,* Delhi: Bhartiya Vidya Prakashan, 1982.

- Naik, C.D., *Ambedkar's Perspective on Buddhism and other Religions,* Delhi: Kalpaz Publications, 2009.

- Rahula, Walpola, *What The Buddha Taught,* The Corporate Body of the Buddha Educational Foundation, 2003.

- Sangharakshita, *Ambedkar and Buddhism*. Glasgow: Windhorse Publications, 1986.

- Sankrityana, Rahula, *Bauddha Darshan,* Allahabad: Kitab Mahal, 1992.

- Shakya, Rajendra Prasad, *Bauddha Darshan,* Bhopal: Madhya Pradesh Hindi Academy, 2001.

- Upadhyaya, Bharat Singh, *Bauddha Darshan evam anaya Bhartiya Darshan,* Delhi: Motilal Banarasidas Publishers Private Limited, 1996.

- Vijay Kumar Singh, Buddhism Tibetan Tradition and Indian Path, Sankalp Publication, Chhattisgarh, 2019.

- Vijay Kumar Singh, Sects in Tibetan Buddhism, DK Printworld, Delhi, 2006.

BS-104

Buddhist Ethics

Theory Marks: 80

Internal Assessment: 20

Time: 3 hrs.

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 remaining four questions selecting at least one from each Unit. Each question will carry equal marks.

Unit- I
- Buddhist concept of *Ahimsa* with special reference to Brahmanical and Jaina views on *Ahimsa*.
- Comparison with Gandhi's conception of *Ahimsa* and *Satyagraha* (zest for truth); and means-ends relation.

Unit- II
- Buddhist concepts of *Kamma* and *Sila* with reference to Gita's concept of Nishkamakarma (self-less action).
- Buddhist concepts of Brahmavihara.

Unit- III
- Concept of Sila, Samadhi, Prajna.
- Theory of Karma and Rebirth (Pratisandhi), Kushala and Akushala Karma.

Unit- IV
- Arhata and Bodhisattva Ideal.
- Buddhist Theory of Perfection (Paramita).

Suggested Readings:
- Aiyer, Raghvan, Moral and Political Thought of Mahatma Gandhi, Madras: 1978.
- Duff, R.A., Trials and Punishment, Cambridge: Cambridge University Press: 1986.
- Fishin, J.S., Justice, Equal Opportunity, and the Family, New Haven: Yale University Press: 1983.
- Fishin, J.S., Justice, Equal Opportunity, and the Family, New Haven: Yale University Press: 1983.
- Frankena, W., Ethics, Englewood Cliffs, NJ: 1963.
- Har Dayal, The Bodhisattva Doctrine in Buddhist Sanskrit Literature, reprint, Delhi: Motilal Banarsidass, 1999.
- Har Dayal, The Bodhisattva Doctrine in Buddhist Sanskrit Literature, reprint, Delhi: Motilal Banarsidass, 1999.
- Keown, D., Morality in the Visuddhimagga, New York: 1983.
- Keown, D., The Nature of Buddhist Ethics, New York: 1992.
- Macintyre, A., A Short History of Ethics, London: 1966.
- Mackie, J.L., Ethics: Inventing Right and Wrong, Harmondsworth, Middlesex: 1977.
- Misra G.S.P. Development of Buddhist Ethics, Munshi Ram Manohar Lal, Delhi, 1984.
- Narada Maha Thera, A Manual of Buddhism, Buddhist Missionay Society, Srilanka, 1992.
- Nuttall, J., Moral Questions: An Introduction to Ethics, London, Macmilan: 1993.
- Rahul Walpol, What the Buddha Taught, Reprint, 2007, Oneworld Publication, Oxford, London.
- Shakya, Gyanaditya, *Human Values and Buddhist Ethics,* Nagpur: Sangyan Prakashan, 2018.
- Vijay Kumar Singh, Buddhism Tibetan Tradition and Indian Path, Sankalp Publication, Chhattisgarh, 2019.

DEPARTMENT OF PHILOSOPHY
KURUKSHETRA UNIVERSITY KURUKSHETRA

Scheme of Examination for M.A. (Philosophy) Third Semester
(Effective from the Academic Session: 2020-2021)

Scheme of Examination for M.A. Philosophy for Third Semesters with CBCS System. There are four credits for each paper and One credit is equal to 20 Marks.

Scheme of Examination for M.A. (Philosophy) Third Semester

Paper No. Nomenclature of the Paper	Theory Marks	Internal Assessment Marks	Assessment Credit	Max. Marks Allowed	Time Allowed	Month &Year of Examination	L+T+P
Compulsory Paper							
PHI-HC-301: Contemporary Western Philosophy - I	80	20	4	100	03 Hour	Dec. 2020.	4+1/2+0
Optional Papers (Group A)							
PHI-SC-A-302: Yoga as applied Philosophy -I	80	20	4	100	03 Hours	Dec. 2020.	4+1/2+0
PHI-SC-A-303: Philosophy of Religion –I	80	20	4	100	03 Hours	Dec. 2020.	4+1/2+0
PHI-SC-A-304: Comparative Religion -I	80	20	4	100	03 Hours	Dec. 2020.	4+1/2+0
PHI-SC-A-305: Philosophical Teachings of Shrimadbhagvad-Gita – I	80	20	4	100	03 Hours	Dec. 2020.	4+1/2+0

Optional Papers (Group B)

PHI-SC-B-302 Social and Political Philosophy –I	80	20	4	100	03 Hours	Dec.2020.	4+1/2+0
PHI-SC-B-303 Western Ethical Theories –I	80	20	4	100	03 Hours	Dec.2020.	4+1/2+0
PHI-SC-B-304 Applied Ethics	80	20	4	100	03 Hours	Dec.2020.	4+1/2+0
PHI-SC-B-305 Philosophy of Mind (Indian)	80	20	4	100	03 Hours	Dec.2020.	4+1/2+0

Open Elective Paper-II   **(To be offered to students from Outside the Department)**

PHI-OE-306 Indian Ethics	40	10	2	50	03 Hours	Dec, 2020.	2+0+0

Total Credits: 5x4=20 +2(open elective)   =22   *One credit has been given for one Hour of Teaching/Tutorial per Week

(Dr. R.K.Deswal)
Professor & Chairman
Dept. of Philosophy
Kurukshetra University Kurukshetra

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Compulsory Paper
PHI-HC-301 Contemporary Western Philosophy ─I
Aims & Objectives:
The aim of the paper is to introduce the students to the main philosophical problems of contemporary western thinkers and to show how their thinking is different from ancient and modern thinkers of the West. The students will understand the importance of analysis in philosophizing.

Outcome:
The outcome of this paper will make students understand the importance of analytical method in Philosophy. The students will also learn the role of language in philosophizing and also what the limits of language and philosophy are as well.

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 syllabi and Two Questions 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: B. Russell: Logical Atomism; Knowledge by Acquaintance and Knowledge by Description; G.E. Moore: A Defense of Common-sense; Refutation of Idealism.

Unit-2: G. Frege: Sense and Reference; L. Wittgenstein: Meaning as Reference; Meaning as Use; Nature of Philosophical Problems and their Solutions.

Unit-3: A.J Ayer: Rejection of Metaphysics; Verification Principle; Functions of Philosophy; J.L. Austin: Speech Acts; Performative Utterances.

Unit-4: William James: Radical Empiricism; Pragmatism; G.Ryle: Category-Mistake; Descartes' Myth.

Suggested Books:

Ajit Kumar Sinha	: *Samkalin Darshan.*
B.K.Lal	: *Samkalin Paschatya Darshan.*
Laxmi Saxena	: *Samkalin Darshan.*
Jagdish Sahay Shrivastav	: *Paschatya Darshan ki parmukh Darshnik Parvartiyan.*
Y.Masiha	: *A Critical History of Western Philosophy (*Hindi version also available)
Chanderdhar Sharma	: Western Philosophy.
Sobha Nigam	: *Paschatya Darshan ke samprdaay.*

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-A)
PHI-SC-A-302Yoga as Applied Philosophy –I
Aims & Objectives:
Yoga Philosophy is a very important Philosophical System of India. It is not merely a philosophical system; it is a way of life. The paper aims at broadening students understanding of Yoga as an applied philosophy so that students can apply its principle in their own everyday life.
Outcome: The outcome of the paper will make the students realize the practical and holistic importance of yoga principles.

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 syllabi and Two Questions 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: Philosophy of Yoga: Meaning, Definition, Origin & Development of Yoga. Concept of Parinamvada ; Doctrine of Kleśa in Yogasutra of Patanjali.

Unit-2: Psychology of Yoga; Theory of Kriyayoga; Theory of Karmavad; Kinds of Antrayas and their elimination; Concept of Dukha; Adhyatmika, Adhidaivik and Adhibhotik.

Unit-3: Citta and its varieties; Methods of Citta-control; Five kinds of Yama and Niyama, Values and their Role in Yoga and Dharma; Yama, Niyam and their Importance in Personal and Social Life.

Unit-4: Asanas and Principle of their Practice, Asnas, their Kinds and their Cultural, Physiological and Therapeutic Effects; Pranāyāma, its varieties, techniques and precautions; Pranayama and its benefits in chronic diseases.

Suggested Books:
K.S.Bashi : *Cure Yourself ThroughYoga.*
Pavan Kumari : *Patanjali Yoga Sutra: A Critical Study.*
Swami Vivekananda Prevrajak : *Yogasutra.*
Ramnath Shama & Rachana Sharma : *Bhartiya Manovijyana.*
Sri Ram Chandra Gupta : *Yogic Culture and Modern Man- Secrets of Vital Health and Happiness.*
Chanderdhar Sharma : *Bhartiya Darshan: Aalochan avam anusheelan.*
Surender Kumar Sharma : *Hathyoga: Ek Atihasik Pripekshya.*
Swami Sampurnananda : *Yoga-Darshan.*
Rajveer Arya : *Yogasutra.*
Swami Vivekananda : *Raja Yoga.*
Udayavir Shastri : *Samkhya Sutra- Kapilmuni.*

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-A)
PHI-SC-A-303 Philosophy of Religion ─I
Aims & Objectives:
The aim of the paper is to provide knowledge of the basic concepts of Philosophy of Religion. It gives an insight into how Philosophy of Religion is different from Religion. The paper is a critical study of religion.
Outcome: The students, after studying the paper, will be able to analyze critically the concepts of religion such as God, Soul, Immortality, Evil etc. This will help them shed dogmatism.

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 syllabi and Two Questions 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: Definition and Nature of Religion; Definition and Nature of Philosophy of Religion; Significance of Philosophy of Religion; Relation of Religion with Science and Philosophy.

Unit-2: Difference between Dharma,Religion and Majhab;Theories of the Origin of Religion; Origin of the Idea of God; Concept of Iśvara in Indian Philosophy.

Unit-3: Religious Experience and Religious Consciousness; Arguments for the Existence of God: Ontological Argument, Cosmological Argument, Teleological Argument and Moral Argument.

Unit-4: Atheism; God and the Absolute; Deism, Theism, Pantheism and Panentheism.

Suggested Books:
Swami Dayanand   : *Satyarth Prakash.*
H.P.Sinha   : *Dharma Darshan ki Ruprekha.*
J.Hick   : *An Interpretation of Religion.*
M.Hiriyanna   : *Quest for Perfection.*
N.K.Brahma   : *Philosophy of Hindu Sadhana.*
Osho   : *Main Dharma Nahin, Dharmikta Shikhata hun.*
Swami Vivekananda   : *Complete Works* (relevant chapters)
B.K.lal   : *Dharmadarshan.*
Yacub Masih   : *Samanya Dharam Darshan.*

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-A)
PHI-SC-A-304 Comparative Religion ─I
Aims & Objectives:
The aim of this paper is to give an overview of all the major religion of the world and to study them in a comparative way to create an atmosphere of religious harmony.
Outcome:
The study of the paper will enhance the students' understanding of world religions and this will make them realize that the basic tenets of all religions are same and so they should be tolerant to others' religions.

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 syllabi and Two Questions 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: Hinduism : Essential Characteristic of Hinduism; Concept of God; Concept of Soul; Theory of World; Law of Karma**.**

Unit-2: Hinduism: Theory of Maya and Bondage; Rebirth; Liberation and its Paths; Concept of Daśāvatāra.

Unit-3: Buddhism: Anti-metaphysical attitude of Buddha; Four Noble-Truths; Nature of Nirvana; Sīla- Samādhi- Prajñā,Theory of Aalya vijyana.

Unit-4: Buddhism : Theory of Anātmavāda; Atheism of Buddhism; Concept of Vipassanā Meditation ; Religious Sects: Hīnayāna and Mahāyāna; Difference between Hinayāna and Mahayāna.

Suggested Books:
A.Thompson   : *A Modern Philosophy of Religion.*
H.P.Sinha   : *Dharma Darshan ki Ruprekha.*
J.Hick   : *An Interpretation of Religion.*
Kedar Nath Tiwari   : *Comparative Religion.*
M.Hiriyanna   : *Quest for Perfection.*
N.K.Brahma   : *Philosophy of Hindu Sadhana.*
Aurobindo   : *Basis of Indian Culture.*
Swami Vivekananda   : *Complete Works* (relevant chapters)
V.P. Verma   : *Dharma Darshan ki Mool Samsayayein.*
Vatsyayan   : *Philosophy of Religion* (World Religions)
Osho   :Es Dhammo Sanantno,1-8.
Yacub Masih   : *A Comparative Philosophy of Religion*
Osho   : *Main Dharma Nahin, Dharmikta Shikhata hun.*

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Optional Paper (GROUP-A)
PHI-SC-A-305 Philosophical Teachings of Shrimadbhagvad-Gita – I
Aims & Objectives:
The aim of the paper is to broaden the students' understanding of the Shrimadbhagvad-Gita. The Gita as a philosophical treatise has a very important place not only in India but in the whole world. The paper provides a very good understanding of the important concepts of the Holy Book, such as Karma, Akarma, Vikarma, Nishkama Karma, Yoga, Sthitprajna etc.

Outcome: The study of the paper on the Gita will enhance students understanding of the important philosophical concepts contained in the book, leading the students to see all round significance of the book, whether it is social, ethical, and religious, political, economic or spiritual.

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 syllabi and Two Questions 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: Bhagavad-Gita: Meaning, Origin &History; Subject Matter of Bhagavad-Gita; Traitvada, Dvaitavada, and Advaitvada, Avataravada; Contemporary Relevance of Bhagavad-Gita.

Unit II: Spiritual Background of Bhagavad-Gita: Parmatman; Atman; Prakrti; Concept of Adhibhuta, Adhidvaita and Adhiyajna; Concept of Kshetra and Kshetraja; Concept of Srishti.

Unit III: Ethical Teachings of Bhagavad-Gita: Yajna Vichar -- Sattvika, Rajasika and Tamasika; Karma, Vikarama and Akarma; Concept of Nishkama Karma; Concept of Jyanayoga, Karmayoga and Bhaktiyoga.

Unit IV : Yogic Teachings of Bhagavad-Gita : Samatva Yoga Uchyate; Samye Sthitam Manah; Yogstha Kuru Karmani; Yogah Karmasu Kausalam; Sthitprajna, Vitaraga and Prajna Pratistha.

Suggested Books:
1. *Shrimadbhagvadgita* Shankar Bhashya,.
2. *Shrimadbhagvadgita* Ramanuj Bhashya,.
3. Shri Aurobind, *Essays on Gita*,.
4. B.G. Tilak, *Srimadbhagvadgita Bhashya*,
5. Osho Rajneesh, *Gita Darshana, Part-*1 to 8.
6. Aryamuni : *Vedic Gita,*

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHI-SC-B-302 Social and Political Philosophy –I
Aims & Objectives:
The purpose of the paper is to broaden the students' acumen regarding social and political concepts. The paper aims at giving a detailed and critical understanding of such concepts as Social Change, Social Progress, Role and Importance of Family etc.

Outcome:
The students will be more aware of the nature of society and its problems after studying the paper. They will be able to see the relevance of society in individual life. They will feel more responsible towards society.

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 syllabi and Two Questions 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: Social Philosophy: Definition and Nature of Social Philosophy; Its Methods and Significance; Its Relation with Sociology and Political Science.

Unit-2: Social Change: Kinds of Social Change; Factors leading to Social Change and a check over; Social Progress: Concept and Factors.

Unit-3: Family: Family as a Social Institution; Role of Family in Socialization of Individual; Joint Family System: Merits and Demerits of Joint Family in the Modern Society; Family in the Modern Society.

Unit-4: Social Problems: Female Foeticide, Child Abuse, Child Labour and Corruption in Public Life; Education: Meaning, Definition and Objectives.

Suggested Books:

Ajit Kumar Sinha	: *Outlines of Social Philosophy*,
Barbara Goodwin	: *Using Political Ideas*,.
J.S.Makenzi	: *Samaj Darshan Ki Ruprekha*,
Satyapal Gautam	: *Samaj Darshan*,.
Shivbhanu Singh	: *Samaj Darshan Ka Sarvekshan*,
Ramender	: *Samaj Avam Rajniti Darshan*,

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHI-SC-B-303 Western Ethical Theories –I
Aims & Objectives:
The paper aims to broaden students' understanding of Western Ethical Principles so that they can analyze critically each thinker.
Outcome: It is hope that by the end of the paper the students will be well acquainted in all the major ethical trends of western philosophy.

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 syllabi and Two Questions 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: Moral Skepticism: Sophists, Pyrrho; Post Aristotelian Moral Theories: Epicureanism, Stoicism.

Unit-2: Hedonism: Hobbes, Hume; Utilitarianism: Kinds -- Act-Utilitarianism and Rule-Utilitarianism.

Unit-3: Evolutionary Ethical Theories: Herbert Spencer, Samuel Alexander; Perfectionism: T.H.Green, F.H.Bradley.

Unit-4: Intuitionism : Samuel Clark, Shaftsbury, Butler; Kant: Regorism.

Suggested Books:

John S. Mackenzie	: *A Manual of Ethics.*
J.N.Sinha	: *A Manual of Ethics.*
Haridya Naryana Mishra	: *Nitishastra Ke Parmukh Siddhant.*
S.N.Gupta	: *Nitishastra va Samaj-Darshan ki Ruprekha.*
Tandra Patnaik	: *Issues in Practical Ethics.*
V.P.Verma	: *Nitishastra ke Mool Siddhant.*
V.P.Verma	: *Adhinitishastra ke Mool Siddhant.*

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHI-SC-B-304Applied Ethics
Aims & Objectives:
The main objective of the paper is to enhance the student acumen regarding applied side of the ethical principles. Ethics is a practical science. Its application in everyday instances makes it relevant. The students will gain practice in identifying ethical issues in a variety of real life situations or scenarios, as well as skills in ethical reasoning, and a framework for making ethical judgment and decisions**.**
Outcome: - By studying and analyzing applied form of ethical principles, it is hoped that the students will become more self-aware, self disciplined and morally autonomous.

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 syllabi and Two Questions 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: Origin, Nature and Scope of Applied Ethics; Main Streams, Limitations and Relevance.

Unit-2: Capital Punishment: Arguments -- For and Against; Mental Pollution by Media: Arguments -- For and Against; Cloning Humans: Arguments -- For and Against.

Unit-3: Problem of Euthanasia; Moral Rights of the Foetus; Rights of Animals.

Unit-4: Female foeticide; Child Abuse; Violence: Effect on Women and Children.

Suggested Books:

A.P.Dubey	: *Applied Ethics*, Northern Book Centre, New Delhi,2004.
Brenda Almond & Donald Hill	: *Applied Philosophy: Morals and Metaphysics in Contemporary debates*, Roultledge & Kegan Pal, London, 1991.
David S.Oderberg	: **Applied** *Ethics*, Blackwell Publishers, First ed.2000.
E.R. Winkler & J.R. Combe (eds.)	: *Applied Ethics*: *A Reader*, Blackwell, 1993.
G.C.Graber & D.C. Thomasma	: *Theory and Practice in Medical Ethics*, The Continuum co. New York, 1989.
Jennifer Jackson	: *Ethics in Medicine*, Polity Press, Cambridge, 2006.
May Briody Mahowald	: *Bioethics and Woman-*, Oxford University Press,2006
Peter Singer (Ed.)	: *Applied Ethics-* Oxford University Press, 1986.

M.A. Philosophy
Third Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHI-SC-B-305 Philosophy of Mind (Indian)
Aims & Objectives:
The aim of this paper is to acquaint the students with various perspectives on the fundamental issues which arise in our reflection on human Mind. Issues such as nature of human consciousness, human behaviour, Knowledge of Self, factors of Personality etc. will be discussed with special reference to Classical Indian Philosophy,

Outcome: After study the paper the student will be well versed in concepts related to Philosophy of Mind.

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 syllabi and Two Questions 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: Nature and Scope of Indian Philosophy of Mind and its Methods; Comparative study of Indian & Western approaches.

Unit-2: Upaniṣad: Concept of States of Consciousness; Buddhism: Factors of Personality and Nature of Perception; Jainism: Nature of Consciousness.

Unit-3: Nyāya: Concept of Personality, States of Consciousness, Vaiśesika: Factors of Personality and Theories of Consciousness.

Unit-4: Sāṅkhya: Nature of Personality: Triguṇa Theory; Yoga: The Philosophy of Kleśas; States of Consciousness; Factors of Personality.

Suggested Books:

B. Kuppuswamy : *Elements Of Ancient Indian Psychology*, Vikas Publisher, New Delhi, 1979.
Chennakesavan, Sarasvati : *Concept of Mind in Indian Philosophy*. Motilal Banarsidash Publisher Pvt. Ltd.: Delhi, 1991.
Dutta & Chatterjee : *An Introduction to Indian Philosophy*. University of Calcutta, 1984.
Kireet, Joshi et al (Eds) : *Consciousness, Indian Psychology and Yoga*, Indian Book Corporation, 2005.
N. Ross Reat : *Origins of Indian Psychology*, Asian Humanities Press, 1990.
Jadunath Sinha : *Indian Psychology: Cognition; Emotion and Will; Epistemology of Perception* (3 Vols.), Motilal Banarsidass, New Delhi, 1986.
Raghunath Safaya : *Indian Psychology: A Critical and Historical Analysis of Psychological Speculation in Indian Philosophical Literature*, Munshiram Manoharlal Publishers Pvt., New Delhi, 1976.
Ram Nath Sharma & Rachna Sharma : *Bhartiya Manovijyana*, Atlantic Publishers and Distributors, New Delhi, 2005.
Silva, Padmasiri : *An Introduction to Buddhist Psychology*. Macmillan Press Ltd., 2000.
S.K.Ramakrishna Rao : *Development of Psychological Thoughts in India*, Kavlaya Publishers, Mysore. Scheme *of Examination for M.A. Philosophy for Fourth*

Semesters with CBCS System. There are four credits for each paper and One credit is equal to 20 Marks.

Scheme of Examination for M.A. (Philosophy) Fourth Semester

Paper No. Nomenclature of the Paper	Theory Marks	Internal Assessment Marks	Assessment Credit	Max. Marks	Time Allowed	Month &Year of Examination	L+T+P
Compulsory Paper							
PHI-HC-401: Contemporary							
Western Philosophy –II	80	20	4	100	03 Hours	May, 2021.	4+1/2+0
Optional Papers (Group A)							
PHI-SC-A-402 Yoga as Applied Philosophy –II	80	20	4	100	03 Hours	May, 2021.	4+1/2+0
PHI-SC-A-403 Philosophy of Religion -II	80	20	4	100	03 Hour	May, 2021.	4+1/2+0
PHI-SC-A-404Comparative Religion –II	80	20	4	100	03 Hours	May, 2021.	4+1/2+0
PHI-SC-A-405 Philosophical Teachings							
of Shrimadbhagvad-Gita –II	80	20	4	100	03 Hours	May, 2021.	4+1/2+0

Total Credit 5x4=20

Optional Papers (Group B)

PHI-SC-B-402 Social and Political Philosophy –II	80	20	4	100	03 Hours	May, 2021.	4+1/2+0
PHI-SC-B-403 Western Ethical Theories –II	80	20	4	100	03 Hours	May, 2021.	4+1/2+0
PHI-SC-B-404 Environmental Ethics	80	20	4	100	03 Hours	May, 2021.	4+1/2+0
PHI-SC-B-405 Philosophy of Mind (Western)	80	20	4	100	03 Hours	May, 2021.	4+1/2+0

N.B. –I. **Optional Groups will be started according to availability of the Teaching Faculty in the Dept**. **of Philosophy.**

Total Credit 5x4=20

(Dr. R.K.Deswal)
Professor & Chairman
Dept. of Philosophy,
Kurukshetra University Kurukshetra.

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Compulsory Paper
PHI-HC-A-401: Contemporary Western Philosophy ─ II
Aims & Objectives:
The aim of the paper is to introduce the students to the existential approach in understanding philosophical concepts. The students will also understand the importance of phenomenological method.

Outcome:
The outcome of this paper will make students understand the importance of phenomenological method and existential approach in Philosophy.

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 syllabi and Two Questions 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: E. Husserl: Phenomenological Method; Intentionality of Consciousness;
   M. Heidegger: Modes of *Dasein*; Authentic Existence and Inauthentic Existence, Difference between Being and beings.

Unit-2: S.A. Kierkegaard: Truth is Subjectivity; Three stages of Existence;
   K. Jaspers: Modes of Existence; Ultimate Situations, Encompassing and Transcendence.

Unit-3: Jean Paul Sartre: Existence precedes Essence; Being-in-itself; Being-for-itself; Being-for others; Consciousness and Nothingness; Inauthentic Existence.

Unit-4: G. Marcel: Problem and Mystery: I and Thou; Freedom and Experiencing God;
   F. Nietzsche: Atheistic Existentialism; Will to Power; Criticism of God.

Suggested Books:
Ajit Kumar Sinha   : *Samkalin Darshan.*
B.K.Lal   : *Samkalin Paschatya Darshan.*
Laxmi Saxena   : *Samkalin Darshan.*
Jagdish Sahay Shrivastav : *Paschatya Darshan ki parmukh Darshnik Parvartiyan.*
Y.Masiha   : *A Critical History of Western Philosophy(*Hindi version also available).
Martine Heidegger   : *Introduction to Metaphysics.*
 Sobha Nigam   : *Paschatya Darshan ke samprdaay.*
Chanderdhar Sharma   : *Paschatya Darshan.*

M.A. Philosophy
Fourth Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP –A)
PHIL-SC-A-402 Yoga as Applied Philosophy ─ II
Aims & Objectives:
Yoga Philosophy is a very important Philosophical System of India. It is not merely a philosophical system; it is a way of life. The paper aims at broadening students understanding of Yoga as an applied philosophy so that students can apply its principle in their own everyday life.
Outcome: The outcome of the paper will make the students realize the practical and holistic importance of yoga principles.
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 syllabi and Two Questions 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: Concept of Pratyāhara; Concept of Dharnā (Contemplation); Concept of Dhyāna; Concept of Samadhi and its Stages. Om Meditation/ Pranava.

Unit-2: Concept of Siddhi and Vibhuti in yogsutra of Patanjali ; Concept of Sammohan and its Benefits in various fields; Method of Chitta Vimlata, Prasannta and Nirdoshta; Concept of Isvara and its Importance in Yoga, Concept of Kaivalya.

Unit-3: Citta Bhumiyan and Stage of Samapatti and its Varieties; How to Built Mental Health (Brahamviharas), Hathyoga Practices- Shodhan kriyas in Hathyoga Pradipika and Gherand Samhita, Role of Shodhan kriyas in Yoga Sadhna and their importance in Contemporary time, Concept of Chakra in Hathyoga.

Unit-4: Doctrine of Karma-Yoga, Bhakti-Yoga, Jyāna-Yoga and Dhyana Yoga; Hathyogic Pranayama-Method of Correct breathing, Purak-Rechak-Kumbhak and Yogic deep breathing.

Suggested Books:
S.N.Dasgupta   : *A Study of Patanjali.*
Pavan Kumari   : *Patanjali Yoga Sutra: A Critical Study.*
Ramnath Shama & Rachana Sharma   : *Bhartiya Manovijyana.*
Sri Ram Chandra Gupta   : *Yogic Culture and Modern Man- Secrets of Vital Health and Happiness.*
Bihar School of Yoga Books   : All books
Surender Kumar Sharma   : *Hathyoga: Ek Atihasik Pripekshya.*
Swami Sampurnananda   : *Yoga-Darshan.*
Swami Vivekananda   : *Raja Yoga..*
Shrimad Bhagvad Gita   : (only chapter 2,3,6 & 12th)

M.A. Philosophy
Fourth Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP -A)
PHI-SC-A-403: Philosophy of Religion ─ II
Aims & Objectives:
The aim of the paper is to provide knowledge of the basic concepts of Philosophy of Religion. It gives an insight into how Philosophy of Religion is different from Religion. The paper is a critical study of religion.

Outcome: The students, after studying the paper, will be able to analyze critically the concepts of religion such God, Soul, Immortality, Evil etc. This will help them shed dogmatism.

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 syllabi and Two Questions 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: Freedom of Will, Karma and Rebirth; Puruṣārthas: Dharma, Artha, Kāma and Mokṣa; Objections against Religion.

Unit-2: Inter-Religious dialogue and the possibility of universal religion with special reference to Hinduism, Sikhism, Buddhism and Christianity; Problem of Religious Language: Cognitive, Non-Cognitive and Semi-Cognitive Theories.

Unit- 3: Secularism; Religious Tolerance; Religion and Scientific Outlook; Religion and Reason; Religion and Terrorism.

Unit- 4: Mysticism; God, Man and the World; Brahman, Isvara, Jiva and Jagat.

Suggested Books:

H.P.Sinha   : *Dharma Darshan ki Ruprekha.*
J.Hick   : *An Interpretation of Religion.*
N.K.Brahma   : *Philosophy of Hindu Sadhana.*
N. Smart   : *The Religious Experience of Mankind.*
R.Otto   : *The Idea of the Holy.*
Swami Vivekananda : *Complete Works* (relevant chapters)
W.James   : *Varieties of Religious Experience.*
Yacub Masih   : *Samanya Dharam Darshan.*
V.P.Verma   : *Dharma Darshan ki mool Samsyaen*

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP -A)
PHI-SC-A-404: Comparative Religion ─ II
Aims & Objectives:
The aim of this paper is to give an overview of all the major religions of the world and to study them in a comparative manner to create an atmosphere of religious harmony.
Outcome:
The study of the paper will enhance the students' understanding of world religions and this will make them realize that the basic tenets of all religions are same and so they should be tolerant to others' religions**.**

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 syllabi and Two Questions 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: Jainism : Theory of Substance; Concept of Soul; Theory of Bondage and Liberation; Theism and Jainism.

Unit-2: Islam: Concept of God (Allah); The Cardinal Principles of Islam; Five Pillars of Islam; Ethical Teachings and Various Sects.

Unit-3: Christianity: Concept of God; Nature of the World; Problem of Evil and its Solution; Sermon of the Mount.

Unit-4: Sikkhism: Concept of God; Ataman, Jagat, Guru and Moksha.

Suggested Books:
A.Thompson   : *A Modern Philosophy of Religion.*
H.P.Sinha   : *Dharma Darshan ki Ruprekha.*
J.Hick   : *An Interpretation of Religion.*
Kedar Nath Tiwari   : *Comparative Religion.*
M.Hiriyanna   : *Quest for Perfection.*
N.K.Brahma   : *Philosophy of Hindu Sadhana.*
N. Smart   : *The Religious Experience of Mankind.*
R.Otto   : *The Idea of the Holy.*
Swami Vivekananda   : *Complete Works* (relevant chapters)
V.P. Verma   : *Dharma Darshan ki Mool Samsayayein.*
Vatsyayan   : *Philosophy of Religion* (World Religions)
W.James   : *Varieties of Religious Experience.*
Yacub Mashih   : *A Comparative Philosophy of Religion*

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Optional Paper (GROUP-A)
PHI-SC-A-405 Philosophical Teachings of Shrimadbhagavad-Gita – II
Aims & Objectives:
The aim of the paper is to broaden the students' understanding of the Shrimadbhagwad-Gita. The Gita is a very important Philosophical treatise of ancient India, but it still has a very important place, not only in India but in the whole world. The paper provide a very good understanding of the important concept of the Holy Book, such as, Karma, Akarma, Vikarma, Nishkarama Karma, Yoga, Sthitprajna etc.
Outcome:
The study of the paper on the Gita will enhance students' understanding of the important Philosophical concepts, leading the students to see all round significance of the book, whether it is social, ethical, religious, political, economic or spiritual.
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 syllabi and Two Questions 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:	Philosophical Background of Bhagavad-Gita: Theory of Causation; Kshara, Akshara and Purushottam; Concept of Dharmakshetra; Concept of Trigunatmaka Prakriti; Concept of Mokhsa.
Unit II:	Sociological Background of Bhagavad-Gita: Concept of Four Varna; Concept of Karma – Sattvik, Rajasika and Tamasika; Concept of Universal Dharma; Daivi Sampad and Asuri Sampad.
Unit III:	Psychological Teachings of Bhagavad-Gita: Contemporary Man, Mental Diseases and Bhagavad-Gita; Yuddha, Dharma, Majhab and Bhagavad-Gita; Sri Krishna – The First Psychologist of Known History.
Unit IV:	Political and Educational Teachings of Bhagavad-Gita; Concept of Rajarshi and Comparison with Plato's Concept of Philosopher King; Concept of Four Types of Bhakta (Shishya); Concept of Religious Nation; Necessity of Bhagavad-Gita in Educational Institutions.

Suggested Books:
7.   *Shrimadbhagvadgita* :Shankar Bhashya,.

8.   *Shrimadbhagvadgita* :Ramanuj Bhashya,.

9.   Shri Aurobind, : *Essays on Gita*,.

10.   B.G. Tilak : *Srimadbhagvadgita Bhashya*,

11.   Osho   : *Gita Darshana, Part 1-8.*

12.   R.S. Garg : *Gita for Success in Modern Life.*

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP -B)
PHI-SC-B-402: Social and Political Philosophy – II
Aims & Objectives:
The purpose of the paper is to broaden the students' acumen regarding social and political concepts. The paper aims at giving a detailed understanding of such concepts as Varna System, Nature of Society, Gender Equality etc.
Outcome:
The students will be more aware of the nature of society and its problems after studying the paper. They will be able to see the relevance of society in individual life. They will feel more responsible towards society.
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 syllabi and Two Questions 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: Indian Social Systems: Varṇa-System; Theories of Origin and Position of Different Varṇas; Difference between Class, Caste and Varna. Caste Discrimination: Swami Dayanand, Gandhi and Ambedkar.

Unit-2: Society: Meaning, Origin and Relation between Individual and Society (Social Contract Theory, Organic Theory and Idealistic Theory); Class, Caste and Varna: A Standard View.

Unit -3: Political Ideologies: Democracy, Socialism, Humanism and Secularism.

Unit-4: Gender Equality: Meaning of Gender Equality; Woman and Society: Sociological View; Woman and Social Change; Position of Women in India; Reformist Movements of Raja Ram Mohan Roy, Swami Dayanand and Mahatma Gandhi.

Suggested Books:

Ajit Kumar Sinha   : *Outlines of Social Philosophy*,
J.S.Makenzi   : *Samaj Darshan Ki Ruprekha*,
 Ramender   : *Samaj Avam Rajniti Darshan*,
Satyapal Gautam   : *Samaj Darshan*,
Shivbhanu Singh   : *Samaj Darshan Ka Sarvekshan*,
 Ramnath Sharma   : *Samaj Darshan*

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHIL-SC-B-403 Western Ethical Theories ─ II
Aims & Objectives:
The paper aims to broaden students understanding of Western Ethical Principles so that they can analyze critically each thinker.
Outcome: It is hope that by the end of the paper the students will be well acquainted in all the major ethical trends of western philosophy**.**
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 syllabi and Two Questions 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: Meta-Ethics: Nature and problems of Meta-ethics; Types of Meta-ethics; Naturalism and its types.

Unit-2: Non-naturalism: Meaning and Description; Intuitionism: G.E.Moore, H.A. Pichard, W.T.Ross.

Unit-3: Emotivism: Ayer and Stevenson; Prescriptivism: R.M. Hare, J.Urmson.

Unit-4: Applied Ethics: Nature and purpose of Applied Ethics; Main types of Applied Ethics: Business Ethics, Environmental Ethics and Medical Ethics.

Suggested Books:

A.K.Shrivastava   : *Environmental Ethics.*
A.P.Dubey   : *Applied Ethics*
David S.Oderberg   : *Applied Ethics.*
John S. Mackenzie   : *A Manual of Ethics.*
J.N.Sinha   : *A Manual of Ethics.*
Haridya Naryana Mishra   : *Nitishastra Ke Parmukh Siddhant.*
Peter Singer (ed.)   : *Applied Ethics.*
S.N.Gupta   : *Nitishastra va Samaj-Darshan kie Ruprekha.*
Tandra Patnaik   : *Issues in Practical Ethics*.
V.P.Verma   : *Nitishastra ke Mool Siddhant.*
V.P.Verma   : *Adhinitishastr ke Mool Siddhant.*

M.A. Philosophy
Fourth Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHI-SC-B-404 Environmental Ethics
Aims & Objectives: The main aim of the paper is to provide the students basic understanding of the issues and the concepts related to environmental Ethics and to make them aware of the urgent need for sustainable development. The emphasis is given on the study of such concepts as Deep Ecology, Gaia Theory, Non- Anthropocentrism etc.

Outcome: - At the end of the paper the students will become aware of the present environmental crisis and will be able to see the need for the sustainable development.

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 syllabi and Two Questions 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: Nature and Scope of Environmental Ethics; Basic Concepts and Issues.

Unit-2: Nature, Man and Society: A Plea for Non-Anthropocentrism; Climate Change: Meaning, Causes and Preventions.

Unit-3: Environmental Ethics and Ecology: Nature and Scope of Ecology: Main characteristics of Ecology.

Unit-4: Sustainable Development and Environment; Deep Ecology: Meaning and Definition: Characteristics of Deep Ecology; Gaia Theory.

Suggested Books:

Brenda Almond & Donald Hill : *Applied Philosophy: Morals and Metaphysics in Contemporary debates*,
E.R. Winkler & J.R. Combe (eds.) : *Applied Ethics*: *A Reader*
Kanchan Saxena : *Readings in Applied Philosophy*,
Haridya Naryana Mishra : *Philosophy of Ecology*,
John Benson : *Environmental Ethics*,
Patrick Curry : *Ecological Ethics: An Introduction*,

M.A. Philosophy
Fourth Semester
(w.e.f. 2020-21)

Maximum Marks: 100
Theory: 80 Marks
Assessment: 20 Marks
Time Allowed: 3 Hours

Option (GROUP-B)
PHI-SC-B-405 Philosophy of Mind (Western)
Aims & Objectives:
The aim of this paper is to acquaint the students with various perspectives on the fundamental issues which arise in our reflection on human Mind. Issues such as nature of human consciousness, human behaviour, Knowledge of Self, etc. self-knowledge will be discussed with special reference to contemporary western philosophy.
Outcome: After study the paper the student will be well versed in concepts related to Philosophy of Mind.
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 syllabi and Two Questions 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: Nature of Western Philosophy of Mind; Nature of Consciousness: First Person Account & Third Person Account.

Unit-2: Cartesian Dualism: Meaning, Problems and its Modifications.

Unit-3: Behaviourism: Meaning; Psychological Behaviorism of B.F.Skinner; Philosophical Behaviourism of L. Wittgenstein & G.Ryle; Identity Theory of J.J.C. Smart.

Unit-4: A General Introduction of Functionalism; Representational Theory of Mind; Interrepresentational theories of Mind (Donald Davidson & Daniel C. Dennett) and Eliminativism (Paul Churchland).

Suggested Books:

Bechtel, William   : *Philosophy of Mind : An Overview of Cognitive Science*,
Jerome A. Shaffer   : *Philosophy of Mind*,
Heil John   : *Philosophy of Mind* (a contemporary introduction

Pradhan,R.C.   : *Recent Developments in Analytic Philosophy*.

Shukla, J.P.   : *The Nature of Mind*.
Titus, H.H. &   : *Living Issues in Philosophy*.

William O' Donohue : Philosophy of Psychology

DEPARTMENT OF PHILOSOPHY
KURUKSHETRA UNIVERSITY KURUKSHETRA

Scheme of Examination for M.A.Final (Philosophy)
(Effective from the Academic Session: 2020-2021
For DDE and Private Students

Paper No. Nomenclature of the Paper	Theory Marks	Internal Assessment Marks	Max. Marks	Time Allowed	Month &Year of Examination
Compulsory Paper					
Paper-VI: Contemporary Western Philosophy	**80**	**20**	**100**	**03 Hour**	**May/June, 2021.**
Optional Papers (Group A)					
Paper-VII: Yoga as applied Philosophy	**80**	**20**	**100**	**03 Hours**	**May/June 2021.**
Paper-VIII: Philosophy of Religion	**80**	**20**	**100**	**03 Hours**	**May/June, 2021.**
Paper-IX: Comparative Religion	**80**	**20**	**100**	**03 Hours**	**May/June, 2021.**
Paper-X: Philosophical Teachings of Shrimadbhagvad-Gita	**80**	**20**	**100**	**03 Hours**	**May/June. 2021.**

(Prof. R.K.Deswal)
Professor&Chairman
Dept. of Philosophy, K.U.K

10(1530)

M.A. Philosophy
Final (Annual)
(w.e.f. Academic Session: 2020 - 21)

Paper – VI: Contemporary Western Philosophy
(Compulsory Paper)

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 syllabi and Two Questions from Each Unit, spread all over 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: B.Russell: Logical Atomism; Knowledge by Acquaintance and Knowledge by Description. G. E. Moore: A Defense of Common-sense; Refutation of Idealism.

Unit-2: G. Frege: Sense and Reference, L. Wittgenstein: Meaning as Reference; Nature and Function of philosophy. A. J. Ayer: Rejection of Metaphysics. J. L. Austin: Speech Act; Performative Utterances.

Unit-3: John Dewey: Instrumentalism. William James: Radical Empiricism. G. Ryle: Category Mistake; Descartes' Myth. E. Husserll: Phenomenological Method; Intentionality of Consciousness.

Unit-4: M. Heideggar: Modes of Dasein; Authentic Existence and Inauthentic Existence, S.A. Kierkegaard: Truth is Subjectivity; Three stages of Existence. Jean Paul Sartre: Existence preceeds Essence; Being-in-itself; Being-for-itself; Being-for-others; Consciousness and Nothingness. F. Nietzsche: Atheistic Existentialism; Will to Power.

Suggested Books:

Ajit Kumar Sinha: *Samkalin Darshan.*
B.K.Lal: *Samkalin Paschatya Darshan.*
Laxmi Saxena: *Samkalin Darshan.*
Jagdish Sahay Shrivastav: *Paschatya Darshan ke parmukh Darshnik Parvartiyan.*
John Macquarrie: *Existentialism.*
H.J. Blackham: *Six Existentialist Thinkers*.
M.K.Bhadra: *A Critical Survey of Phenomenology and Existentialism.*
Martine Heidegger: *Introduction to Metaphysics*.
B.K. Lal: *Contemporary Western Philosophy.*
Yacub Masih: *Contemporary Western Philosophy.*

M.A. Philosophy
Final (Annual)
(w.e.f. Academic Session: 2020 - 21)

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time: 3 Hours

Paper – VII: Yoga as Applied Philosophy
(Group – A: Optional Paper)

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 syllabi and Two Questions from Each Unit, spread all over 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: Philosophy of Yoga: Meaning, Definition, Origin & Development of Yoga. Doctrine of Three Gunas; Prakrti; Purusa.

Unit-2: Citta and its Vritis; Methods of Citta-control; Five kinds of Yama and Niyama; Their Role in Yoga and their Importance in Personal and Social Life; Five types of Kleshas and Stages of Kleshas;Types of Antrayas.

Unit-3: Asanas: Principles of their Practice, Their Kinds and Their Cultural, Physiological and Therapeutic effect. Pranayama: Its various techniques and benefits. Pratyahara; Dharna (Contemplation); Dhayana; Samadhi and its Stages.

Unit-4: Citta-Bhumiyan and Stages of Samapatti and its varieties; How to Built Mental Health (Brahamviharas); Yoga practice for removal of Mental Stress, Tension, Anxiety and Hypertension; Yoga for Elimination of Terrorism; Yoga for our daily behavior; Yoga, War and Peace; Yoga and Modern Education System.

Suggested Books:

K.S.Bashi : Cure Yourself Through Yoga.
Pavan Kumari : Patanjali Yoga Sutra: A Critical Study.
Raghunath Safaya : Indian Psychology.
Ramnath Sharma & Rachana Sharma : Bhartiya Manovijyana.
Sri Ram Chandra Gupta : Yogic Culture and Modern Man- Secrets of Vital Health and Happiness.
Swami Shivapermananda : Step-by-Step Yoga for Stress Relief.
Surender Kumar Sharma : Hathyoga: Ek Atihasik Pripekshya.
Swami Sampurnananda : Yoga-Darshan.
S.P. Atreya : Yoga Psychology.
Swami Vivekananda : Raja Yoga.
Udayavir Shastri : Samkhya Sutra- Kapilmuni.
A.B.Keith (Trans.Shiv Kumar) : Samkhya Darshan ka Itihas.
Shrimad Bhagvad Gita (only chapter 2,3,6 & 12th)
Osho Rajneesh : *Yog Darshan*
Maharishi Patanjli : *Yogsutra*

M.A. Philosophy
Final (Annual)
(w.e.f. Academic Session: 2020 - 21)

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time: 3 Hours

Paper – VIII: Philosophy of Religion
(Group – A: Optional Paper)

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 syllabi and Two Questions from Each Unit, spread all over 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: Definition and Nature of Religion; Definition and Nature of Philosophy of Religion; The Significance of Philosophy of Religion; Relation of Religion with Science, Ethics and Philosophy. Theories of the Origin of Religion. Religious Experience and Religious Consciousness.

Unit-2: Concept and Attributes of God. Arguments for the Existence of God: Ontological Argument, Cosmological Argument and Teleological Argument. Transcendence and Immanence; God and the Absolute; Deism, Theism, Pantheism.

Unit-3: Inter-Religious Dialogue and the Possibility of Universal Religion with Special Reference to Hinduism, Buddhism and Christianity. Theories of Religious Language: Cognitive, Semi-Cognitive Theories.

Unit-4: Secularism; Religious Harmony and Religious Tolerance, Mysticism. God, Man and the World; Brahman, Isvara, Jiva and Jagat. Concept of God in Indian Philosophy.

Suggested Books:

A.Thompson	: *A Modern Philosophy of Religion.*
H.P.Sinha	: *Dharma Darshan ke Ruprekha*.
J.Hick	: *Philosophy of Religion.*
M.Hiriyanna	: *Quest for Perfection.*
N.K.Brahma	: *Philosophy of Hindu Sadhana.*
N. Smart	: *The Religious Experience of Mankind.*
R.Otto	: *The Idea of the Holy.*
Swami Vivekananda	: *Complete Works* (relevant chapters)
W.James	: *Varieties of Religious Experience.*
Yacub Masih	: *Samanya Dharam Darshan.*

M.A. Philosophy
Final (Annual)
(w.e.f. Academic Session: 2020 - 21)

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time: 3 Hours

Paper – IX: Comparative Religion
(Group – A: Optional Paper)

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 syllabi and Two Questions from Each Unit, spread all over 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: Hinduism : Concept of God; Concept of Soul; Theory of World; Law of Karma**;**Rebirth; Liberation and Paths of Liberation. Dr. Schweitzer's views against Hinduism and Dr. S. Radhakrishanan's answer.

Unit-2: Buddhism: Anti-metaphysical Attitude of Buddha; Four Noble-Truths; Theory of No-Soul; Difference between Hinayana and Mahayana Sects. Jainism: Theory of Substance; Concept of Soul; Theory of Bondage and Liberation.

Unit-3: Sikhism: Essential Characteristics of Sikhism, Concept of Akal Purusha, Jivatma and Salvation. Islam: Concept of God (Allah); The Cardinal Principles of Islam; Five Pillars of Islam; Ethical Teachings of Islam.

Unit-4: Christianity: Concept of God; The Nature of the World; Problem of Evil and its Solution; Christianity and the Sermon of the Mount. Zoroastrianism: Concept of God; Problem of Evil and its Solution; Main Characteristics of Zoroastrianism.

Suggested Books:

A.Thompson	:	*A Modern Philosophy of Religion.*
H.P.Sinha	:	*Dharma Darshan ke Ruprekha.*
J.Hick	:	*Philosophy of Religion.*
Kedar Nath Tiwari	:	*Comparative Religion.*
M.Hiriyanna	:	*Quest for Perfection.*
N.K.Brahma	:	*Philosophy of Hindu Sadhana.*
N. Smart	:	*The Religious Experience of Mankind.*
R.Otto	:	*The Idea of the Holy.*
Swami Vivekananda	:	*Complete Works* (relevant chapters)
V.P. Verma	:	*Dharma Darshan ki Mool Samsayayein.*
Vatsyayan	:	*Philosophy of Religion* (World Religions)
W.James	:	*Varieties of Religious Experience.*
Yacub Masih	:	*A Comparative Philosophy of Religion*

M.A. Philosophy
Final (Annual)
(w.e.f. Academic Session: 2020 - 21)

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time: 3 Hours

Paper – X: Philosophical teachings of Shrimadbhagvad-Gita
(Group – A: Optional Paper)

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 syllabi and Two Questions from Each Unit, spread all over 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 Srimad Bhagvadgita and its background**;** Meaning and secret behind name of Gita,'s Chapters(1-9), Meaning and secret behind name of Gita's Chapter (10-18); Gitopadesha According to various commentator; Concept of Karmayoga in 'Gita Rahasya'of B.G.Tilak; Gita Darshan of Osho(Face, not Escape).

Unit-2 Concept of Ishwra; Concept of Atma; Concept of Prakriti; Concept of Moksha; Concept of Nishkama and Sakama Karma in Gita; Nature of Yajyarth Karma.
.

Unit-3 Nature and Doctrine of Swadharma and Paradharma; Concept of Sattva, Rajas and Tamas. Concept of Sthitprajya; Concept of Karma, Akrama and Vikarma; Philosophy of Karma-Jyana-Bhakti, Philosophy of Yoga.

Unit-4 Concept of Loksangraha, Concept of Four Varna; Ethical Values in Gita: Daivi Sampad and Asuri Sampad; Ideal Man of Gita; Concept of Visvadharma in Gita; Concept of Dharma, Dharmayudh and Dharmakshetra.

Suggested Books :
1. Osho, Gita Darshna (Vol. 1-8)
2. Shri Aurbindo,. Essays on Gita
3. Swami Ramsukhdass, Gita Sadhaksanjivani Tika
4. Shankaracharya, Gita Bhasya
5. Ramanujacharya, Gita Bhasya
6. Swami Prabhupada, Gita Yatharupa
7. Swami Chinmayananda, Gita Bhasya
8. Swami Adgadananda, Yatharth Gita
9. Radharkrishna, Gita
10. Acharya Shilak Ram, Gita Rashtra Bhasya

Department of Philosophy
Kurukshetra University Kurukshetra

Scheme, Syllabi 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: 2019-20

Scheme of Examination for Diploma in Yoga

Paper No	Nomenclature of the Paper	Theory	Internal Assessment	Max. Marks	Time Allowed	Examination w.e.f.	
I	Yoga: Bahiranga Yoga	80	20	100	3:00 Hrs	April/ May, 2020	
II	Yoga : Antaranga Yoga	80	20	100	3:00 Hrs	April/ May, 2020	
III	Practical	Practical copy Exam-25 Marks	Practical - 50 Marks Viva-Voce-25 Marks	100	----	As per schedule notified by Course Coordinator	

EVERY CANDIDATE IS REQUIRED TO COMPLETE ONE MONTH TRAINING PROGRAMME OF YOGA AND SUBMIT A CERTIFICATE TO BE ISSUED BY THE CONCEREND INSTITUTE/COLLEGE/DEPARTMENT/UNIVERSITY/SOCIETY/TRUST ETC.

(Prof. R.K.Deswal)

Professor& Chairman

Department of Philosophy,

Kurukshetra University,

Kurukshetra.

DIPLOMA IN YOGA
Paper No. I Yoga: Bahiranga Yoga
(w.e.f 2019-20)

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 Questions from Each Unit, spread over all the concerned units, 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   Yoga: Meaning, Definition, History, Development, Literature and Doctrine of Yoga; Chitta, Chitta Vrittiyan, Chitta Bhumiyan, Chitta Vrittiniroda and Antrayas of Yoga; Kinds of yoga: Astangyoga, Jyanyoga, Karmyoga,Bhaktiyoga, Hathyoga, Layayoga, Mantrayoga and Tantrayoga; Misconceptions about Yoga and their solutions. Essential factors about yogic practices: Diet, Dress, Discipline, Prayerfulness', Place, Bathing, Time, Fragrance.

Unit-2   Introduction to human body and its systems: Definition of Anatomy, Physiology and their functions; Respiratory system; Digestive system; Endocrine system; Blood circulation system; Nervous system.

Unit-3   **Yama:** Meaning, Definition, Kinds, and its Benefits; **Niyama:** Meaning, Definition, Kinds, and its Benefits in behavior; **Asana:** Meaning, Definition, Kinds, and its benefits ; **Pranayama:** Meaning, Definition, Kinds, and its benefits ; **Pratyahara:** Meaning, Definition, Kinds, and its Benefits ; 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 Hathyoga; **Kundalini** Yoga; Ten vayus, Ten Nadis and Ten indriyas.

Suggested Books :
1. *Asana Pranayama*, Dr. Devvarta Acharya.
2. *Bahirangayoga*, Swami Yogeshewarananda.
3. *Yog Chikitsa*, Kuvalyananda.
4. *Asana Pranayama* Mudra Bandha, Bihar school of yoga.
5. *Kundalini Yoga*, Bihar school of yoga.
6. *Bachho Ke Liye Yoga Shiksha*, Bihar school of yoga.
7. *Pran Pranayama Pranvidhya*, Bihar school of yoga.
8. *Rog Aur Yog*, Bihar school of yoga.
9. *Ayurvediya Kriya Shrir*, Vaidhya Ranjit Rai Dasie.
10. *Yog: Samanya Prichya*, Acharya Shilak Ram.
11. *Kundlini Yoga,* M. P. Pandit.
12. *Pranayama,* Ranjit Sen Gupta.

DIPLOMA IN YOGA
Paper No. II Yoga : Antaranga Yoga
(w.e.f 2019-20)

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 Questions from Each Unit, spread over all the concerned units, 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 and Abhayantric; Nasagra dharna, Bhrumadhya Dharna, Jyoti Dharna, Murti Dharna, Bindu Dharna, Tara Dharna, Chadarma Dharna, Bhrumadhya Prakash Dharna, Shwas-Prashwas Dharna, Brahmand Dharna, Omkar Dharna, Dharna and Hypnotism; Benifits of Dharna.

Unit-2 Dhyana : Meaning, Definition and Kinds of Dhyana; Concept of Dhyata-Dhyan–Dhyeya; Ekagarta and Dhyana; Yognidra and Jada Samadhi; Guru and Shaktipata; Dhyana and Swami Dayananda; Dhyana and Swami Vivekananda; Dhyana and J. Krishnamurti, Osho and Shri Ram Sharma; Benefits of Dhyana in various fields of life.

Unit-3 Samadhi : Meaning, Definition and Kinds of Samadhi; Three types of Tapas : Adhyatmik, Adhidevik and Adhibhotik; Samadhipada 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 : Kriyayoga- Technique of Patanjali; Pran-Apan Gati-Technique of Gita; Vipassyana 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 *Vijjayanabhairavtantra*; 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 vidyodyabhasya*, Acharya Udayavir
5. *Yog Sadhna*, Shri Anandmurti
6. *Yog Darshanam*, Hariharananda Arnaya
7. *Sanatna Bhartiya Yog Sadhana Evam Uski Vividh Dhyan Vidhiyan*, Acharya Shilak Ram
8. *Goraksha Padhti*, Gorkshanath
9. *Atma Vijyan*, Swami Yogeshwarananda
10. *Yog Visheshank*, Gita Press
11. *Yog: Samnya Prichya*
12. *Gherand Samhinta*, Maharashi Gherand
13. *Tantra Sutra* (vol.1-6), Osho.
14. *Vedon Mein Yogvidhya*, Swami Divyananda
15. *Yoga Psychology*, Shri Anandamurti

DIPLOMA IN YOGA
Paper No. III Practical
(w.e.f 2019-20)

Practical – 50 Marks
Practical Copy – 25 Marks
Viva-Voce-25 Marks
Total – 100 Marks

Asanas:

Sukhasana
Sidhasana
Padmasana
Kamlasana
Vajrasana
Virasana
Gomukhasana
Yogasana
Gorakshasana
Pawanmuktasana
Chakrasana
Sashtang Dandvatasana
Mayurasana
Salbhasana
Kandhrasana
Makrasana
Markatasana
Sarpasana
Dhanurasana
Nokasana
Halasana
Karnpidasana
Sakndh Sanchalanasana
Ekpadasana
Mandukasana
Kukkutasana
Ustrarasana
Padprasaran Sarwang Tulasana
Vistritpadhastsparshasana
Suptvajrasana
Tulasana
Uthithhastpadprasarasana
Dwihastktichakrasana
Griwa Chakrasana
Pravatasana
Trikonasana
Tadasana
Katichakrasana
Sarwangasana
Shirshasana
Girvachaksana
Surya Namaskar

B.   Selected Pranayamas

Patanjali : Bahyavritti, Abhyantaravrtti, Stambhvritti, Bahyabhyantara,Vishyakshepi.
Hathyoga: Ujjayee, Bhastrika, Bhramari, Sheetlee, Suryabhedi.
Traditional   :   Nadishudhi,   Anulom-Vilom,   Purak-Rechak,   Triband   Rechak,
                Kapalbhati.

C.   Selected Kriyas:
        Jalneti
        Sutraneti
        Tratka
        Agnisara
        Kapalbhati
D.   Selected Mudras:
        Mahamudra
        Mahabandha Mudra
        Mahavedha Mudra
        Vajroli Mudra
        Asvini Mudra
E.   Bandhas:
        Mool Bandha
        Jalandhar Bandha
        Uddiyan Bandha

Scheme & syllabi
for
Diploma in Yoga and Applied Philosophy (One Year)
w.e.f from the Academic Session: 2019-2020.
Scheme of Examination

Paper No.	Nomenclature of the Papers	Internal Assessment Marks	Theory Marks	Max. Marks	Time Allow ed
DYAP-101	Yoga: Bahirangyoga	20	80	100	3 Hrs.
DYAP-102	Yoga : Antarangyoga	20	80	100	3 Hrs.
DYAP-103	Yoga: Hathyoga	20	80	100	3 Hrs.
DYAP-104	Applied Philosophy	20	80	100	3 Hrs.
DYAP-105	Practical	Practical Copy-25 Marks	Practical- 50 Marks Viva-voce-25 Marks	100	_

Prof. R.K. Deswal
Professor & Chairman
Department of philosophy
K.U. Kurukshetra

Yoga: Bahirangyoga
(w.e.f. 2019-20)

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Max. Marks : 100
Theory : 80 Marks
Int. Assessment : 20Marks
Time : 3 Hrs.

</div>

PAPER NO. : DYAP – 101

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 Questions from Each Unit, spread over all the concerned units, 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   Yoga: Meaning, Definition and Origin; Philosophy of Yoga; Psychology of Yoga; Kinds of Yoga: Ashtang Yoga, Hathyoga, Jyanayoga, Karmyoga and Bhaktiyoga.

Unit-II   Essential factors about yoga practice: Place, Posture, Time, Dress, Discipline , Diet, Prayerfulness and Mentality ; Yama (Social Discipline): Meaning, Definition, Kinds and its benefits in social life; Niyama(Personal Discipline): Meaning ,Definition, Kinds and its benefits in personal life.

Unit-III   Asana: Meaning, Definition, Kinds and benefits; Difference between Asana and Exercise; Pranayama: Meaning, Definition,Kinds and its benefits; Difference between Pranayama and Deep breathing.

Unit-IV   Pratyahara: Meaning, Definition, Kinds and its benefits; Difference between Bahirangayoga and Antrangayoga. Kriyayoga in Astangyoga; Theory of Chittnirodh and Ekagrata.

Suggested Books :
1. *Asana Pranayama*, Dr. Devvarta Acharya.
2. *Bahirangayoga*, Swami Yogeshewarananda.
3. *Yog Chikitsa*, Kuvalyananda.
4. *Asana Pranayama Mudra Bandha*, Bihar School of Yoga.
5. *Kundalini Yoga,* Bihar School of Yoga.
6. *Bachho Ke Liye Yoga Shiksha*, Bihar School of Yoga.
7. *Pran Pranayama Pranvidhya*, Bihar School of Yoga.
8. *Rog Aur Yog,* Bihar School of Yoga.
9. *Ayurvediya Kriya Sharir*, Vaidhya Ranjit Rai Dasai.
10. *Yog: Samanya Prichya*, Acharya Shilak Ram.
11. *Kundlini Yoga*, M. P. Pandit.
12. *Pranayama,* Ranjit Sen Gupta.

Yoga: Antarangyoga

(w.e.f. 2019-20)

PAPER NO. : DYAP – 102

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 Questions from Each Unit, spread all over the concerned units, 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   **Dharna**: Meaning, Definition and Kinds of Dharna; Method and Practice of Dharna; Benefits of Dharna; Antrayas:Meaning, Definition, Kinds and their Nivritti in Yoga.

Unit-II   **Dhyana**: Meaning ,Definition,Kinds and Method of Dhyana;Concept of Dhyata, Dhyana and Dhyeya; Dhyana and Ekagrata;Various techniques of Dhyana: Pranva dhyana(Yogsutra), Vippasana Dhyana(Goenka), Dynamic Dhyana(Osho), Awareness Dhyana(J.Krishnamurti).

Unit-III   **Samadhi**: Meaning,Definition and Kinds of Samadhi; Chittnivrittinirodh Upaya:Abhayas and Vairagya; Concept of Sadhanpada in *Yogasutra* of Patanjali; Theory of Chaturvyuha of Patanjali and Four Noble Truths of Buddha.

Unit-IV   Siddhies and Vibhuties in Yogsutra of Patanjali; Life and Contribution of Contemporary Yogis:Yogananda,Osho and Swami Yogeshwarananda; Yoga for Physical health; Yoga for Mental health.

Suggested Books :
1.   *Yog Darshna* (Vol. 1-4),Osho
2.   *Yog Pradeep*, Swami Omananda Thirtha
3.   *Yog darshana*, Swami Adgadananda
4.   *Yogsutra vidyodyabhasya*, Acharya Udayavir
5.   *Yog Sadhna*, Shri Anandmurti
6.   *Yog Darshanam*, Hariharananda Arnaya
7.   *Sanatna Bhartiya Yog Sadhana Evam Uski Vividh Dhyan Vidhiyan*, Acharya Shilak Ram
8.   *Goraksha Padhti*, Gorkshanath
9.   *Atma Vijyan,* Swami Yogeshwarananda
10.   *Yog Visheshank,* Gita Press
11.   *Yog: Samnya Prichaya,* Acharya Shilak Ram.
12.   *Gherand Samhinta*, Maharashi Gherand
13.   *Tantra Sutra* (vol.1-6), Osho.
14.   *Vedon Mein Yogvidhya*, Swami Divyananda
15.   *Yoga Psychology*, Shri Anandamurty

Yoga: Hathyoga
(w.e.f.2019-20)

PAPER NO. : DYAP – 103

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 Questions from Each Unit, spread all over the concerned units, 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   Hathyoga: Meaning ,Definition, Aims and Objectives ; Discipline and Precautions for Practice of Hathyoga; Hathyoga literature;Relevance of Hathyoga in daily life.

Unit-II   Do's and Don'ts in Hathyoga; Yama and Niyama in Hathyoga; Concepts of Asanas in *Hathyoga Pradipika* and *Gherand Samhita*; Meaning , Definition, Objectives and Classification of Pranayama in *Hathyoga Pradipika* and *Gherand Samhita.*

Unit-III   Shodhan Kriyas in Hathyoga and their techniques ,benefits and precautions; Classification of Bandha in Hathyoga; Concept of Mudras; Concept of Chakras in *Shadchakranirupanam.*

Unit-IV- Concept of Dharna in *Vijjyanbhairav* ; Concept of Pratyahara,Dhyana and Samadhi in Hathyoga ;Concept of Kundalini in Hathyoga.

Suggested Books :
1.   *Yog Darshna* (Vol. 1-4),Osho
2.   *Yog Pradeep*, Swami Omananda Thirtha
3.   *Yog darshana*, Swami Adgadananda
4.   *Yogsutra Vidyodyabhasya*, Acharya Udayavir
5.   *Yog Sadhna*, Shri Anandmurti
6.   *Yog Darshanam*, Hariharananda Arnaya
7.   *Sanatna Bhartiya Yog Sadhana Evam Uski Vividh Dhyan Vidhiyan*, Acharya Shilak Ram
8.   *Goraksha Padhti*, Gorkshanath
9.   *Atma Vijyan,* Swami Yogeshwarananda
10.   *Visheshank,* Gita Press,Gorakhpur
11.   *Yog: Samnya Prichaya,* Acharya Shilak *Ram*
12.   *Gherand Samhinta*, Maharashi Gherand
13.   *Tantra Sutra (*vol.1-6), Osho.
14.   *Vedon Mein Yogvidhya*, Swami Divyananda
15.   *Yoga Psychology*, Shri Anandamurti

Applied Philosophy
(w.e.f.2019-20)

PAPER NO. : DYAP – 104

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 Questions from Each Unit, spread all over the concerned units, 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, Definition and Nature of Philosophy; Meaning , Definition and Nature of Applied Philosophy; Yoga as Applied Philosophy; Importance of Applied Philosophy in Contemporary times.

Unit-II   Sadharna Dharma, Tri-ratna, Brahmvihara, Purusartha Chatustya.

Unit-III   Business Ethics ; Euthanasia; Capital Punishment and Human Rights. Medical Ethics; Gender Equality .

Unit-IV   Environmental Ethics: Environmental Degradation and Global Warming ; Anthropocentrism; Gaia Principal ; Afforestation; Sustainable Development.

Suggested Reading

1. *Anupryukt Darshanshastra,* Vijaykant Dubye.
2. *Anupryukt Nitishastra*, V.P.Verma.
3. *Nitishastra*, V.P.Verma.
4. *Anupryukt Darshanshastra avam Nitishastra ke Aayam*, J.Shankar and A.D.Sharma.
5. *Bhartiya Nitishastra*, Ram Nath Sharma.
6. *Paschatya Nitishastra*, Ram Nath Sharma.

Paper No. V- Practical
(w.e.f 2019-20)

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Practical – 50 Marks
Practical Copy – 25 Marks
Viva-Voce-25 Marks
Total – 100 Marks

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Asanas:

Sukhasana
Sidhasana
Padmasana
Kamlasana
Vajrasana
Virasana
Gomukhasana
Yogasana
Gorakshasana
Pawanmuktasana
Chakrasana
Sashtang Dandvatasana
Mayurasana
Salbhasana
Kandhrasana
Makrasana
Markatasana
Sarpasana
Dhanurasana
Nokasana
Halasana
Karnpidasana
Sakndh Sanchalanasana
Ekpadasana
Mandukasana
Kukkutasana
Ustrarasana
Padprasaran Sarwang Tulasana
Vistritpadhastsparshasana
Suptvajrasana
Tulasana
Uthithhastpadprasarasana
Dwihastktichakrasana
Griwa Chakrasana
Pravatasana
Trikonasana
Tadasana
Katichakrasana

Sarwangasana
Shirshasana
Girvachakrasana
Surya Namaskar

B.   Selected Pranayamas

Patanjali : Bahyavritti, Abhyantaravritti, Stambhvritti, Bahyabhyantara Vishyakshepi.
Hathyoga: Ujjayee, Bhastrika, Bhramari, Sheetlee, Suryabhedi.
Traditional : Nadishudhi, Anulom-Vilom, Purak-Rechak, Triband Rechak, Kapalbhati.

C.   Selected Kriyas:
Jalneti
Sutraneti
Tratka
Agnisara
Kapalbhati

D.   Selected Mudras:
Mahamudra
Mahabandha Mudra
Mahavedha Mudra
Vajroli Mudra
Asvini Mudra

E.   Bandhas:
Mool Bandha
Jalandhar Bandha
Uddiyan Bandha

SCHEME OF B.COM III (SPECIALTY PROGRAMMES)
(5th Semester w.e.f. the Session 2019-20)

BANKING & INSURANCE

Time: 3 Hours
Max. Marks: 100(80+20)
External: 80, Internal:20

Paper No.	Bachelor of Commerce (Banking & Insurance)
BC-501	Cost Accounting
BC-504	Income Tax-I
BC(BI)-503	Insurance Management-I
BC(BI)-504	Commercial Bank Management-I
BC(BI)-505	Merchant Banking and Financial Services-I
BC(BI)-506	Fundamentals of Insurance-I
BC(BI)-507	Indian Banking System-I
BC(BI)-508(i)	*Training Report**(See Note 3)**
BC(BI)-508(ii)	Viva-Voce (General)**(See Note 3)**

Notes:

1. Max. Marks for each paper are 80+20 = 100 i.e. Theory=80, InternalAssessment=20

2. *Training Report carries a maximum of 50 marks and the marks for Viva-Voce (General) shall be given out of a maximum 50 marks.

3. No Training report BC(BI)-508(i) and viva-voce General BC(BI)-508(ii) in 5thSemester of B.Com.III (Specially Programme). Rest of the Exam. Semester will remain same for 5th& 6th Semesters.

Semester-V
BC-501
COST ACCOUNTING

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: nature and scope of cost accounting; cost concepts & classification; methods & techniques.

Materials: material planning &purchasing, pricing of material issue; treatment of material losses, material & inventory control: concept and techniques.

Labour: labour cost control procedure; labour turnover; Idle time and overtime; Methods of wage payment: time and piece rate; incentive schemes.

Overheads: classification, allocation, apportionment and absorption of overheads; under and over- absorption.

Methods of costing: unit costing; job costing; contract costing; process costing (process losses, valuation of work in progress, joint and by-products) service costing (only transport).

Standard costing and variance analysis: material and labour.

Cost control and cost reduction; cost audit; an overview of cost audit standards.

REFERENCES

- Arora, M.N. Cost Accounting – Principles and Practice, Vikas Publishing House, New Delhi.
- Jain, S.P. and K.L. Narang. Cost Accounting: Principles and Methods, Kalyani Publishers, Jalandhar.
- Lal, Jawahar. Cost Accounting, Tata McGraw Hill Publishing Co., New Delhi.
- Maheshwari, S.N. and S.N. Mittal. Cost Accounting: Theory and Problems, Shri Mahabir Book Depot, New Delhi.
- Mittal, D.K. and Luv Mittal. Cost Accounting. Galgotia Publishing Co., New Delhi.
- Nigam, B.M. Lall and I.C. Jain. Cost Accounting: Principles and Practice, Prentice Hall of India, New Delhi.
- Shukla, M.C., T.S. Grewal and M.P. Gupta. Cost Accounting: Text and Problems, S. Chand & Co. Ltd., New Delhi.

Semester-V
BC-504
INCOME TAX-I

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, 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, residence and tax liability, income which does not form part of total 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.

REFERENCES

- 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.

Semester-V
BC(BI)-503-Insurance Management-I

Time: 3 Hours
Max. Marks: 80
Internal Assessment: 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Introduction: Savings and investment schemes like shares, units, capital markets, mutual funds, etc. vis-a-vis insurance; Tax benefits under insurance policies; Life cycle needs-including solutions, matching of the customers needs and requirements to available products;

Unit-II : Comparison between different products offered vis-a-vis chargeable premium and coverage. Computation of Premium/Bonuses: Premium calculation-including rebates, mode rebate, large-sum assured policies rebate; Extra premium; Under premiums; Computation of benefits; Surrender value; Paid-up value.

Unit-III: Insurance Documents: Insurance documents, including proposal forms and other relevant forms; First premium receipt/ renewal premium receipt; Policy contract; Endorsements; Renewal notice/bonus notices; other insurance documents related toreceipt.

Suggested Readings

1. Mishra M.N.: Insurance Principles and Practice; S. Chand & Co., NewDelhi.
2. Insurance Regulatory Development Act 1999 and other relevantActs.
3. Life Insurance Corporation Act1956.
4. Gupta O.S.: Life Insurance; Frank Brothers, NewDelhi.
5. Vinayakam N., Radhaswamy and Vasudevan SV; Insurance Principles and Practice, S. Chand & Co.; NewDelhi.
6. Mishra M.N., Life Insurance Corporation of India, Vols I, II & III; Raj Books,Jaipur.

Semester-V
BC(BI)-504-Commercial Bank Management-I

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Principles of Banking: Definition of bank; Creation of money; Present structure of commercial banking system in India; Brief history; Functions; Working during 1947-1990 and thereafter.

Unit-II: Management Principles in Banks: Managerial functions in banks; Hierarchy, individual and group behaviour; Management of personnel -Functions of manager, inspector, local advisory committee; Recruitment; Selection; Training; Promotion; Control of staff.

Unit-III: Management of Deposits and Advances: Deposit mobilization; Classification and nature of deposit accounts; Advances; Lending practices; Types of advances; Principles of sound bank lending; Preparation of reports; Credit plans; Planning customers; Limits of credit; security.

Suggested Readings
1. Tandan ML: Banking -Law and Practice in India; lndian Law House, NewDelhi.
2. Radhaswami M. and Basudevan A: Textbook of Banking; S. Chand & Co. NewDelhi.
3. Panikar K.K: Banking -Theory & System: So Chand & Co. NewDelhi.
4. Vinayakan N: Banking by 2000 A.D; Kanishka Publishers,Delhi.
5. Jessup P.F: Innovations in BankManagement.
6. Reed E.W: Commercial BankManagement.
7. Desai Vasant: Principles of BankManagement.
8. Khubchandan B.S.: Practice and Law of Banking; Macmillan, NewDelhi.

Semester-V
BC(BI)-505-Merchant Banking and Financial Services-I

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I : Merchant Banking: Functions; Scope; Merchant banking in India; SEBI guidelines for merchant bankers.
Role of Merchant Bankers in Fund Raising: Managing public issue; Public issue programme; Alternative to public issue; Private placement; Raising public deposits.

Unit-II: Credit Rating: Introduction; Instruments; Benefits; Rating methodology; Cautions;;Types of rating.
Project Appraisal: Project life cycle; Evaluation; Social cost benefit analysis; Capital cost and financial projections.

Unit-III: Long Term Finance & Working Capital Finance: Term loans; Working capital loans; Maximum permissible bank finance; Factoring and forfaiting.
Lease Financing and Decisions: Concept; Types of leases; Leasing decisions; Evaluation of leases.

Suggested Readings

1. Khan M.Y. & Jain P.K: Financial Management; Text and Problems, Tata McGraw Hill, NewDelhi.
2. Pandey I.M: Financial Management; Vikas Publishing House, NewDelhi.
3. Verma J.C: A Manual of Merchant Banking; Sharat Law House, New Delhi.,
4: Pahwa H.P.S; Project Financing: Bharat Law House, NewDelhi.
5. Khan M.Y: Financial Services; Tata McGraw Hill. New Delhi.
6: Rustagi R.P: Financial Managemenl- Theory Concepts and Problems - Incorporating the Emerging Trends in Capital Market; Galgotia, New Delhi.
7. Machiraju H.R: Merchant Banking Principles and Practice; New Age International, NewDelhi.
8. Pezzullo Mary Ann: Marketing Financial Services; Macmillan, NewDelhi.
9. Merrill Mary P.: Financial Planning in the Bank; Macmillan, NewDelhi.
10. Gupta Shashi K. Financial Services, Kalyani Publishers, NewDelhi.

Semester-V
BC(BI)-506-Fundamentals of Insurance-I

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Introduction to Insurance: Purpose and need of insurance; Insurance as a social security tool; Insurance and economic development. Fundamentals of Agency Law: Definition of an agent; Agents regulations; Insurance intermediaries; Agents compensation.

Unit-II: Procedure for Becoming an Agent: Pre-requisite for obtaining a license; Duration of license; Cancellation of license; Revocation or suspension/termination of agent appointment; Code of conduct; Unfair practices.

Unit-III: Functions of the Agent: Proposal form and other forms for grant of cover; Financial and medical underwriting; Material information.

Suggested Readings

1. Mishra M.N.: Insurance Principles and Practices; S. Chand and Co, NewDelhi.
2. Insurance Regulatory Development Act1999.
3. Life Insurance Corporation Act1956.
4. Gupta OS: Life Insurance; Frank Brothers, NewDelhi.
5. Vinayakam N., Radhaswamy and Vasudevan SV; Insurance- Principles and practice, S. Chand and Co., NewDelhi.
6. Mishra MN: Life Insurance Corporation of India, Vols I, II & III; Raj Books,Jaipur.

Semester-V
BC(BI)-507-Indian Banking System-I

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Indian Banking System: Structure and organization of banks; Reserve Bank of India; Apex banking institutions; Commercial banks; Regional rural banks; Co-operative banks.

Unit-II: Development banks, Banking Sector Reforms, State Bank of India: Brief history; Objectives; Functions; Structure and organizations; Working and progress.

Unit-III: Banking Regulation Act, 1949: History; Social control; Banking Regulation Act as applicable to banking companies and public sector banks.

Suggestion Readings

1. Basu A.K: Fundamentals of Banking-Theory and Practice; A. Mukheljee and Co.,Calcutta.
2. Sayers R.S: Modern Banking; Oxford UniversityPress.
3. Panandikar S.G. and Mithani D.M: Banking in India; OrientLongman.
4. Reserve Bank of India: Functions andWorking.
5. Dekock: Central Banking; Crosby Lockwood Staples,London.
6. Tennan M.L: Banking -Law and Practice in India; India Law House, NewDelhi.
7. Khubchandani B.S.: Practice and Law of Banking; Macmillan, NewDelhi.
8. Shekhar and Shekhar: Banking Theory and Practice; Vikas Publishing House, NewDelhi.

SCHEME OF B.COM III (SPECIALTY PROGRAMMES)
(5th Semester w.e.f. the Session 2019-20)

E-COMMERCE

Time: 3 Hours
Max. Marks: 100(80+20)
External: 80, Internal:20

Paper No.	Bachelor of Commerce (E-Commerce)
BC-501	Cost Accounting
BC-504	Income Tax-I
BC(EC)-503	Fundamentals of M-Commerce-I
BC(EC)-504	Principles of E-Marketing-I
BC(EC)-505	Essentials of E-Commerce-I
BC(EC)-506	Management Accounting
BC(EC)-507	Internet & World Wide Web-I
BC(EC)-508(i)	*Training Report**(See Note 4)**
BC(EC)-508(ii)	Viva-Voce (General)**(See Note 4)**

Notes:

1. Max. Marks for each paper are 80+20 = 100 i.e. Theory=80, InternalAssessment=20

2. *Training Report carries a maximum of 50 marks and the marks for Viva-Voce (General) shall be given out of a maximum 50 marks.

3. For Subject Internet & World Wide Web* of B.Com. (E-Commerce) Theory: 50 Marks, Practical: 30 Marks, Internal Assessment: 20 Marks.

4. No Training report BC(BI)-508(i) and viva-voce General BC(BI)-508(ii) in 5thSemester of B.Com.III (Specially Programme). Rest of the Exam. Semester will remain same for 5th& 6th Semesters.

Semester-V
BC-501
COST ACCOUNTING

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: nature and scope of cost accounting; cost concepts & classification; methods & techniques.

Materials: material planning &purchasing, pricing of material issue; treatment of material losses, material & inventory control: concept and techniques.

Labour: labour cost control procedure; labour turnover; Idle time and overtime; Methods of wage payment: time and piece rate; incentive schemes.

Overheads: classification, allocation, apportionment and absorption of overheads; under and over- absorption.

Methods of costing: unit costing; job costing; contract costing; process costing (process losses, valuation of work in progress, joint and by-products) service costing (only transport).

Standard costing and variance analysis: material and labour.

Cost control and cost reduction; cost audit; an overview of cost audit standards.

REFERENCES

- Arora, M.N. Cost Accounting – Principles and Practice, Vikas Publishing House, New Delhi.
- Jain, S.P. and K.L. Narang. Cost Accounting: Principles and Methods, Kalyani Publishers, Jalandhar.
- Lal, Jawahar. Cost Accounting, Tata McGraw Hill Publishing Co., New Delhi.
- Maheshwari, S.N. and S.N. Mittal. Cost Accounting: Theory and Problems, Shri Mahabir Book Depot, New Delhi.
- Mittal, D.K. and Luv Mittal. Cost Accounting. Galgotia Publishing Co., New Delhi.
- Nigam, B.M. Lall and I.C. Jain. Cost Accounting: Principles and Practice, Prentice Hall of India, New Delhi.
- Shukla, M.C., T.S. Grewal and M.P. Gupta. Cost Accounting: Text and Problems, S. Chand & Co. Ltd., New Delhi.

Semester-V
BC-504
INCOME TAX-I

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, 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, residence and tax liability, income which does not form part of total 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.

REFERENCES

- 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.

SEMESTER-V
BC(EC)-503: Fundamentals of M-Commerce-I

Max Marks:80
Internal Assessment:20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I
Introduction to E-Commerce: Concept of WAP, Mobile computing framework, Technological foundation of WAP: wireless delivery technology & switching method, mobile data internetworking standards: CDMA, TDMA, mobile information access devices

Unit-II
WAP vs. e-commerce, WAP vs. traditional business operations, global growth projections,

Unit-III
M-Commerce operations: In banking, stock market, trading and shopping, current and emerging issues in m-commerce,

REFERENCES:

1. AgarwalaKamlesh N. and AgarwalaPrateek: WAP the Net: An introduction to Wireless Application Protocol; Macmillan India Ltd. NewDelhi
2. AgarwalaKamlesh N. and AgarwalaPrateek: M-Commerce; Macmillan India Ltd. NewDelhi
3. Daman Andy: The Essential Guide to Wireless Communication Applications ; Pearson Education Asia (Low PriceEdition)
4. Schiller Jochen: Mobile Communication ; Addison-Wesley(Low PriceEdition)

SEMESTER-V
BC(EC)-504-Principles of E-marketing-I

Max Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I
Introduction: Nature and scope of marketing; Importance of marketing-as a business function, and in the economy; Traditional marketing concept; Concept of E-marketing; E- marketing environment.

Unit-II
Consumer behavior and market segmentation: Consumer behaviour-Nature,Concept;Importance;Major factors affecting consumer behavior; Market segmentation-concept and importance; bases for market segmentation.

Unit-III
Building Traffic: Promotion-Online promotion on the web site, listing on search engine; banners; link exchange programmed; affiliate programmed; referral programmed; directory listing; Building trust branding;navigation;presentation;fulfillment;logos of security; up-to-date technology; Building loyalty.

REFERENCES
1. AgarwalaKamlesh N.,AgarwalaPrateek and AgarwalaDeeksha:e-CRM;Macmillan India Ltd,NewDelhi.
2. Kotler Philip:Marketing Management;Prentice Hall,NewDelhi.
3. Pride William M. and Ferrel O.C: Marketing;Houghton-MiffinBoston.
4. Staton W.J.,Etzel Michael J.,andWalker BruceJ.;Fundamentals of marketing;McGraw Hill,NewDelhi.
5. Lamb Charles W.,Hair Joseph F., AND McDaniel Carl:Principles of Marketing,South-Westren-Publishing;Cincinnati,Ohio.
6. Cundiff,EdwardW.and Still R.R:Basic Marketing-Concepts,Decision and Strategies;PrenticeHall,NewDelhi.
7. Cravens David W.,Hills Gerald E,Woodruff RobertB.:Marketing Management;Homewood,III,RichardD.Irwin.
8. Kotler and Armstrong:Principles of Marketing; Prentice-Hall of India,NewDelhi.

SEMESTER-V
BC(EC)-505: ESSENTIALS OF E-COMMERCE-I

Max Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I
Introduction to E - commerce: Business operations, E – commerce practices; concepts of b2c, c2c, g2h, g2c; Features of E – commerce. Type of E – commerce systems, elements of E – commerce, principles of E – commerce, benefits and limitations of E – commerce, management issues relating to E – commerce

Operations of E – commerce: credit card transaction; secure hypertext transfer protocol (SHTP), electronic payment systems, secure electronic transaction (SET); Set's encryption process; cyber e-cash, smart cards, Indian paymentmodels.

Unit-II
Emerging Business models: Retail model, media model, advisory model, made-to-order manufacturing model, do-it-yourself model, information service model, emerging hybrid models, emerging models inIndia.

Unit-III
Applications in B2C: Key technologies for b2b, architectural models for b2b, characteristics of the supplier – oriented marketplace, buyer oriented marketplace and intermediary – oriented marketplace, just in time delivery in b2b, internet based EDI from traditional EDI, marketing issues in b2b.

REFERENCES:
1. AgarwalaKamlesh N. and AgarwalaDeeksha:Bridge to online Storefront:Macmillan India, New Delhi
2. AgarwalaKamlesh N. and AgarwalaDeeksha: Business on the Net-Introduction to the E- commerce;Macmillan India NewDelhi
3. AgarwalaKamlesh N. and AgarwalaDeeksha: Bulls, Bears and The Mouse: An Introduction to Online Stock Market Treadind; Macmillan India NewDelhi
4. Tiwari Dr. Murli D.; Education and E-Governance; Macmillan India NewDelhi
5. Minoli Daniel, Minoli Emma: Web Commerce Technology Handbook; Tata McGrew Hill New Delhi
6. MinoliDaniel:Internet& Intranet Engineering; Tata McGrew Hill NewDelhi
7. BhatnagarSubhash and Schware Robert (Eds); Information and Communication Technology in Development; Sage Publication India, NewDelhi
8. Amor, Daniel: E-business (r) evaluation, The: Living and Working in an Interconnected World; Prentice Hall US
9. Afuah, A, and Tucci, C: Internet Business Models and Strategies; McGrew Hill, NewYork
10. AgarwalaKamlesh N.: Internet Banking ; Macmillan India NewDelhi

Semester - V
BC(EC)-506- Management Accounting

Max Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper. The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

UNIT - I

Management Accounting: Meaning, Nature, Scope & Functions of Management Accounting, Role of Management Accounting in decision making, Management Accounting vs. Financial Accounting, Tools & Techniques of Management Accounting.

Ratio analysis, classification of ratios, profitability ratios, turnover ratios, liquidity ratios, adv. of ratio analysis limitation of accounting ratios.

UNIT - II

Fund flow statement as per Indian Accounting Standard 3, cash flow statement.

UNIT - III

Interim financial reporting & segment reporting, social reporting accounting & reporting of the effects of changing prices.

SEMESTER-V
BC(EC)-507: Internet and World Wide Web-I

Max Marks: 50
Practical: 30
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of two (02) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I
The mechanism of internet: Distributed computing, Client server computing, Internet Protocol suite, protocol stack, Open System Interconnection Reference Model (OSIRM) Based on the International Organization for Standardization (ISO) (Application layer, Presentation layer, Session layer, Transport layer, Network layer, data link layer and Physical layer); TCP/IP protocol suitemodel

Unit-II
Mechanism of transmitting the message, across the network and function of Each layer, processing of data at the destination, Mechanism to log onto the Network, Mechanism of sending & receiving email. Internet enabled services: Electronic mail (email), Usenet & use group, File Transfer Protocol (FTP), Telnet, Finger, Internet Chat (IRC), Frequently Asked Questions(FAQ)

Unit-III
The World Wide Web consortium (w3c-origin & evolution), Standardizing the Web, W3C members, W3C recommendations, Browsing & Searching, Browsing & Information Retrieval, Exploring the World Wide Web, Architecture of World Wide Web, Hyperlink, Hypertext Markup language, Hypertext Transfer Protocol,Address-URL

REFERENCES:

1. AgarwalaKamlesh.Nand AgarwalaDeeksha:Bridge to the onlinestorefront;Macmillan India New Delhi
2. AgarwalaKamlesh.N andAgarwalaDeeksha:FatalClick:Whattodo When Viruses size your computer; Macmillan India NewDelhi
3. Philips Lee Anne:Practical HTML 4;Prentice Hall NewDelhi
4. Douglas E. Comer:The Internet Book; Prentice Hall NewDelhi
5. MinoliDaniel,MinoliEmma:Web Commerce Technology Handbook;Tata McGraw Hill New Delhi
6. Minoli Daniel:Internet & Intranet Engineering;Tata McGraw Hill NewDelhi
7. Deitel Harvey M. and Deitel Paul J. and NeitoT.R;Complete Internet and World wide web Programming Training Coarse, Prentice Hall NewDelhi
8. Complete Reference of HTML/XHTML by ThomasA.Powell
9. Hemant Kapilla:Data Comm. &Networking

SCHEME OF B.COM III (SPECIALTY PROGRAMMES)
(B.Com. 6th Semester w.e.f. the Session 2019-20)

BANKING & INSURANCE

Time: 3 Hours
Max. Marks: 100(80+20)
External: 80, Internal:20

Paper No.	Bachelor of Commerce (Banking & Insurance)
BC-601	Management Accounting
BC-604	Income Tax-II
BC(BI)-603	Insurance Management-II
BC(BI)-604	Commercial Bank Management-II
BC(BI)-605	Merchant Banking and Financial Services-II
BC(BI)-606	Fundamentals of Insurance-II
BC(BI)-607	Indian Banking System-II
BC(BI)-608(i)	*Training Report**(See Note 3)**
BC(BI)-608(ii)	Viva-Voce (General)**(See Note 3)**

Notes:

1. Max. Marks for each paper are 80+20 = 100 i.e. Theory=80, InternalAssessment=20

2. *Training Report carries a maximum of 50 marks and the marks for Viva-Voce (General) shall be given out of a maximum 50 marks.

3. No Training report BC(BI)-508(i) and viva-voce General BC(BI)-508(ii) in 5th Semester of B.Com.III (Specially Programme). Rest of the Exam. Semester will remain same for 5th&6thSemesters.

Semester-VI
BC-601
MANAGEMENT ACCOUNTING

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.

Management accounting: concept, scope, techniques and significance, comparison between financial accounting, cost accounting and management accounting.

Management reporting: need and type of reports.

Management information system.

Analysis of financial statements: comparative statements, common size statements, ratio analysis: liquidity, solvency, profitability and turnover; trend analysis.

Cash flow and funds flow statements: need and method of preparing statements.

Absorption V/S variable costing: features and income determination, cost volume profit analysis, break-even analysis, contribution; P/V ratio, break-even point, Margin of safety, Angle of incidence, determination of cost indifference point.

Budgeting and budgetary control: need, methods and types of budgets, essentials of budgetary control system.

REFERENCES

- Drury, Colin. Management and Cost Accounting, Thomson Learning.
- Garrison H., Ray and Eric W. Noreen. Managerial Accounting, McGraw Hill.
- H.V. Jhamb, Management Accounting, ANE Books Pvt. Ltd. New Delhi.
- Horngreen, Charles T., Gary L. Sundem. Introduction to Management Accounting, Prentice Hall.
- Horngreen, Charles T., George Foster and Srikant M. Dattar. Cost Accounting, A Managerial Emphasis, Prentice Hall of India Ltd., New Delhi.
- Jain, S.P. and K.L. Narang. Cost Accounting: Principles and Methods, Kalyani Publishers, Jalandhar.
- Khan, M.Y. and P.K. Jain. Management Accounting, Tata McGraw Hill, Publishing Co., New Delhi.
- Lal, Jawahar. Advanced Management Accounting Text and Cases. S. Chand & Co., New Delhi.
- Lal, Jawahar. Cost Accounting, Tata McGraw Hill Publishing Co., New Delhi.
- Singh, S. K. and Gupta Lovleen. Management Accounting – Theory and Practice. Pinnacle Publishing House.

Semester-VI
BC-604
INCOME TAX-II

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.**

Deductions under section 80C to 80U in computing total income.

Computation of total income and tax liability of an individual and H.U.F.

Computation of total income and tax liability of a Firm.

Deduction of tax at source; advance payment of tax.

Income tax authorities and their powers.

Procedure for assessment; different types of returns.

Procedure of filing e-return and revised return.

Recovery and refund of tax.

Penalties and prosecutions; appeals and revision.

REFERENCES

- 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, Sahitya Bhawan Publications, Agra.
- Prasad, Bhagwati, Income Tax Law & Practice, Wishwan Prakashan, Bhopal.
- Singhania V.K., Student's Guide to Income Tax, Taxmann Publications Pvt. Ltd., New Delhi.

Semester-VI
BC(BI)-603-Insurance Management-II

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Life Insurance Products: Traditional Unit Linked Policies; Individual and Group Policies; with-profit and without-profit polices; Different types of insurance products-Whole life products, interest sensitive products, term- assurance annuities, Endowment; Assurance. Options and Guarantees.

Unit-II: Group Insurance and Pension Plans, Health Related insurance, Consumer Protection Act 1986, Income Tax Act.

UNIT-III: Married Women's Property Act, and Contract Act as relevant to the conduct of Insurance business.

Suggested Readings

1. Mishra M.N.: Insurance Principles and Practice; S. Chand & Co., NewDelhi.
2. Insurance Regulatory Development Act 1999 and other relevantActs.
3. Life Insurance Corporation Act1956.
4. Gupta O.S.: Life Insurance; Frank Brothers, NewDelhi.
5. Vinayakam N., Radhaswamy and Vasudevan SV; Insurance Principles and Practice, S. Chand & Co.; NewDelhi.
6. Mishra M.N., Life Insurance Corporation of India, Vols I, II & III; Raj Books,Jaipur.

Semester-VI
BC(BI)-604-Commercial Bank Management-II

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Investment Management: Nature of bank investment; Liquidity and profitability Preparation of cheques; Bills; Endorsement; Government securities;

Unit-II: Documents of title to goods: railway-receipt; Bill of lading; Book debts; Securities - Government and commercial.

Unit-III: Management of Finance: Bank accounts; Records; Reports; Statement of advances; Evaluation of loan applications; Profit and lossaccount;
Balance sheet and statutory reports regarding cash revenue.

Suggested Readings

1. Tandan ML: Banking -Law and Practice in India; Indian Law House, NewDelhi.
2. Radhaswami M. and Basudevan A: Textbook of Banking; S. Chand & Co. NewDelhi.
3. Panikar K.K: Banking -Theory & System: So Chand & Co. NewDelhi.
4. Vinayakan N: Banking by 2000 A.D; Kanishka Publishers,Delhi.
5. Jessup P.F: Innovations in BankManagement.
6. Reed E.W: Commercial BankManagement.
7. Desai Vasant: Principles of BankManagement.
8. Khubchandan B.S.: Practice and Law of Banking; Macmillan, NewDelhi.

Semester-VI
BC(BI)-605-Merchant Banking and Financial Services-II

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Mutual Funds: Introduction; Classification; Mutual funds in India.
Portfolio management- introduction, principles, steps, qualifications, and obligations; Responsibilities of portfolio manager.

Unit-II: Venture capital -introduction, scope, steps to provide venture capital, mode of funding.
Mergers and Acquisitions: Need, types of mergers; Financial, legal and human considerations in mergers and acquisitions; Effectiveness of mergers and acquisitions.

Unit-III: Depository and Custodial Services: Depository -introduction, concept, constitution of depository system; Functioning of depository system; Depository system in India; Custodial services -meaning; Registration; Obligations and responsibilities of custodians; Code of conduct.

Suggested Readings

1. Khan M.Y. & Jain P.K: Financial Management; Text and Problems, Tata McGraw Hill, NewDelhi.
2. Pandey I.M: Financial Management; Vikas Publishing House, NewDelhi.
3. Verma J.C: A Manual of Merchant Banking; Sharat Law House, New Delhi.,
4: Pahwa H.P.S; Project Financing: Bharat Law House, NewDelhi.
5. Khan M.Y: Financial Services; Tata McGraw Hill. New Delhi.
6: Rustagi R.P: Financial Managemenl- Theory Concepts and Problems - Incorporating the Emerging Trends in Capital Market; Galgotia, New Delhi.
7. Machiraju H.R: Merchant Banking Principles and Practice; New Age International, NewDelhi.
8. Pezzullo Mary Ann: Marketing Financial Services; Macmillan, NewDelhi.
9. Merrill Mary P.: Financial Planning in the Bank; Macmillan, NewDelhi.
10. Gupta Shashi K. Financial Services, Kalyani Publishers, NewDelhi.

Semester-VI
BC(BI)-606-Fundamentals of Insurance-II

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Nomination and assignment; Procedure regarding settlement of policy claims.

Company Profile: Organizational set-up of the company. Promotion strategy; Market share; Important activities; Structure; Product.

Unit-II: Actuarial profession; Product pricing-actuarial aspects; Distribution channels.

Fundamentals/Principles of Life Insurance/ Marine /Fire/Medical /General Insurance: Contracts of Various kinds; Insurable Interest.

Unit-III: Insurance Act 1938, LIC Act 1956, Insurance Regulatory & Development Authority Act 1999, Ombudsman Scheme.

Suggested Readings

1. Mishra M.N.: Insurance Principles and Practices; S. Chand and Co, NewDelhi.
2. Insurance Regulatory Development Act1999.
3. Life Insurance Corporation Act1956.
4. Gupta OS: Life Insurance; Frank Brothers, NewDelhi.
5. Vinayakam N., Radhaswamy and Vasudevan SV; Insurance- Principles and practice, S. Chand and Co., NewDelhi.
6. Mishra MN: Life Insurance Corporation of India, Vols I, II & III; Raj Books,Jaipur.

Semester-VI

BC(BI)-607-Indian Banking System-II

Time: 3 Hours
Max. Marks : 80
Internal Assessment : 20

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I: Banking Regulation Act as applicable to Co-operative banks. Regional Rural and Co-operative Banks in India: Functions; Role of regional rural and cooperative banks in rural India; Progress and performance.

Unit-II: Reserve Bank of India: Objectives; Organization; Functions and Working;

Unit-III: Monetary policy; Credit control measures and their effectiveness. Indian Banking System vis-a- vis British and American Banking System.

Suggestion Readings

1. Basu A.K: Fundamentals of Banking-Theory and Practice; A. Mukheljee and Co.,Calcutta.
2. Sayers R.S: Modern Banking; Oxford UniversityPress.
3. Panandikar S.G. and Mithani D.M: Banking in India; OrientLongman.
4. Reserve Bank of India: Functions andWorking.
5. Dekock: Central Banking; Crosby Lockwood Staples,London.
6. Tennan M.L: Banking -Law and Practice in India; India Law House, NewDelhi.
7. Khubchandani B.S.: Practice and Law of Banking; Macmillan, NewDelhi.
8. Shekhar and Shekhar: Banking Theory and Practice; Vikas Publishing House, NewDelhi.

SCHEME OF B.COM III (SPECIALTY PROGRAMMES)
(6th Semester w.e.f. the Session 2019-20)

E-COMMERCE

Time: 3 Hours
Max. Marks: 100(80+20)
External: 80, Internal:20

Paper No.	Bachelor of Commerce (E-Commerce)
BC-601	Management Accounting
BC-604	Income Tax-II
BC(EC)-603	Fundamentals of M-Commerce-II
BC(EC)-604	Principles of E-Marketing-II
BC(EC)-605	Essentials of E-Commerce-II
BC(EC)-606	Management Accounting
BC(EC)-607	Internet & World Wide Web-II
BC(EC)-608(i)	*Training Report**(See Note 4)**
BC(EC)-608(ii)	Viva-Voce (General)**(See Note 4)**

Notes:

1. Max. Marks for each paper are 80+20 = 100 i.e. Theory=80, InternalAssessment=20

2. *Training Report carries a maximum of 50 marks and the marks for Viva-Voce (General) shall be given out of a maximum 50 marks.

3. For Subject Internet & World Wide Web* of B.Com. (E-Commerce) Theory: 50 Marks, Practical: 30 Marks, Internal Assessment: 20 Marks.

4. No Training report BC(BI)-508(i) and viva-voce General BC(BI)-508(ii) in 5th Semester of B.Com.III (Specially Programme). Rest of the Exam. Semester will remain same for 5th&6thSemesters.

Semester-VI
BC-601
MANAGEMENT ACCOUNTING

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.

Management accounting: concept, scope, techniques and significance, comparison between financial accounting, cost accounting and management accounting.

Management reporting: need and type of reports.

Management information system.

Analysis of financial statements: comparative statements, common size statements, ratio analysis: liquidity, solvency, profitability and turnover; trend analysis.

Cash flow and funds flow statements: need and method of preparing statements.

Absorption V/S variable costing: features and income determination, cost volume profit analysis, break-even analysis, contribution; P/V ratio, break-even point, Margin of safety, Angle of incidence, determination of cost indifference point.

Budgeting and budgetary control: need, methods and types of budgets, essentials of budgetary control system.

REFERENCES

- Drury, Colin. Management and Cost Accounting, Thomson Learning.
- Garrison H., Ray and Eric W. Noreen. Managerial Accounting, McGraw Hill.
- H.V. Jhamb, Management Accounting, ANE Books Pvt. Ltd. New Delhi.
- Horngreen, Charles T., Gary L. Sundem. Introduction to Management Accounting, Prentice Hall.
- Horngreen, Charles T., George Foster and Srikant M. Dattar. Cost Accounting, A Managerial Emphasis, Prentice Hall of India Ltd., New Delhi.
- Jain, S.P. and K.L. Narang. Cost Accounting: Principles and Methods, Kalyani Publishers, Jalandhar.
- Khan, M.Y. and P.K. Jain. Management Accounting, Tata McGraw Hill, Publishing Co., New Delhi.
- Lal, Jawahar. Advanced Management Accounting Text and Cases. S. Chand & Co., New Delhi.
- Lal, Jawahar. Cost Accounting, Tata McGraw Hill Publishing Co., New Delhi.
- Singh, S. K. and Gupta Lovleen. Management Accounting – Theory and Practice. Pinnacle Publishing House.

Semester-VI
BC-604
INCOME TAX-II

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.**

Deductions under section 80C to 80U in computing total income.

Computation of total income and tax liability of an individual and H.U.F.

Computation of total income and tax liability of a Firm.

Deduction of tax at source; advance payment of tax.

Income tax authorities and their powers.

Procedure for assessment; different types of returns.

Procedure of filing e-return and revised return.

Recovery and refund of tax.

Penalties and prosecutions; appeals and revision.

REFERENCES

- 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, Sahitya Bhawan Publications, Agra.
- Prasad, Bhagwati, Income Tax Law & Practice, Wishwan Prakashan, Bhopal.
- Singhania V.K., Student's Guide to Income Tax, Taxmann Publications Pvt. Ltd., New Delhi.

SEMESTER-VI
BC(EC)-603-Fundamentals of M-Commerce-II

Max Marks:80
Internal Assessment:20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I

Application in wireless internet environment, location based application, independent application, business application, advantages of m-commerce

Unit-II

Security issues in m-commerce, wireless internet environment and WAP environment, security of data during transmission at WAP gateway or proxy server

Unit-III

Types of security threats, security tools, and legal protection to m-commerce.

REFERENCES:

1. Agarwala Kamlesh N. and Agarwala Prateek: WAP the Net:An introduction to Wireless Application Protocol; Macmillan India Ltd. NewDelhi
2. Agarwala Kamlesh N. and Agarwala Prateek: M-Commerce; Macmillan India Ltd. NewDelhi
3. Daman Andy: The Essential Guide to Wireless Communication Applications; Pearson Education Asia (Low PriceEdition)
4. Schiller Jochen: Mobile Communication; Addison-Wesley(Low PriceEdition)

SEMESTER-VI
BC(EC)-604: Principles of E-marketing-II

Max Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I
Product: Concept of product; products owing existence to the Net –e-mail; electronic greetings; chat software; consumer goods and industrial goods; product life cycle; product planning and development; packaging-role of functions;E-branfing.

Unit-II
e-CRM(e-customer relationship management): e-CRM-concept and role; organization structure for e-CRM; key technology; components of e-CRM; change management and e- CRM

Unit-III

Customer service: order fulfillment- concept of customer service in web environment; order fulfillment; customer care programs; pre- sale and post-sale customer service; customer redressal policy; privacy and confidentiality of customer information.

REFERENCES

1. Agarwala Kamlesh N.,Agarwala Prateek and Agarwala Deeksha:e-CRM;Macmillan India Ltd,NewDelhi.
2. Kotler Philip:Marketing Management;Prentice Hall,NewDelhi.
3. Pride William M. and Ferrel O.C:Marketing;Houghton-MiffinBoston.
4. Staton W.J.,Etzel Michael J.,andWalker BruceJ.;Fundamentals of marketing;McGraw Hill,NewDelhi.
5. Lamb Charles W.,Hair Joseph F., AND McDaniel Carl:Principles of Marketing,South- Western-Publishing;Cincinnati,Ohio.
6. Cundiff,EdwardW.andStillR.R:BasicMarketing-Concepts,Decisionand Strategies;PrenticeHall,NewDelhi.
7. CravensDavidW.,Hills GeraldE,WoodruffRobertB.:Marketing Management;Homewood, II,RichardD.Irwin.
8. Kotler and Armstrong:Principles of Marketing;Prentice-Hall ofIndia,NewDelhi.

SEMESTER-VI
BC(EC)-605: ESSENTIALS OF E-COMMERCE-II

Max Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

Unit-I
Applications in B2C: Consumer's shopping procedure on the internet, impact on disintermediation and re-intermediation, global market, strategy of traditional department store, products in b2c models, success factors of e-brokers, broker-based service online; online travel tourism services

Unit-II
Applications in governance: EDI in governance; E-government, E-Governance applications of Internet; concept of government-to-business, business-to-governance and citizen-to-governance, e-governance models, private sector interface in e-governance

Unit-III
Benefits and impact of e-commerce on travel industry, real estate market, online stock trading and its benefits, implementation and impacts
Internet & E-commerce scenario in India; Internet security issues; Legal aspects of E- commerce.

REFERENCES:

1. Agarwala Kamlesh N. and Agarwala Deeksha:Bridge to online Storefront:Macmillan India, NewDelhi
2. Agarwala Kamlesh N. and Agarwala Deeksha: Business on the Net-Introduction to the E- commerce;Macmillan India NewDelhi
3. Agarwala Kamlesh N. and Agarwala Deeksha: Bulls, Bears and The Mouse: An Introduction to Online Stock Market Treadind; Macmillan India NewDelhi
4. Tiwari Dr. Murli D.; Education and E-Governance; Macmillan India NewDelhi
5. Minoli Daniel, Minoli Emma: Web Commerce Technology Handbook; Tata McGrew Hill New Delhi
6. Minoli Daniel:Internet & Intranet Engineering; Tata McGrew Hill NewDelhi
7. Bhatnagar Subhash and Schware Robert (Eds); Information and Communication Technology in Development; Sage Publication India, NewDelhi
8. Amor, Daniel: E-business (r) evaluation, The: Living and Working in an Interconnected World; Prentice HallUS
9. Afuah, A, and Tucci, C: Internet Business Models and Strategies; McGrew Hill, New York
10. Agarwala Kamlesh N.: Internet Banking ; Macmillan India NewDelhi

Semester-VI
BC(EC)-606- Financial Management

Max Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of four (04) marks each is compulsory. Besides, attempt any four questions choosing at least one question from each of the three units.

UNIT - I

Financial Statement: Meaning & types of financial statements, limitations of financial statements, objectives, objectives & methods of financial St. analysis, common size & comparative statementanalysis.

UNIT – II

Reporting & Measurement - Income concepts for financial reporting, Measurement & reporting of revenue & Exp. & Gains & Losses, Measurement of Assets & Liabilities other developments in reporting: disclosure in financial reporting.

UNIT – III

Accounting standards an overview of national & International accounting standards (Excluding study of individual standards).

SEMESTER-VI
BC(EC)-607: Internet and World Wide Web-II

Max Marks: 50
Practical: 30
Internal Assessment: 20
Time: 3 Hours

Note: Nine questions shall be set in the question paper.The candidates will be required to attempt five questions in all. First question comprising of five (05) short questions of two (02) marks each is compulsory. Besides, attempt any four questions (10 Marks each) choosing at least one question from each of the three units.

Unit-I

Web Browsing: Browsers, basic Information of Web Browsers, Browsers with Advanced facility, Internet Explorer, Netscape navigator, Netscape Communicator, Search Engine/ Directories: Directory, General features of the Search engines, Approaches to website selection.

Unit-II

Major search engines, specialized search engines, popular search engines/directories, Guidelines for effective searching, A general approach to searching, Designing website\ webpage, WW operations, Web standards, HTML-concept & version, naming scheme for HTML documents, HTML editors, Explanation of the structure of the Homepage, Elements in HTML Documents, XHTML, CSS, Extensible Stylesheet Language(SXL)

Unit-III

Tips for Designing Web Pages/Security of data/Information Security, Network Security, PINA Factor Privacy, Integrity,Non-reputation,authentication,SSL, Encryption, Digital Signature, Digital Certificate, Server Security, Firewall, Password, Biometrics, Payment Security, Virus Protection,Hacking.

REFERENCES:

1. Agarwala kamlesh.N and Agarwala Deeksha:Bridge to the online store front; Macmillan India NewDelhi
2. Agarwala kamlesh.N and Agarwala Deeksha:Fatal Click:What to do When Viruses size your computer; Macmillan India NewDelhi
3. Philips Lee Anne:Practical HTML 4;Prentice Hall NewDelhi
4. Douglas E. Comer:The Internet Book; Prentice Hall NewDelhi
5. Minoli Daniel,Minoli Emma:Web Commerce Technology Handbook;Tata McGraw Hill New Delhi
6. Minoli Daniel:Internet & Intranet Engineering;Tata McGraw Hill NewDelhi
7. Deitel Harvey M. and Deitel Paul J. and Neito T.R;Complete Internet and World wide web Programming Training Coarse, Prentice Hall NewDelhi
8. Complete Reference of HTML/XHTML by Thomas A.Powell
9. Hemant Kapilla: Data Comm. &Networking

Scheme of Examination
Health and Physical Education

ANNUAL SYSTEM

From Session 2018-2019

(B.A. 1st Year, 2nd Year and 3rd Year)

Year	Theory Marks	Time	Practical Marks	Total	W.E. From Session	Exam to be Conducted
1st Year	70	3 hours	30	100	2018-19	March-2019
2nd Year	70	3 hours	30	100	2019-20	March- 2020
3rd Year	70	3 hours	30	100	2020-21	March- 2021
Total	**210**		**90**	**300**		

B.A. -1st Year
(Health & Physical Education)
(From Session 2018-2019)

Time- 3 hours   Maximum Marks: 70

Instructions for Paper- Setter:

The question paper will consist of five Units I, II, III, IV and V. Units I, II, III & IV will have two questions from their respective Units of the Syllabus and will carry 12.5 marks each. Unit Vth will consists of 10 short answer type questions, which will cover the entire syllabus and will carry 2 marks for each question.

Instructions for Candidates

Candidates are required to attempt one question each from Unit I, II, III and IV. Unit - V is compulsory for all.

Unit - 1: Introduction to Physical Education and Health Education
1. Meaning, Aim, Objectives and Scope of Physical Education.
2. Definition, Aim, Objectives and Scope of Health Education
3. Relationship of Physical Education with General Education
4. First Aid: Meaning, Aim, Objectives and General Principles of First Aid.
5. First Aid for Common injuries - Bleeding, Burns, Electric Shock, Drowning and Snake Bite
6. Misconceptions regarding Physical Education

Unit- II: Health and Historical Prospects of Physical Education
1. Meaning, definition and importance of Health.
2. Factors influencing Health.
3. Pre-independence and Post – independence historical development of Physical Education in India.
4. Role of IOA, SAI, NSNIS and YMCA in the development of Physical Education and Sports in India.
5. Sports Policy of Haryana State and National Sports Policy

Unit- III: Introduction to Yoga and fitness
1. Yoga - Meaning, Concept and Historical development
2. Types and Importance of Yoga
3. Pranayam - Meaning, types and their benefits.
4. Meaning, definition and importance Physical Fitness
5. Components and Principles of Physical Fitness
6. Factors influencing of Physical Fitness.

Unit- IV: Introduction to Human Anatomy and Physiology
1. Meaning and definition of Human Anatomy and Physiology
2. Definition of Cell, Tissue, Organ and System
3. Structure and Properties of Cell
4. Anatomy, Types and Function of bones in Human Body
5. Meaning and types of joints in Human Body.
6. Types of synovial joints in Human Body

Text Books and References

- Singh Ajmer et.al. "Modern Text Book of Physical Education, Health and Sports", Kalyani Publishers, Ludhiana,(2010).
- Sharma, V.K, "Health & Physical Education" Saraswati House Pvt. Ltd . Daryagani, New Delhi. (2013).
- Kang G.S. Deol N.S. "An introduction to Health and Physical Education 21st century" Patiala (2008).
- Singh Ajmer et. al. "Olympic Movement" Kalyani Publishers, Ludhiana, (2000).
- Sharma, V.K., '' Yog Shiksha'' Saraswati House Pvt.Ltd. Daryaganj, New Delhi (2011)
- Kamlesh & Sangral, "Principles & History of Physical Education", Parkash Brothers, Ludhiana.(2000)
- Avelin C. Pearce., "Anatomy and Physiology for Nurses"Oxford University Press.New Delhi, (2003).   .
- Iyengar, B.K.S. "Light on life" Oxford, Pan Macmillan Ltd. (2005).
- Iyengar, B.K.S. "The Tree of Yoga" New Delhi, Harper Collins. (2009).
- Verma, K.K., "Health & Physical Education" Parkash Brothers, Ludhiana.(2005).

B.A. – 1ˢᵗ Year (Practical)
(Health & Physical Education)
(From Session 2018-2019)

Maximum Marks- 30

1. Any one game   **10 Marks**
   (With ground specifications, general rules and general skills)
      (i)   kho - kho   (ii)   Badminton   (iii) Cricket

2. Name and identification of bones in Human Body   **5 Marks**

3. Athletics: **(5+5) Marks**
   (i) Shot Put (Measurements & Basic Techniques)
   (ii)Types of Starts - Crouch Start and standing starts (Basic Technique)

4. Viva – Voce and Practical File   **5 Marks**

B.A. -2nd Year
(Health & Physical Education)
(From Session 2019-2020)

Time- 3 hours   **Maximum Marks: 70**

Instructions for Paper- Setter:

The question paper will consist of five Units I, II, III, IV and V. Units I, II, III & IV will have two questions from their respective Units of the Syllabus and will carry 12.5 marks each. Unit Vth will consists of 10 short answer type questions, which will cover the entire syllabus and will carry 2 marks for each question**.**

Instructions for Candidates

Candidates are required to attempt one question each from Unit I, II, III and IV. Unit - V is compulsory for all.

Unit- 1 Concept of Safety Education, Warming Up and Cooling Down
1. Meaning, need and importance of Safety Education
2. Principles for prevention of sports Injuries.
3. General treatment for common sports injuries i.e Abrasion, Contusion, Sprain , Strain, Fracture and Dislocation of joints
4. Meaning, types and significance of warming up and cooling down
5. Methods of warming up and cooling down.
6. Physiological aspects of warming up and cooling down

Unit –II Common Diseases and Concept of Balanced Diet
1. Meaning of Communicable and Non – Communicable diseases
2. Modes of transmission, prevention and control of communicable diseases.
3. Common diseases: HIV/ AIDS, Hepatitis, Dengue, Typhoid, Malaria and Influenza.
4. Balanced Diet: Meaning and importance
5. Components of balanced diet and their sources
6. Factors affecting balanced diet and Harmful effects of Junk Food

Unit –III Cardiovascular and Respiratory System
1. Cardiovascular System: Structure and Functioning of Heart
2. Types of Circulation: Systemic and Pulmonary
3. Effects of exercise on Cardiovascular System.
4. Structure and Physiology of Respiratory Organs
5. Effect of exercise on respiratory System
6. Terminology of respiration: Tidal Volume, Residual Volume and Total Lung Capacity.

Unit –IV Psychological aspects of Physical Education and Major Sports Events
1. Meaning of Psychology and sports Psychology
2. Need and importance of sports psychology
3. Learning: meaning, laws and Learning curve
4. Ancient and Modern Olympic Games
5. Asian Games and   Commonwealth Games.

Text Books and References:

- H.H. Clark & D.H. Clark: Development and adopted physical education, Englewood cliffs, New Jersey, Prentice Hall, 1987.
- Mathews D.K. & Fox D.K "The Physiological basis of Physical Education and Sprots, 2nd .Philadelphia. K .B. Sanuders & Co., (1996).
- Sharma, V.K, "Health & Physical Education" Saraswati House Pvt. Ltd. Daryagani, New Delhi. (2013).
- Kang G.S. Deol N.S. "An introduction to Health and Physical Education 21st century" Patiala (2008).
- Singh, Ajmer et. Al.'' Olympic Movement"Kalyani Publishers, Ludhiana, (2000).
- Kamlesh & Sangral, "Principles & History of Physical Education", Parkash Brothers, Ludhiana (2000).
- Mangal, S.K.,"Psychology for Physical Education" Parkash Brothers, Ludhiana (2008).
- Kamlesh & Sangral,'' Methods in Physical Education" Parkash Brothers, Ludhiana (2007).
- Jensen Fisher:9 "Scientific Basis of Athletic Conditioning" Philadelphia, Lee and Febiger (1975).

B.A. – 2nd Year (Practical)
(Health & Physical Education)
(From Session 2019-2020)

Maximum Marks- 30

1. **Any one Game of the following:**   **10 Marks**

   (With ground specifications, general rules and general skills)

   (i) Basketball   (ii) Foot ball   (iii) Kabaddi

2. **Measurement of Body Mass Index**   **5 Marks**

   (Normal Range of B.M.I for Children, Women and Men)

3. **Athletics:**   **5 Marks**
   Discus throw and Long Jump
   (Specifications, general rules and general skills)

4. **Viva – Voce and Practical File**   **10 Marks**

B.A. – 3rd Year
(Health & Physical Education)
(From Session 2020-2021)

Time- 3 hours   **Maximum Marks: 70**

Instructions for Paper- Setter:

The question paper will consist of five Units I, II, III, IV and V. Units I, II, III & IV will have two questions from their respective Units of the Syllabus and will carry 12.5 marks each. Unit Vth will consists of 10 short answer type questions, which will cover the entire syllabus and will carry 2 marks for each question**.**

Instructions for Candidates

Candidates are required to attempt one question each from Unit I, II, III, IV and V is compulsory for all.

Unit -I   Concept of Motivation, Socialization, Growth and Development
1. Meaning and definition of motivation.
2. Types of motivation and importance of motivation in sports.
3. Meaning of Socialization and Socialization through sports.
4. Effect of social behavior on performance of sports person
5. Meaning and definition of Growth and Development
6. Stages and principles of Growth and Development.

Unit – II   Concept of Posture, Organization and Administration
1. Meaning of posture and importance of good posture
2. Causes of poor posture
3. Symptoms, causes and remedies of Postural Deformities: Lordosis, Kyphosis, Scoliosis, Flat Feet, Knock Knee and Bow Legs.
4. Meaning and importance of organization and administration in Physical Education and Sports
5. Principles of sports organization and administration
6. Tournaments and their types (League and Knock out)

Unit-III   Digestive and Muscular System
1. Digestive System: Organs and Structure
2. Mechanism of food digestion
3. Effects of exercise on Digestive System.
4. Gross Anatomy of muscle, Types of Muscles in human body
5. Effects of exercise on Muscular System
6. Composition of Human Blood and its functions.

Unit- IV   Concept of Sports Biomechanics, Sports Training and Doping
1. Meaning and definition of sports training
2. Types of sports training: Circuit training, Interval Training and Continuous Training
3. Doping: Meaning, types and its effects on health.
4. Sports biomechanics: Meaning, definition and Importance of Biomechanics in Sports
5. Newton's Laws of motion and their application in sports
6. Lever: Meaning, types and their application in Sports

Text Books and References

- Kamlesh & Sangral, "Principles & History of Physical Education", Parkash Brothers, Ludhiana. (2000).
- Bucher Olsen and Willgoose "The Foundation of Health" Prentice Hall inc.Englewood Fliffs,New Jersey,(1976).
- Turner S and Smith "School Health and Health Education" The C.V. Mos by Company St.Loius (1961).
- Singh Ajmer et.al. "Modern Text Book of Physical Education, Health and Sports", Kalyani Publishers, Ludhiana (2010).
- Avelin C. Pearce., "Anatomy and Physiology for Nurses"Oxford University Press. New Delhi (2003). .
- Verma K.K., "Health & Physical Education" Parkash Brothers, Ludhiana (2005).

- Mathews D.K. & Fox D.K "The Physiological basis of Physical Education and Sprots, 2nd .Philadelphia.K.B.Sanuders & Co., (1996).
- Sharma, V.K, "Health & Physical Education" Saraswati House Pvt. Ltd. Daryagani, New Delhi. (2013).
- Kang G.S. Deol N.S. "An introduction to Health and Physical Education 21st century" Patiala (2008).
- Singh Ajmer et. al. "Olympic Movement" Kalyani Publishers, Ludhiana, (2000).

B.A. – 3rd Year (Practical)
(Health & Physical Education)
(From Session 2020-2021)

Maximum Marks- 30

1. **Any one Game of the following**   **10 Marks**

   (Ground Specifications, General rules and General Skill)

   (i) Volleyball (ii) Hockey (iii) Judo/Boxing/Wrestling/Self-defense tactics

2. **Pranayam:**   **5 Marks**

   (i) Bhramari   (ii) Anulom Vilom   c) Kapal Bhati

3. **Tying of different types of Bandages and Arm Slings and First Aid**   **5 Marks**

   (First aid for different injuries and circumstances, items of First aid box and their uses)

4. **Viva – Voce and Practical file**   **10 Marks**

Note:- Examination scheme and syllabus of B. A. (Annual System) from the session 2018-2019 is finalized in the Staff Council meeting held on 22.08.2019 and same will be approved by U. G. Board of Studies meeting which will be held on 30.08.2019.

B.Sc.(Printing & Packaging Technology)

Scheme of Examination

and

Syllabus

Duration: Three Year

Eligibility: 10+2 in any stream

w.e.f. Academic Session 2019-20

Institute of Mass Communication and Media Technology

Kurukshetra University, Kurukshetra

B.Sc. (Printing & Packaging Technology)

Scheme of Examination

w.e.f. Academic Session 2019-20

1st Semester		Th	P/FW	IA	T	Time
BPPT-101	Printing Process	50	30	20	100	3 Hours
BPPT-102	Typography	50	30	20	100	3 Hours
BPPT-103	Fundamental of Packaging	50	30	20	100	3 Hours
BPPT-104	Communicative English	80	-	20	100	3 Hours
BPPT-105	Fundamentals of Computer	50	30	20	100	3 Hours
2nd Semester						
BPPT-201	Sheet fed Offset Technology	50	30	20	100	3 Hours
BPPT-202	Screen Printing	50	30	20	100	3 Hours
BPPT-203	Printing and Packaging Materials	50	30	20	100	3 Hours
BPPT-204	Graphic Design	50	30	20	100	3 Hours
BPPT-205	Communicative Hindi	80	-	20	100	3 Hours
	*Environmental Studies	75	25	-	100	3 Hours

Note:

Abberivation of some points:-

Th- Theory, P- Practical, FW- Field Work, IA- Internal Assesment, T- Total

*   Environment studies paper is a qualifying paper which is compulsory for all the students of the UG courseandthe same will be conducted in the second semester of the course.

(BPPT 101)

PRINTING PROCESS

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 Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3 Hrs. (for theory paper)

UNIT –I
History of printing: Woodblock printing in East Asia, Europe, Movable type printing, printing Press.Characterstics of print medium, Origin of printing processes- Intaglio, Lithography, Offset press, Screen printing, Flexography, Photocopier, Printers, Digital press, Frescography, 3D printing.**Scope of Indian Printing Industry**Brief 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: Electrostatic, Digital and Mini Offset. Specialized printing: Thermography, Die Stamping, Hot foil stamping, Hologram printing. Suitability & limitations and applications of various printing Processes

UNIT –III
Basic operations in printing- Pre press: Basic concepts, Typesetting of text matter, formatting the text pagination and arranging the pictures and graphics, Film outputting of text and visual elements particularlycolor sepration, assembly of film and plate making. Image types: Vector ,Raster images,Image resolution, File formats, File transportation and storage, press: makeready operations and printing and post press operations: Binding and finishing: Cutting, gluing,gathering sewing .

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

PRINTING PROCESS - LAB

LIST OF PRACTICALS

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.

TYPOGRAPHY

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 Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3 Hrs. (for theory paper)

Unit - I

. Typography - definition, concept and scope

Printing type - Two Dimensional 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., 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

TYPOGRAPHY LAB

LIST OF PRACTICALS

1.   Block Lettering & Numbering (Normal Types)..

2.   Four-line Principle (Drawing).

3.   Physical (Features) parts of the type (Structural Diagram).

4.   Fundamental strokes.

5.   Finishing strokes & their identification.

6.   Introduction to various fonts & their drawing characteristics.

BPPT 103

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 Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3 Hrs. (for theory paper)

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. Shelf life, Cushioning Materials Functions and properties. Classifications -: space fillers, resilient cushioning materials, non-resilient cushioning materials.

Unit – II

Carton Production & Innovative Packaging Techniques

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 working and principle. Injection Blow Moulding, Extrusion blow Moulding, Extrusion. Injection Moulding, Compression moulding, Thermo forming. Vacuum forming, Pressure forming, Matched mould forming

Unit – III

Packaging Media:

Boards-types, paper-types. Glass properties, advantages, types, basic approaches to designing a bottle, thermal shock test, pressure test, impact test, density test. Metals - functions, uses. Aluminium foils - Manufacturing of foil, properties, applications, methods of laminating foil to film or paper. . 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

Future Trends:

Futuristic trends in packaging.. Environmental implications of packaging - recycling, 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,

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

FUNDAMENTALS OF PACKAGING (LAB)

LIST OF PRACTICALS

1. Designing and preparation of various flexible packages.
2. Designing and preparation of various rigid packages.
3. Study and operation of various packaging machines.
4. Designing & preparation of various designs of paper bags.
5. Testing of raw materials like wood, paper, plastic.
6. Drop test, Vibration test ,Inclined impact test, Compression test.

BPPT 104

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 Marks: 100,
Theory Marks: 80
Internal Assessment: 20
Time: 3 Hrs. (for theory paper)

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)

REFERENCE BOOKS:

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.

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 Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3 Hrs. (for theory paper)

UNIT – I

INTRODUCTION

Characteristics and Classification of Computers, Evolution of Computers, Computer Generations, Basics Computer Organization: Input Unit, Output Unit, Storage Unit, Arithmetic Logical Unit, Control Unit, Central Processing Unit, The System concept

UNIT – II

PROCESSOR AND MEMORY

Processor, Processor speed, Types of Processor, Main Memory, Capacity, Types of Memory, Cache Memory,Secondary Storage Devices: Magnetic Tapes, Magnetic Disks, Optical Disks, Memory Storage Devices, Mass Storage Devices, Data Backup

UNIT – III

Input Devices: Monitors Keyboard, Mouse, Electronic Pen, Scanners, Electronic Card Reader, CCD Camera, Digital Camera
Output Devices printers, dot matrix, ink jet, laser, Thermal printer,Plotters, , ,Screen Image Projector

UNIT – IV

COMPUTER SOFTWARE: What is Software, Relationship between Hardware and Software, System Software, Application Software, Operating System, Main Functions of an Operating System

DATA COMMUNICATIONS AND COMPUTER NETWORKS

Basic Elements of a Communication System, Data Transmission Modes, Data Transmission Media and Speed, Network Topologies, Network Types, Wireless Networks, Internet Electronic Mail, File Transfer Protocol, Telnet, World Wide Web

Recommended Books :

1.Computer Fundamentals:- Pardeep K Sinha

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FUNDAMENTALS OF COMPUTER LAB

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<u>**LIST OF PRACTICALS**</u>

1.   Introduction to Computer Terminologies.

2.   Use of different Hardware devices.

3.   Word-Processing Softwares.

5.   Softwares used in Printing.

6.   Page set-up with different sizes and margins.

7.   Different kinds of Scanners, their working and uses.

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BPPT 201

SHEET FED OFFSET 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 Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3 Hrs. (for theory paper)

Unit – I

Basic principles in planographic printing:

Offset Printing Process – History, Principle, advantages, limitations, types and their uses. Press configurations. Various Required and auxiliary elements, Requirements and Needs of production room

Unit - II

Infeed unit –

Function of feeding unit, pile table, air blast nozzles, Sucker, separator brushes & fingers. Sheet control devices-conveyor assemblies, conveyor tape, hold down rods, Sheet feeding system, Sheet register- Front lay & Side lay, Sheet detectors

Unit - III

Printing unit

Plate Cylinder- parts of plate cylinder, plate punching & mounting Blanket cylinder- Types of blanket cylinder, Care of blanket, blanket cleaning device. Impression cylinder, Inking system-Introduction, inking rollers, types of inking system, Roller maintenance, dampening system, Introduction. Damping rollers, Types of dampening system, Ingredients of fountain solution, Ph & Conductivity of dampening system, Roller storage, Roller covers

Unit - IV

Delivery unit-

Gripper, Types of gripper, Sheet transfer, Delivery unit components, Anti set-off spray equipment. Extended pile delivery, Continuous pile delivery. Pre make ready, make ready, Sheet control devices.

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, Olusegun Odesina**.

SHEET FED OFFSET TECHNOLOGY LAB

LIST OF PRACTICALS

1. One colour printing.

2. Four colour printing.

3. Study of the various mechanisms.

4. Study of the lubrication system.

5. Setting the feeder, feed board, lays and delivery.

6. Identification of printing faults in the given samples-reasons and remedical actions.

(BPPT 202)

Screen Printing

Total Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3Hrs.(fortheory paper)

UNIT I

Screen Printing Basics: History of Screen Printing, Basic concept, Stencils - Their kinds and methods of preparation. Fabric and frame preparation. Fabric treatment. Screens -multifilament, mono filaments, Selecting mesh material, stretching screen fabric to frame, screen preparation, screen reclamation - Trouble shooting clogged screens. Care and storage of screens. Method of halftone preparation for screen printing.

UNIT -II

Squeegee and Ink considerations :Image transfer - The squeegee, Squeegee considerations, squeegee preparation, hardness categories of squeegee blades, Variety of blade, its shape and application. **Screen ink**-Ink selection, ink preparation. Different types used for different substrates- Poster ink, Enamel, Lacquer inks. Printing on plastic, Ink for printed circuits and Nameplates, Textile inks. .

UNIT –III

Screen Ink drying: Methods Used for Ink drying. Special capabilities of screen printing. Drying Equipment- Drying racks, wicket dryers, Jet dryers, Infrared dryers, Ultraviolet dryers. Flocking process. Key considerations for choosing dryers: Type of ink to be cured, Drayer size, Positioning and production capacity, Venting fumes and moisture, Digital and analog controls.

UNIT IV

Screen Printing Substrates: Introduction, Paper and Paper board, Wood, Textiles, Plastics, Metals, Ceramics and glass. Specialized Areas - Printed circuit boards of screen printing.

Screen printing machines: Their kinds and working principles and methods. High speed production presses, Lever action hand operated presses, semiautomatic presses, automatic presses, Special machine configurations: Screening cylindrical surfaces, cylindrical screens, carousel units.

Recommended Book :

1. Letter Press Printing Part 1, 2, By C.S. Misra

2. Printing Technology By Adams, Faux, Rieber

3. Screen Printing Review By Babett Magee

4. Screen Printing By John Stephens

5. Handbook of Print Media, Heidelberg

Screen Printing Lab

LIST OF PRACTICALS

1. Study of various types of screen materials.

2. Operating of automatic machine.

3. Printing on various substrates - wood, leather, textile, acrylic, metal, paper & paper products, plastics.

4. Screen printing on Irregular Surfaces - Bottles, Ceramics, Glass.

5. Screen printing on printed circuit boards (PCB)

6. Screen Reclamation.

(BPPT 203)

PRINTING & PACKAGING MATERIALS

Total Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3Hrs.(fortheory paper)

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

Metals

Type of metals and characteristics of metals used for type alloys for foundry types, , Physical and chemical properties of aluminum, zinc, copper, nickel, chromium, magnesium in relation to printing applications.

Photographic Materials

Main kinds of films and photographic papers used in graphic orgination Films positives, mainbase, stripping, thickness, right and wrong reading, negatives; paper positive materials. Developers, Reducers, Intensifiers.

Unit - II

Light Sensitive Materials

Various sensitized materials, used and relationship with processes Silver halide emulsions-classification according to speed, contrast and spectral sensitivity.

Paper and Ink

Fibrous and Non-fibrous materials used in paper and board manufacturing. General characteristics and requirements of printing inks formulations pigments, vehicles, varnishes, solvents, agents.

Unit - III

Adhesives

Classes and characteristics of adheisves used in binding and warehouse work and their range of applications selection for specific purpose.

Miscellaneous Materials

rexine, threads, tapes, stitching wire, metal foils and covering materials used for binding and print finishing.

Unit – IV

PACKAGING MATERIALS

GLASS:,: Manufacture, Properties, Applications and Testing

PLASTICS : Polymer Chemistry, Classification of Polymers, Properties, Processing of Plastics, Special Plastics used in packaging and Their applications.

METAL CONTAINERS : Tins, Cans, Formed Containers, Steel Drums.CushioningMechanism, FragilityAssessment, Cushion Design, Testing,

Wooden Container: Textile bags

Recommended Books :-

- Printing Surface Praperation by :-   C. S. Mishra

PRINTING & PACKAGING MATERIALS LAB

LIST OF PRACTICALS

1.   Different samples of paper and thier study.

2.   Different samples of Ink and thier study.

3.   Study of various metals used in printing.

4.   Study of different types of adhesive used in printing.

5.   Study of various types of Plastic and metal containers used in packaging.

BPPT 204

GRAPHIC DESIGN

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 Marks: 100,
Theory Marks: 50,
Practical:30
Internal Assessment: 20
Time: 3Hrs.(fortheory paper)

UNIT –I

INTRODUCTION

Graphic Design, Visual Art, Communication Art, Graphic Art, Components of Graphic Communication, Functions of Graphic Communication

Elements of design: point line, shape, size, tone, value, weight, texture space, etc. Principles of design- balances, proportion, rhythm, unity, contrast.

UNIT –II

Types of Letterforms: Typography- Structure Design and Function, Typefaces, Type families, Function of Type Composition.

Visual Images: Functions, Categories of Visuals, Originals, Visuals on Printed page, Editing of Illustrations

Layout Planning: Thumbnail Sketches, Rough Layout, Comprehensive Layout

UNIT –III

Colour in Design: Introduction, Functions of Colour, Colour Vision. Colour Combination, Colour Schemes, Colour Perspective, Reproduction of Colour: Fake colours, Spot Colours, Process Colours

Copy for Printing: Verbal Copy,Copy Marking, Copy Fitting,Typesetting Proofreading

Visual Copy: Cropping and Scaling,,Sizing and Marking,Reproduction of Illustrations

UNIT –IV

DESKTOP PUBLISHING

Capabilities, Users of Desktop Publishing System,Equipment Required for Desktop Publishing,Features of Some Specific Software Programmes:Corel Draw,Photoshop,PageMaker,QuarkXpress

Design management: Definitions in advertising art, modern art abstract art, applied art, advertising, publicity, public relations, sale promotion, sales manager

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.

GRAPHIC DESIGN LAB

LIST OF PRACTICALS

1.   Introduction to computers, various softwares used for designing purpose – Demonstration (Manipulation of same design)

2.   Logo designing

3.   Color wheel

4.   Designing of visiting card. Letterhead, Envelop, Bill form, Receipt, Invitation card, Posters, Title page of a Book, Magazine Cover page.

BPPT 205

Communicative Hindi

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ENVIRONMENTAL STUDIES

Note: The Examiners will set eight questions The students are required to attempt any five questions. All questions will carry equal marks.

Total Marks: 100,
Theory Marks: 75,
Practical/Field Work:25
Time: 3 Hrs. (for theory paper)

Unit I :

Definations:
The Multidisciplinary nature of environmental studies
Definition, scope and importance.

Need for public awareness.

Unit II :

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 III

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 : IV

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.
- 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.

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.
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

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.

Course: 2
CONTEMPORARY INDIA AND EDUCATION

Max. Marks: 100
Time: 3 Hours (Theory:80,Internal: 20)

NOTE FOR PAPER SETTER
  i.   **Paper setter <u>will</u> set nine questions in all, out of which students will be required to attempt five questions.**
  ii. **Q.No 1 will be compulsory and will carry 16 marks. There will be four short - answer type Questions of 4 marks each to be selected from the entire syllabus.**
  iii. **Two long answer type question will be set from each of the four units, out of which the student will be required to attempt one question from each unit. Long- answer type questions will carry 16 marks each.**

Rationale

The course on "Contemporary India and Education" shall develop a conceptual understanding about issues of diversity, inequality and marginalization in Indian society and the implication for education with analyses of significant policy debates in Indian education.

Learning Outcomes

After the transaction of the course, student teachers will be able to:

- understand emerging societal issues and their implication for education
- understand various provision concerning education in Indian Constitution.
- identify the concerns related to socially disadvantaged segments of the society.
- understand the policies on education before and after independence related to secondary education programmes.
- evaluate the govt. policies in the context of Universalisation of school education.

Course Contents

Unit – I

1.   **Indian Constitution and Status of Education:**

- Equality of opportunities in education: Article 28, 29, 350 and 351 and their issues.
- Education and Fundamental Rights and Duties: Article 14, 15, 16, 21-A,30 and 51A.
- Directive Principles of state policies

2.   **Diversity in Society and Implications for Education:**

- Social diversities based on Castes, Languages, Religions and Regions,.
- Status of Education of Socially disadvantaged segments namely SC, ST, OBC, Women, PWD'S and minorities.
- Right to Education Act 2009: right of children to free and compulsory education

Unit – II

3. **Educational Committees and Commission before independence with special reference to:**
   - Maculay's minutes: Its features and recommendations
   - Adam's Report: features and its recommendations.
   - Woods Despatch of 1854: Recommendations Merits and demerits
   - Basic Scheme of Education 1937: objective, merits and demerits; Concept & need

   of Nai Talim and philosophy of work education and experiential learning for rural reconstruction.

Unit – III

4. **Educational Committees and Commission after independence with special reference to:**
   - Secondary Education Commission (1952-53): objectives and recommendations.
   - Indian Education Commission (1964-66): objectives and recommendations.
   - National policy on Education (1986)): objectives and recommendations
   - Revised National Policy 1992
   - POA: Major features.

Unit – IV

5. **Contemporary Issues in Indian Education**
   - Universalization of school Education and DPEP, MDM, SSA, RMSA and IEDSS
   - Vocationalization of Secondary Education: need and implications.
   - Emotional Integration and international understanding in the context of globalization.
   - Modernization: Concept, merits and demerits.
   - Concept and importance of Road Safety, Road Safety Rules and Regulatons, Traffic Signs, Raod Safety Measures, Legal Mandates of Road Safety,

Practicum/Sessionals

   Any one of the following:

   i. Revisiting educational policies framed for the education of different sections of the society SC/ BC/Minorities/ Women.
   ii. Prepare a report on problems of secondary education.
   iii. Review educational policies for vocational education.
   iv. Review of Policies related to universalization of school education.
   v. Case study of a school on Community Engagement, Conduct & Outcome of SMC meetings.
   vi. Panel Discussion on Gandhi's idea on Education and their relevance in present day context.
   vii. Survey on literacy levels and out of school children in any locality.

KURUKSHETRA UNIVERSITY, KURUKSHETRA

Scheme & Syllabus for Bachelor of Vocation(B.Voc.) in Computer (1st to 6th Semester)

w.e.f

Session 2019-20 in Phased Manner

KURUKSHETRA UNIVERSITY, KURUKSHETRA

Scheme for Bachelor of Vocation(B.Voc.) in Computer w.e.f. 2019-20
(in Phased Manner)

Semester-1

Paper code	Nomenclature	Duration of Exam	External	Internal*	Max Marks	Type	Hours per Semester	Credits
BVC-19-11	Computer Fundamentals	3 Hours	80	20	100	General	60	4
BVC-19-12	Operating Systems-I	3 Hours	80	20	100	General	60	4
BVC-19-13	PC Software	3 Hours	80	20	100	General	60	4
BVC-19-14	Web Designing	3 Hours	80	20	100	Skill	60	4
BVC-19-15	Programming in C	3 Hours	80	20	100	Skill	60	4
BVC-19-16	Practical - PC Software & Web Designing	3 Hours	100	----	100	Skill	75	5
BVC-19-17	Practical - C Language	3 Hours	100	---	100	Skill	75	5

Semester-2

Paper code	Nomenclature	Duration of Exam	External	Internal*	Max Marks	Type	Hours per Semester	Credits
BVC-19-21	Communication Skills & Personality Development	3 Hours	80	20	100	General	60	4
BVC-19-22	Operating Systems-II	3 Hours	80	20	100	General	60	4
BVC-19-23	Data Structures	3 Hours	80	20	100	General	60	4
BVC-19-24	Web Programming - PHP	3 Hours	80	20	100	Skill	60	4
BVC-19-25	Practical - Data Structures	3 Hours	100	----	100	Skill	60	5
BVC-19-26	Practical - Web Programming	3 Hours	100	---	100	Skill	75	5
BVC-19-27	Project Work*	3 Hours	100	---	100	Skill	60	4

* For Project reports, date of submission shall be 30th May. After that candidate has to pay late fee as per University norms. Evaluation of Project Reports shall be carried out by external examiner.

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KURUKSHETRA UNIVERSITY, KURUKSHETRA

Scheme for Bachelor of Vocation(B.Voc.) in Computer w.e.f. 2020-21

Semester-3

Paper code	Nomenclature	Duration of Exam	External	Internal*	Max Marks	Type	Hours per Semester	Credits
BVC-19-31	Artificial Intelligence	3 Hours	80	20	100	General	60	4
BVC-19-32	Computer Networks	3 Hours	80	20	100	General	60	4
BVC-19-33	Software Engineering	3 Hours	80	20	100	General	60	4
BVC-19-34	RDBMS - I	3 Hours	80	20	100	Skill	60	4
BVC-19-35	Java Programming	3 Hours	80	20	100	Skill	60	4
BVC-19-36	Practical - Oracle	3 Hours	100	----	100	Skill	75	5
BVC-19-37	Practical – Java Programming	3 Hours	100	---	100	Skill	75	5

Semester-4

Paper code	Nomenclature	Duration of Exam	External	Internal*	Max Marks	Type	Hours per Semester	Credits
BVC-19-41	E - Commerce	3 Hours	80	20	100	General	60	4
BVC-19-42	Advanced Java	3 Hours	80	20	100	General	60	4
BVC-19-43	RDBMS - II	3 Hours	80	20	100	General	60	4
BVC-19-44	JSP & Servlets	3 Hours	80	20	100	Skill	60	4
BVC-19-45	Practical - JSP & Servlets	3 Hours	100	----	100	Skill	75	5
BVC-19-46	Practical - Advance Java	3 Hours	100	---	100	Skill	75	5
BVC-19-47	Project Work*	3 Hours	100	---	100	Skill	60	4

* For Project reports, date of submission shall be 30th May. After that candidate has to pay late fee as per University norms. Evaluation of Project Reports shall be carried out by external examiner.

KURUKSHETRA UNIVERSITY, KURUKSHETRA

Scheme for Bachelor of Vocation(B.Voc.) in Computer w.e.f. 2021-22

Semester-5

Paper code	Nomenclature	Duration of Exam	External	Internal*	Max Marks	Type	Hours per Semester	Credits
BVC-19-51	Current Technologies	3 Hours	80	20	100	General	60	4
BVC-19-52	Linux & Shell Programming	3 Hours	80	20	100	General	60	4
BVC-19-53	Network Security	3 Hours	80	20	100	General	60	4
BVC-19-54	Programming with C# and .NET	3 Hours	80	20	100	Skill	60	4
BVC-19-55	Mobile Application Development - I	3 Hours	80	20	100	Skill	60	4
BVC-19-56	Practical - Programming with C# and .NET	3 Hours	100	----	100	Skill	75	5
BVC-19-57	Practical - Mobile Application Development – I	3 Hours	100	---	100	Skill	75	5

Semester-6

Paper code	Nomenclature	Duration of Exam	External	Internal*	Max Marks	Type	Hours per Semester	Credits
BVC-19-61	Management Information Systems	3 Hours	80	20	100	General	60	4
BVC-19-62	Wireless Networks	3 Hours	80	20	100	General	60	4
BVC-19-63	Programming with ASP.NET	3 Hours	80	20	100	General	60	4
BVC-19-64	Mobile Application Development - II	3 Hours	80	20	100	Skill	60	4
BVC-19-65	Practical - Programming with ASP.NET	3 Hours	100	----	100	Skill	75	5
BVC-19-66	Practical - Mobile Application Development –II	3 Hours	100	---	100	Skill	75	5
BVC-19-67	Project Work	3 Hours	100	---	100	Skill	60	4

*For Project reports, date of submission shall be 30th May. After that candidate has to pay late fee as per University norms. Evaluation of Project Reports shall be carried out by external examiner.

**Internal Assessment will be based on attendance, class tests and assignments/seminar/viva-voce (in case of practicals and projects)

BVC-19-11 Computer Fundamentals

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

Evolution of Computer – Generations, Types of Computer, Computer System Characteristics

Basic Components of a Digital Computer – Control Unit, ALU, Input/Output Function and Memory, Memory Addressing Capability of a CPU, Word Length of a Computer, Processing Speed of a Computer, Computer Classification.

Unit II

Input/Output Units - Keyboard, Mouse, Trackball, Joystick, Digitizing Tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-Code Reader, Analog Size, Resolution, Refresh Rate, Dot Pitch, Video Standard – VGA, SVGA, XGA etc.

Printers & its Types – Daisy Wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter; Sound Card and Speakers.

Unit III

Memory – RAM, ROM, EPROM, PROM and other Types of Memory, Storage Fundamentals – Primary Vs Secondary Data Storage.

Storage Devices – Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive, Flash Drives, Video Disk, Blue Ray Disc, SD/MMC Memory Cards, Physical Structure of Floppy & Hard Disk, SSD(Solid State Drive).

Unit IV

Information Representation - Number Systems, Conversion from one Number System to another Number System, Integer Representation – Sign Magnitude, 1's Complement, 2's Complement, BCD Codes, Floating-point Representation

Binary Arithmetic – Addition, Subtraction, Multiplication, Division.

TEXT BOOKS:

1. Rajaraman V., Fundamentals of Computers, PHI.

2. Sinha P.K., Computer Fundamentals, BPB Publication

REFERENCE BOOKS:

1. Basandra S.K., Computers Today, Galgotia Publications

2. Ram B., Computer Fundamentals, New Age International Publisher.

BVC-19-12 Operating Systems-

Maximum marks: 100 (External: 80, Internal: 20)　　　　　**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.

Unit I

Introductory Concepts: Operating System Functions and Characteristics, Historical Evolution of Operating Systems, Real Time Systems, Distributed Systems, Methodologies for Implementation of O/S Service System Calls, System Programs.

Unit II

Process Management: Introduction, Definition of Process, Process States, Process States Transition, Process Control Block, Operations on Processes, Suspend and Resume, Interrupt Processing.

CPU Scheduling: Scheduling Criteria, Levels of Scheduling, Scheduling Algorithms, Multiple Processor   Scheduling.

Unit III

Storage Management: Memory Management of Single-user and Multiuser Operating System, Partitioning, Swapping, Paging and Segmentation, Virtual Memory, Page Replacement Algorithms, Thrashing.

Unit IV

Device Management: I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O to Hardware Operation, Streams.

Disk Scheduling, Disk Structure, Disk Managements. Swap-Space Management.

TEXT BOOKS:

1. Deitel Harvey M., An Introduction to Operating Systems, Addison Wesley

2. Silbershatz Abraham, Galvin Peter B., Operating System Concepts, John Wiley & Sons

REFERENCE BOOKS:

1. Tanenbaum Andrew S., Modern Operating System, Pearson Education

BVC-19-13 PC Software

Maximum marks: 100 (External: 80, Internal: 20)　　　　　　**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.

Unit I

MS-Windows: Basics of Windows. Basic Components of Windows, Icons, Types of Icons, Taskbar, Activating Windows, Using Desktop, Title Bar, Running Applications, Exploring Computer, Managing Files and Folders, Copying and Moving Files and Folders.

Control Panel - Display Properties, Adding and Removing Software and Hardware, Setting Date and Time, Screen Saver and Appearance using Windows.

Unit II

Documentation using Word Processing Software– Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark.

Advance Features of Word Processing Software - Mail Merge, Macros, Table, File Management, Printing, Styles, Linking and Embedding Objects, Template.

Unit III

Electronic Spread Sheet - Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts.

Advance Features of Electronic Spread Sheet - Pivot Table & Pivot Chart, Linking and Consolidation. Database Management using Excel - Sorting, Filtering, Table, Validation, Goal Seek, Scenario. What- if Analysis.

Unit IV

Presentation Software: Presentations, Creating Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering Art Objects.

Animations and Sounds, Inserting Animated Pictures or Accessing Through Objects, Inserting Recorded Sound Effect, In Built Sound Effect.

TEXT BOOKS:
1. Taxali, Ravi Kant, Computer Course Windows and Office, McGraw Hill Education(India) Pvt. Ltd.
2. Stultz Russell A., Learn Microsoft Office, BPB Publication
3. Microsoft Office Complete Reference, BPB Publication

REFERENCE BOOKS:
1. Koers D. , Microsoft Office XP, Fast & Easy, PHI Publication
2. Courtrer G Marquis, Microsoft Office Professional Edition, BPB Publication

BVC-19-14 Web Designing

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

Introduction to Internet and World Wide Web, Web Browsers, Web server, Web page, Web site.

Web Publishing: Hosting your site, Internet Service Provider, Planning & Designing Web Site, Steps for Developing Sites, Choosing the Contents, Home Page, Domain Names, Creating a Web Site.
HTML: Introduction, Tags, HTML Standards, Creating Web Pages, Adding Background Colors, Page Formatting, Break Tag, Paragraph Tag, HR Tag, Preformatted Text, Working with Headings, Images, Linking Web Pages, Tables and Lists, Forms, Buttons.

Unit II

Introduction to CSS, Properties and Values, Defining CSS Styles, Using Links and Style, Importing and Embedding Style Sheets, Inlining Styles.
Using Attributes, Class Attributes, ID Attributes, Using Elements, Cascading Style Sheets, Selectors, Class Selectors, ID Selectors, Contextual Selectors.

Unit III

Introduction to JavaScript, Guidelines, Functions, Operators, Precedence, Looping, Boolean Object, Data Object, Math Objects.
JavaScript Window, Opening and Closing Windows, Frame Object, Image Object, Loading Image, Creating Animation, JavaScript Style Sheet, Working with Layers, Layer Animation.

Unit IV

Concept and use of Front Page: Building Basics Web Pages, Use of Number List, Bulleted List, Definition List, Menu List, Use of Tables, Images, Sound, Video, Links & Bookmarks, Styles Sheets, Frame Sets, Using Advanced Features.
Photoshop - Basics, Using Colours, Painting with Pixels, Using Transformation, Layers, Masks and Paths, Enhancing Features.
Flash – Basics, Working with Graphics, Colours, Transforming and Adjusting Graphics, Working with Text & Symbols, Animation, Tweening, Working with Flash Moving and use of Dreamweaver.

TEXT BOOKS:

1. Bayross Ivan, Web Enabled Commercial Applications Development using HTML, Javascript, DHTML & PHP, BPB Publication

2. Powell Thomas, The Complete Reference HTML & CSS, Tat Mc-Graw Hill

REFERENCE BOOKS:

1. Clelland Deke Mc, Photoshop for Windows Bible, IDG Books India Pvt. Ltd.

2. Reinhardt Robert, Dowd Snow, Macromedia Flash MX Bible, Wiley Publishing

BVC-19-15 Programming in C

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

Algorithm, Flowchart, Types of Flowcharts, Rules for drawing Flowcharts, Pseudo Codes. Decision Tables, Characteristics of Good Algorithm, Documentation, Debugging.
Computer Languages, Analogy with Natural Languages, History of Programming Languages, Machine Language, Assembly Language, High Level Language, Programming Language, Translator, Compiler and Interpreter.

Unit II

Overview of C: History & Importance of C, Structure of a C Program.
Elements of C: C Character Set, Identifiers and Keywords, Data Types, Constants and Variables, Assignment Statement, Symbolic Constant.
Operators & Expression: Arithmetic Operator, Relational Operator, Logical Operator, Bitwise Operator, Unary Operator, Assignment Operator, Conditional operators and Special operators..

Unit III

Decision Making & Branching: Decision Making with IF Statement, IF-ELSE Statement, Nested IF Statement, ELSE-IF Ladder, Switch Statement, goto Statement.
Decision Making & Looping: for, while, and do-while loop, Jumps in loops, break, continue Statement.
Functions: Definition, Prototype, Passing Parameters, Recursion. Arrays: Definition, Initialization, Processing an Array.

Unit IV

Storage Classes in C: Auto, Extern, Register and Static Storage Class, Their Scope, Storage & Lifetime.
Pointers: Introduction, Pointer Variables, Pointer Operators, Pointer Assignment, Pointer Conversion, Pointer Arithmetic, Pointer Comparison, Pointers and Arrays, Pointers and Functions. Structure and Union.

TEXT BOOKS:

1. Sinha P.K., Computer Fundamentals, BPB Publication

2. Balagurusamy E., Programming in C,   TMH Publication

REFERENCE BOOKS:

1. Tucker   Allen, Programming Languages – Principles & Paradigms, TMH

2. Kanetker Yashawant, Let Us C, BPB

BVC-19-21 Communication Skills and Personality Development

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit-I

Personality : Definition, Elements, Determinants

Personal Grooming : Personal Hygiene, Social Effectiveness, Business Etiquettes (Power Dressing)

Unit II

Body Language: Non-Verbal Communication, Types of Body Language, Functions of Body Language, Role of Body Language, Proxemics

Art of Good Communication: Verbal & Non-Verbal Communication, Difference between Oral and Written Communication, 7'Cs of Effective Communication, Importance of Effective Communication

Unit III

Team Building: Team Behaviour, Types of Teams, Team Roles and Behaviour, Group Discussion, Do's and Don't

Unit IV

Interview Preparation: Introduction, Resume Writing, Dress Code, Mock-Interview, How to be Successful in an Interview

Reference Books:

1. Dr. T.Bharati, "Personality Development & Communication Development", Neelkamal Publications, Hyderabad

2. Krishna Mohan & Meera Banerji, Developing Communication Skills, Macmilan India Ltd. Delhi

BVC-19-22 Operating Systems-II

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

File Systems: Functions of the System, File Access and Allocation Methods, Directory Systems: Structured Organizations, Directory and File Protection Mechanisms.

Unit II

Concurrent Processes: Introduction, Parallel Processing, Control Structure for Indicating Parallelism, Mutual Exclusion, Critical Section Problem, Semaphores, Classical Process Co-ordination Problems and Their Solutions, Inter-process Communications.

Unit III

Deadlocks: Introduction, Deadlock Characterization, Deadlock Prevention and Avoidance, Deadlock Detection and Recovery, Practical Considerations.

Unit IV

Case Study of UNIX System: Introduction, History, The Shell, The Kernel, File System, Process Management, Memory Management, I/O System.

Case Study of Mach: Introduction, Ports Naming and Protection, Tasks and Threads, Communication Model, Communication Implementation, Memory Management.

TEXT BOOKS:

1. Deitel Harvey M., An Introduction to Operating Systems, Addison Wesley

2. Silbershatz Abraham, Galvin Peter B., Operating System Concepts, John Wiley & Sons

REFERENCE BOOKS:

1. Dhamdhere D.M., System Programming & Operating Systems, Tata Mc-Graw Hill

2. Tanenbaum Andrew S., Modern Operating System, Pearson Education

BVC-19-23 Data Structures

Maximum marks: 100 (External: 80, Internal: 20)　　　　　　**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.

Unit I

Introduction to Data Structures: Elementary Data Organization, Data Structure Operations, Algorithm Complexity and Time-space Tradeoff, Classification of Data Structures.
String Processing: Storing Strings, String Operations, Pattern Matching Algorithms.
Arrays: Linear Arrays, Operations on Arrays, Multidimensional Arrays, Storage of Arrays, Matrices, Sparse Matrices.

Unit II

Linked Lists: Representation of Linked List in Memory, Traversal, Searching, Insertion, Deletion, Sorted Linked List, Header List, Two–way List.
Stacks, Queues, Linked and Array Representation of Stacks, Queues, Deque, Priority Queues, Operations on Stacks and Queues.

Unit III

Applications of Stacks: Recursion, Polish Notation, Quick Sort.
Trees: Binary Trees, Representation of Binary Trees in Memory, Threaded Binary Trees, Balanced Tree, Different Tree Traversal Algorithms, Binary Search Tree: Searching, Insertion, and Deletion in a Binary Search Tree, Heap Sort.

Unit IV

Representation of Graphs and Applications: Adjacency Matrix, Path Matrix, Shortest Path Algorithm, Linked Representation of a Graph, Traversing a Graph.
Sorting and Searching: Linear Search, Binary Search, Insertion Sort, Selection Sort, Bubble Sort, Radix Sort, Merge Sort.

TEXT BOOKS:

1. Lipschutz Seymour, Data Structures, Tata Mc Graw Hill Publishing Company Limited, Schaum's Outlines, New Delhi

2. Langsam Yedidyan, Augenstein Moshe J. and Tanenbaum Aaron M., Data Structures using C, Prentice Hall of India Pvt. Ltd., New Delhi

REFERENCE BOOKS:

1. Terembley J.P. and Sorenson P.G., An Introduction to Data Structures with Applications, Mc-Graw Hill, International Student Edition, New York

2. 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

BVC-19-24 Web Programming – PHP

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

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:

1. Holzner Steven, The Complete Reference PHP, Mc-Graw Hill Professional

2. Vikram Vaswani, PHP: A Beginners Guide, McGraw-Hill Publications

REFERENCE BOOKS:

1. Lynn Beighley & Michael Morrison, Head First PHP and MySQL, O'Reilly Publishers

2. Alan Forbes, The Joy of PHP Programming: A Beginners Guide to Programming Interactive Web Applications with PHP and MySQL, Plum Island Publishing LLC

BVC-19-31 Artificial Intelligence

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit - I
AI History and Applications: Defining AI: Acting Humanly (Turing Test Approach), Thinking Humanly (Cognitive Modeling Approach), Thinking Rationally (laws of thought approach), Acting Rationally (Rational Agent Approach); Foundations of Artificial Intelligence; History of AI, AI techniques, Expert Systems.

Unit - II
Problem Solving by Search: Defining the problem as a State Space Search Strategies: Breadth – first Search, Depth- first search, Depth limited search, Iterative Depending depth first search.
Heuristic Search Techniques: Hill Climbing, Simulated Annealing, Best First Search: OR Graphs, Heuristic Functions, A* Algorithm, AND –OR graphs, AO* Algorithm.

Unit - III
Knowledge Representation: Representations and mappings, Approaches to knowledge Representation, Procedural versus Declarative knowledge;
Predictive Logic: Representing Simple facts, Instance and Isa relationships in Logic, Proposition versus Predicate Logic, Computable Functions and Predicates- not, Rules of Inferences and Resolution-not, Forward versus Backward Reasoning, Logic Programming and Horn Clauses. Weak slot and Filler Structure: Semantic Nets, Frames.
Strong slot Filler Structures: Conceptual Dependency, scripts.

Unit – IV
AI Programming Languages (PROLOG): Introduction, How Prolog works, Backtracking, CUT and FAIL operators, Built –in Goals, Lists, Search in Prolog.
Connectionist Models / ANN: Foundations for Connectionist Networks, Biological Inspiration; Different Architectures and output functions: Feed forward, Feedback, Recurrent Networks, step, Sigmoid and different functions.

TEXT BOOKS:

1. Stuart Russel and Peter Norvig: Artificial Intelligence – A Modern Approach, Pearson Education

REFERENCE BOOKS:

1. Elaine Rich and Kevin Knight: Artificial Intelligence, Tata McGraw Hill

2. N.P. padhy: Artificial Intelligence and Intelligent Systems, Oxford Higher Education, Oxford University Press

3. George F Luger: Artificial Intelligence- Structures and Strategies for complex Problem Solving, Pearson Education

4. Ivan Bratko :PROLOG Programming Pearson Education

BVC-19-32 Computer Networks

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit – I

Introduction to Computer Communications and Networking Technologies; Uses of Computer Networks; Network Devices, Nodes, and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols.
Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model, Network Architecture and the OSI Reference Model; Example Networks: The Internet, X.25, Frame Relay, ATM;

Unit – II

Analog and Digital Communications Concepts: Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Digital Carrier Systems.
Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Dialup Networking; Analog Modem Concepts; DSL Service;

Unit – III

Data Link Layer: Framing, Flow Control, Error Control; Error Detection and Correction; Sliding Window Protocols; Media Access Control: Random Access Protocols, Token Passing Protocols; Token Ring.
Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways.

Unit – IV

Network Layer and Routing Concepts: Virtual Circuits and Datagrams; Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing.
Congestion Control Algorithms; Internetworking; Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric –Key Algorithms; Public-Key Algorithms.

TEXT BOOKS:

1. Michael A. Gallo, William M. Hancock, "Computer Communications and Networking   Technologies", CENGAGE Learning.

2. Andrew S. Tanenbaum, "Computer Networks", Pearson Education.

REFERENCE BOOKS:

1. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson Education.

2. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.

BVC-19-33 Software Engineering

Maximum marks: 100 (External: 80, Internal: 20)   **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.

. Unit I

Software Crisis – Problem and Causes
Software Life Cycle Models: Waterfall, Prototype, Evolutionary and Spiral Models.
Software Project Planning: Cost Estimation: COCOMO Model, Putnam Resource Allocation Model.
Risk Management, Project Scheduling, Personnel Planning, Team Structure, Software Configuration Management, Quality Assurance, Project Monitoring.

Unit II

Software Requirement Analysis and Specifications: Structured Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship Diagrams, Software Requirement and Specifications, Behavioral and non-behavioral Requirements.
Software Design: Design Fundamentals, Problem Partitioning and Abstraction, Design Methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling.

Unit III

Coding: Programming Style, Structured Programming.
Software Testing: Testing Fundamentals, Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Testing, Cause Effect Graphing, Structural Testing: Control Flow Based and Data Flow Based Testing, Loop Testing.

Unit IV

Software Testing Strategies: Unit Testing, Integration Testing, Validation Testing, System Testing, Alpha and Beta Testing.
Software Maintenance: Type of Maintenance, Management of Maintenance, Maintenance Process, Maintenance Characteristics

TEXT BOOKS:

1. Pressman Roger S., Software Engineering – A Practitioner's Approach, Mc-Graw Hill International Edition

2. Sommerville Ian, Software Engineering, Pearson Education Asia

REFERENCE BOOKS:

1. Jalote Pankaj, An Integrated Approach to Software Engineering, Springer Verlag

2. Peters James F. and Pedryez Witold, Software Engineering – An Engineering Approach, John Wiley and Sons, New Delhi

BVC-19-34 RDBMS – I

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit - I

DBMS - Definition, Characteristics of DBMS, Application and Advantages of DBMS, Instances, Schemas and Database States, Three Levels of Architecture, Data Independence, DBMS Languages, Data Dictionary, Database Users, Data Administrators.
Data Models, Types and their Comparison, Entity Relationship Model, Entity Types, Entity Sets, Attributes and its types, Keys, E R Diagram, Data Integrity.
RDBMS - Concept, Components and Codd's Rules.

Unit - II

Relational Algebra - Selection, Projection, Union, Intersection, Cartesian product, Different types of Join like Theta Join, Equi-join, Natural Join, Outer Join.
Functional Dependencies, Good & Bad Decomposition, Anomalies as a Database: A Consequences of Bad Design, Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

Unit – III

Data Definition using SQL Databases, Data Types, Tables, Creating Tables, Viewing Data in Table, Eliminating Duplicacy, Sorting Data, Creating Table from Table, Inserting Data in Table from another Table, Delete Operations, Updating, Modifying, Renaming, Truncating, Destroying Tables.
Data Constraints: Types of Constraints and their Implementation.
Data Functions and Indexes Scalar Function, Group Functions, Aggregate Functions, Creating Index, Duplicate and Unique Index, Reverse Key Index, Bitmap Index, Function Based Index.
Views: Creating View, Renaming, Updateable View, Destroying View.

Unit – IV

Introduction to PL/SQL – PL/SQL Transactions, Transaction Concepts, Close Transactions, Creating a Save Point, Cursor, Types of Cursors, Cursor for Loops, Parameterized Cursors.
PL/SQL Security, PL/SQL Database Objects.
Import/Export Tools for Import/Export, SQL for Import/Export.

TEXT BOOKS:

1. Elmasri Ramez & Navathe Shamkant B., Fundamentals of Database Systems, Addision & Weisely, New Delhi

2. Bayross Ivan, SQL, PL/SQL, The Programming Language of Oracle, BPB Publication

REFERENCE BOOKS:

1. Korth H.F. & Silverschatz A., Database Concepts, Tata McGraw Hill, New Delhi

2. Date C.J., Database Systems, Prentice Hall of India, New Delhi

BVC-19-35 Java Programming

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

JAVA and the Internet: The Java Programming Language and its Characteristics, Java Runtime Environment, Java Compiler, Java Developers Kit, Running Java Applications and Java Applets. Java Programming: Elements of Java Data Types, Scalar Data Types, First Class Objects, Control Structures.

Unit II

Classes and Objects: Introduction, Creating Objects and References, Defining Classes, Class Inheritance, Constructor, Access Mechanism.
Array and String: Creating an Array, One and Two Dimensional Array, String and String Buffer Classes, Wrapper Classes.

Unit III

Inheritance: Member Access, Super Class, Creating Multi Level Hierarchy, Method Overloading and Overriding, Abstract Class, Method, Using Final to Prevent Overriding and Overloading, The Object Class Packages and Interfaces, Defining Packages, Access Protection, Importing Packages, Defining Interfaces.
Exception Handling: Exception Types, Uncaught Exceptions, Multiple catch Clauses, Nested try Statements, throw, throws Finally, Java built-in Exceptions, Creating your own Exception Subclasses.

Unit IV

Multithreaded Programming: Creating threads, run() Method, new thread, thread Class, Stopping and Blocking threads.
Life Cycle of thread - New Born, Runnable, Running, Blocked, Dead, Waiting, Sleeping, Suspended, Blocked, using thread Methods, thread Exceptions, thread Priority, Synchronization, Implementing the Runnable Interface.

TEXT BOOKS:

1. Programming with JAVA, A Primer. E. Balaguruswamy Publisher: Tata Mc-Graw Hill publication.

2. Herbert Schildt, "JAVA: The Complete Reference", Tata Mc-Graw Hill

REFERENCE BOOKS:

1. Arnold, Gosling, Homes, The Java Programming Language, Addison Wesley

2. Mughal K.A., Rasmussen R.K., A Programmer's Guide to Java Certification, Addison Wesley

BVC-19-41 E-Commerce

Maximum marks: 100 (External: 80, Internal: 20)　　　　**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.

Unit I

Introduction to E-Commerce: Benefits, Impact of E-Commerce, Classification of E-Commerce, Applications of E-Commerce Technology, Business Models, Framework of E-Commerce, Business to Business, Business to Customer, Customer to Customer

Unit II

Online Electronic Payment Systems: Prepaid and Post Paid Electronic Payment System, Information Directories and Search Engines, Cyber Cash (Customer to Merchant Payments, Peer to Peer Payments, Security), Smart Card (Card Types, Closed or Open Security), Privacy, Card Costs, Non Card Costs, Electronic Banking, Electronic Fund Transfers.

Unit III

Application of E-Commerce: Applications of E-Commerce in Direct Marketing and Selling, Value Chain Integration, Supply Chain Management, Corporate Purchasing, Financial and Information Services, Obstacles in Adopting E-Commerce Applications, Future of E-commerce.

Unit IV

Launching Your E-Business: Marketing an E-Business, Search Engines and Directories, Public Relations, Customer Communication, News Groups and Forums, Exchanging Links, Web Rings, E-Business Back End Systems, Business Record Maintenance, Back up Procedures and Recovery.

TEXT BOOKS:

1. Schneider Gari P., Electronic Commerce, Thomson Course Technology

2. Bajaj Kamlesh K., Nag Debjani, E-Commerce – Cutting Edge of Business, Tata McGraw Hill

REFERENCE BOOKS:

1. Joseph P.T., E-Commerce – An Indian Prespective, Prentice Hall,Westland J. Christopher, Global Electronic Commerce – Theory & Case Studies, University Press

BVC-19-42 Advanced Java

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

Applet: Applet Life Cycle, Applet Class, Applet Context Class, Passing Parameters to Applet, use of Java.awt Graphics Class and its various Methods in an Applet;
Event Handling, Event Delegation, Model or Event Class Hierarchy, All Classes and Interfaces of Event Delegation Model, Programmes Related to Event Handling Covering all Types of Events.

Unit II

Input/Output: Basics, Streams, Bytes and Character Stream, The Class Print Stream, Data Stream, String Tokenizer Class, Stream Tokenizer.

Unit III

Graphical User Interface: Layout Manager (Flow Layout, Border Layout, Card Layout, Grid Bag Layout, Grid Layout); AWT Controls (Labels, Buttons, Canvases, Check Boxes, Check Box Group, Choices, Text Fields, Text Areas, Lists, Scroll bars, Panels, Windows, Frames, Menus, Menu bar).

Unit IV

Java Swings: Working with J-Frame, J-Applet, J-Panel, J-Text Field, J-Password Field, J-Button, J-Checkbox, J-Radio Button, J-List, J-Scroll Pane, J-Combo Box, J-Menu, J-Menu Bar, J-Menu Item, J-Popup Menu, J-Tree, J-Table

TEXT BOOKS:

1. Schildt Herbert, Java : The Complete Reference, TMH

2. Goslin James, The Java Language Specification, Addison Wesley

REFERENCE BOOKS:

1. Eckel Bruce, Thinking in Java, Pearson Education

BVC-19-43 RDBMS – II

Maximum marks: 100 (External: 80, Internal: 20) **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.

Unit I
Object-oriented Data Model: Object identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods and Persistence, Type Hierarchies and Inheritance, Complex Objects, Polymorphism, Multiple Inheritance, Versions and Configurations.

Parallel and Distributed Databases and Client-Server Architecture: Architecture for Parallel Database; Distributed Database Concepts, Data Fragmentation, Replication, and Allocation Techniques, Overview of Client-Server Architecture.

Unit II
Data Warehousing: Characteristics of Data Warehouses, Operational Database Systems and Data Warehouse (OLTP & OLAP). Three-tier Data Warehouse Architecture, Data Mining: Introduction, Motivation, Importance, Knowledge Discovery Process, Functionalities, Classification of Data Mining Systems, Major issues, Applications of Data Mining.

Advanced Database Applications: Active Database Concepts, Temporal Database Concepts, Spatial Databases, Deductive Databases; Emerging Database Technologies: Mobile Databases, Multimedia Databases, Geographic Information System (GIS); Introduction to Web Databases and XML, Structure of XML Data.

Unit III
Introduction to Transaction Management: Transaction Model and Properties, Transaction Structure, Transaction Serialization and Recovery.

Concurrency Control – Lock Based Concurrency Control, Multi-phases Locking Protocols. Time Stamp Ordering, Serialization, Optimistic Concurrency Control, Deadlock Management – Detection, Avoidance and Resolution. Distributed Deadlock, Structured (Top Actions, Distributed Nested) Transactions.

Unit IV
Recovery –Failure Analysis, Reliability and Availability, Sources of Failure, Recovery Techniques: Shadow Paging and Write-ahead Logging, Memory and Storage Management (Undo, Redo and Steal/Force).

Commit Protocols: Two Phase Commit, Presumed Abort, Presumed Commit, Three Phase Commit, Partitions, Replication and Voting, Shared-nothing DB, Scalability of Replication.

TEXT BOOKS:

1. Elmasri Ramez and Navathe Shamkant B., Fundamentals of Database Systems, Pearson Education

2. Korth H.F. & Silverschatz A., Database Concepts, Tata McGraw Hill, New Delhi

REFERENCE BOOKS:

1. Ramakrishnan Raghu & Gehrke Johannes, Database Management Systems, McGraw Hill Internationsl

2. Rob Peter, Colonel Carlos, Database System Design, Implementation and Management, Cengage Learning,

BVC-19-44 JSP & Servlets

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit-I

Basics of Servlet; Servlet API, GenericServlet, HttpServlet, Servlet Life Cycle, ServletRequest methods, Registration example with DB, ServletConfig methods, ServletConfig example, ServletContext methods, ServletContext example.

Unit-II

Servlet Communication: Servlet-Browser Communication, Web-Component Communication, Servlet-Applet Communication
Session Tracking Mechanisms, Filters, Listeners, Web-Security.

Unit-III

Java Server Pages: Basics of JSP; Life cycle of JSP, Scripting elements; scriptlet tag, expression tag, declaration tag, Implicit Objects; out, request, response, config, application, session, pageContext, page exception.

Unit-IV

Directive elements in JSP, Action elements in JSP, Custom tags in JSP, Exception handling in JSP, JSTL

TEXT BOOKS:

1. Bryan Basham, Kathy Slerra & Bert Bates, Head First Servlets and JSP, O'Reilly.

2. Joel Murach & Michael Urban, Murach's Java Servlets and JSP, Murach Publishing

BVC-19-51 Current Technologies

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

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

Concepts and Architecture: Introduction, Parallel and Distributed Computing, Cluster Computing, Grid Computing, Anatomy and Physiology of Grid, Review of Web Services, OGSA, WSRF;
Grid Monitoring: Grid Monitoring Architecture, An overview of Grid Monitoring Systems, Grid l. CE, JAMM, MDS, Network Weather Service, R-GMA other Monitoring System, Gaglia and Gridmon.

Unit IV

Grid Security and Resource Management: Grid Security, a brief Security Primer, PKI, X509 Certificates, Grid Security, Grid Scheduling and Resource Management.
Scheduling Paradigms, Working Principles of Scheduling, a Review of Condor, SGE, PBS and LSF Grid Scheduling with QoS.

TEXT BOOKS:

1.   Sosinsky Barrie, Cloud Computing Bible, Wiley Publishing Inc.

2.   Li Maozhen, Baker Mark, The Grid Core Technologies, John Wiley & Sons

REFERENCE BOOKS:

1. Kunze Marcel, Cloud Computing Web based Dynamic IT Services, Springer

2. Joseph Joshy and Fellenstein Craigh, Grid Computing, Pearson Education

BVC-19-52 Linux and Shell Programming

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

Definition of Operating System, Types of Operating System, Features of Unix, Basic Architecture of Linux System, Features of Kernel and Shell;

Linux File System: Boot Block, Super Block, Inode Table, Data Blocks, How Linux Kernel Access Files, Linux Standard File System.

Unit II

Structure of File System

Essential Linux Commands - Commands for Files and Directories, Creating and Viewing Files using cat, cd, is, cp, md, rm, mkdir, rmdir, pwd, file, more, less, file comparisons- cmp & comm, View Files, Disk Related Commands, Checking Disk Free Spaces, chmod with its options, cal, date, who, tty, lp, sty;

Filter and Pipes: head, tail, wc, pr, cut, paste, sort, uniq, grep, egrep, fgrep,tee;

The Process: Shell Process, Parent and Children, Process Status, System Process, Multiple Jobs in Background and Foreground, Changing Process Priority with nice, Premature Termination of Process, **Mathematical Commands** - bc, expr, factor, and units.

Unit III

Creating and Editing Files with VI Editor with their Command Options, Operators, Text Deletion, Text Movement, Changing Text, Yanking Text, Filtering Text, The ex mode, Moving Text from one File to another.

Communication: The Bulletin Board- News, Write, Mesg, Talk, Mail, elm, Pine, Finger, Vacation and Connecting to Remote Machine.

Unit IV

System Administration Common Administrative Tasks, Identifying Administrative Files - Configuration and Log Files, Role of System Administrator, Managing User Accounts - Adding and Deleting Users, Changing Permissions and Ownerships.

Installation of Linux System- Linux Installation Requirement, Complete Procedure Steps, Partitioning the Hard Drive, System Startup and Shutdown Process, init and run Levels, File System Mounting, lpstat, Backup Strategy, Installing Software on Linux.

TEXT BOOKS:

1. Bandel David, Napier, Using Linux, Pearson Education

2. Blum Richard, Beginning Linux Programming , John Wiley & Sons

REFERENCE BOOKS:

1. Sarwar Syed Mansoor, Kortskey Robert, Unix, Pearson Education

2. Das Sumitabha, Unix Concepts & Applications, Tata McGraw Hill

BVC-19-53 Network Security

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit-I

Introduction To The Concepts Of Security - The Need for Security, Security Approaches, Principles of Security, Types of Attacks.

Cryptographic Techniques - Plain Text and Cipher Text, Substitution Techniques, Transposition Techniques, Encryption and Decryption.Symmetric and Asymmetric Key Cryptography, Key Range and Key Size, Possible Types of Attacks.

Unit-II

Computer-Based Symmetric Key Cryptographic Algorithms - Algorithm Types and Modes, An Overview of Symmetric Key Cryptography, Diffie-Hellman Key Exchange Algorithm, DES, International Data Encryption Algorithm (IDEA), RC5, AES.

Unit III

Computer-Based Asymmetric Key Cryptography - Brief History of Asymmetric Key Cryptography, An Overview of Asymmetric Key Cryptography, The RSA Algorithm, Symmetric and Asymmetric Key Cryptography Together, Digital Signatures, Knapsack Algorithm.

Unit IV

Internet Security Protocols - Basic Concepts, Secure Socket Layer, Secure Electronic Transaction, SSL Versus SeET HTTPs, 3-D Secure Protocol, Electronic Money, E-Mail Security, Security on Various Layers of Communication Model, Wireless Application Protocol (WAP) Security, Security In GSM.

TEXT BOOKS:

1. Atul Khate, "Cryptography and Network Security",Tata McGraw-Hill

REFERENCE BOOKS:

1. William Stallings, "Cryptography and Network Security principles and practice", Prentice Hall PTR

2. Behrouz Aforouzan, "Cryptography and Network Security", McGraw Hill

BVC-19-54 Programming with C# and .NET

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit-I

Introduction to .NET Framework: NET framework, MSIL, CLR, CLS, CTS, Namespaces, Assemblies The Common Language Implementation, Assemblies, Garbage Collection, The End to DLL Hell - Managed Execution, .NeT Framework and Class Libraries.
C# - The Basics and Console Applications in C#: Name Spaces - Constructor and Destructors, Function Overloading & Inheritance, Operator Overloading, Modifiers - Property and Indexers , Attributes & Reflection API, When to use Console Applications - Generating Console Output, Processing Console Input

Unit-II

C#.NET: Language Features and Creating .NET Projects, Namespaces Classes and Inheritance -, Namespaces Classes and Inheritance -, C, Exploring the Base Class Library -, Debugging and Error Handling -, Data Types -, Exploring Assemblies and Namespaces, String Manipulation ,Files and I/O ,Collections

Unit III

ADO.NET: Benefits of ADO.NET, ADO.NET compared to classic ADO -, Datasets, Managed Providers -, Data Binding: Introducing Data Source Controls -, Reading and Write Data Using the SqlDataSource Control
Windows Forms and Controls in details: The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs – ToolTips

Unit-IV

Visual Inheritance in C#.NET: Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms.
Mastering Windows Forms: Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls

TEXT BOOKS:

1. Christian Nagel, Professional C# .Net, Wrox Publication

2. Vijay Mukhi, C# The Basics, BPB Publications

BVC-19-55 Mobile Application Development-I

Maximum marks: 100 (External: 80, Internal: 20) **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.

Unit-I

Introduction to Open Source: What is Open Source, Licence Issues (MPL, GPL and LGPL) and Open Source Vs Traditional Development Methodologies.

Unit-II

Introduction to Android: Introducing Android, History of Mobile Software Development, Open Handset Alliance, The Android Platform, Layers of Android, Android SDK, Kinds of Android Components, Building a Sample Android Application

Unit-III

Android Application Design Essentials: Anatomy of an Android Applications, Android Terminologies, Application Context , Activities,Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and Its common settings, Using Intent Filter, Permissions, Managing Application resources in a hierarchy, Working with different types of resources.
Android User Interface Design Essentials: User Interface Screen Elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

Unit-IV

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data Between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs.

TEXT BOOKS:

1. Darcey Lauren and Conder Shane, "Android Wireless Application Development" ,Pearson Education.

REFERENCES BOOKS:

1. Reto Meier, "Professional Android Application Development", Wiley India Pvt. Ltd.

2. Murphy L Mark, "Beginning Android", Wiley India Pvt Ltd.

3. Mednieks Zigurd, Dornin Laird, Meike G. Blake & Nakamura Masumi, "Programming Android", O'Reilly Publications.

BVC-19-61 Management Information System

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit I

Fundamental of Management Information Systems: The Fundamental Roles of Information System in Business, Trends in Information Systems, Types of Information Systems, Managerial Challenges of Information Technology.

The Components of Information Systems: System Concept, Components of an Information System, Information System Resources, Information System Activities, Recognizing Information Systems.

Unit II

IT Infrastructure and Emerging Technologies: IT Infrastructure, Infrastructure Components, Software/Hardware Platform Trends and Emerging Technologies, Management Issues.

Foundation of Business Intelligence: Databases and Information Management: Organizing Data in a Traditional File Environment, The Database Approach to Data Management, Using Database to Improve Business Performance and Decision Making, Managing Data Resources.

Unit III

Securing Information Systems: System Vulnerability and Abuse, Business Value of Security and Control, Establishing a Framework for Security and Control, Technologies and Tools for Security, Key System Applications for the Digital Age;

Enterprise Applications: Enterprise Systems, Supply Chain Management Systems, Customer Relationship Management Systems; Enterprise Applications: New Opportunities and Challenges.

Unit IV

Managing Knowledge: The Knowledge Management Landscape, Enterprises-Wide Knowledge Management Systems, Knowledge Work Systems, Intelligent Techniques.

Enhancing Decision Making: Decision Making and Information Systems, Systems for Decision Support, Executive Support Systems (ESS), Group Decision-Support Systems (GDSS).

TEXT BOOKS:

1. Laudon Kenneth C., Laudon Jane P., Management Information Systems Managing The Digital Firm, Pearson Education

2. O'Brien James A., Marakas George M., Management Information Systems, Tata McGraw Hill

REFERENCE BOOKS:

1. Laudon & Laudon, Essentials of Management Information Systems, Pearson Education

2. McLeod Raymond & Schell Jr. George P., Management Information Systems, Pearson Education

BVC-19-62 Wireless Networks

Maximum marks: 100 (External: 80, Internal: 20)　　　　　　**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.

Unit I

Introduction to Wireless Networks Architecture - Characteristics, Applications, Issues, Wireless vs. Wired Networks. Circuit Switched Networks and Packet Switched Networks in Details.
Multiple Radio Access - Medium Access Alternatives, Fixed-Assignment for Voice Oriented Networks, Random Access for Data Oriented Networks, Hand-off and Roaming Support.

Unit II

Cellular Network Generations- GSM, CDMA, GPRS with its Architectures and Application Areas.
Wireless LANs - Introduction to Wireless LAN (IEEE-802.11)-Architecture, Services, Physical layer, MAC Sub-Layer, MAC management Sub-Layer, Other IEEE 802.11 standards, HIPERLAN, Wi-Max standard.

Unit III

Ad-Hoc Networks - Introduction, Issues in Ad-Hoc Wireless Networks, Ad-Hoc Wireless Internet, Ad-Hoc vs Wireless Networks.
MAC Protocol - Issues in Designing a MAC Protocol for Ad-Hoc Wireless Networks, Design Goals of a MAC Protocol for Ad-Hoc Wireless Networks, Classification of MAC Protocols.

Unit IV

MANET Routing Protocols – Types of MANET Protocol (On Demand Protocol, Table-Driven and Hybrid Protocols), Wireless Sensor Networks Classification, MAC and Routing Protocols.
Wireless MANs and PANs, Wireless MAN-Physical and MAC Layer Details, Wireless PAN-Architecture of Bluetooth Systems, Physical, MAC Layer Details, Standards, Examples of Wireless Network Standards.

TEXT BOOKS:

1. C.Siva Ram Murthy and B.S. Manoj "Ad-Hoc Wirelss Networks: Architecture and Protocol", Prentice Hall.

REFERENCE BOOKS:

1. Tanenbaum andrew S., "Computer Networks", Pearson Education.

2. Stallings William, "Data and Computer Communications", Pearson Prentice Hall.

BVC-19-63 Programming with ASP.NET

Maximum marks: 100 (External: 80, Internal: 20)   **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.

Unit-I

ASP.NET: Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NETValidation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data using ADO.NET, Using the Complex Validators Accessing Data using ADO.NET, Configuration Overview

Unit-II

Themes and Master Pages: Creating a Consistent Web Site, ASP.NET 2.0 Themes - Master Pages, Displaying Data with the GridView Control Introducing the GridView Control, Filter Data in the GridView Control, Allow Users to Select from a DropDownList in the Grid, Add a Hyperlink to the Grid, Deleting a Row and Handling Errors

Unit III

Managing State: Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State ,Storing Objects in Session State, Configuring Session State, Setting Up an Outof-Process State Server, Storing Session State in SQL Server, Using Cookieless Session IDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control

Unit-IV

XML Web Services: Need of XML Web Services, Understanding the Web Service Model, Creating an ASP.NET Web Service, Creating and Consuming Web Services with Visual Studio .NET, Creating Web Services, Discovering Web Services, Instantiating and Invoking Web Services, Creating Web Reference Proxy for an XML Web Service, Consuming Web Services in both Windows Forms and Web Apps.

TEXT BOOKS:

1. MacDonald Matthew, ASP.NET : The Complete Reference, Osborne

2. Liberty Jesse, Hurwitz Dan, Programming ASP.NET, O'Reilly

REFERENCE BOOKS:

1. Walther Stephen, ASP.NET Unleashed, SAMS

BVC-19-64 Mobile Application Development-II

Maximum marks: 100 (External: 80, Internal: 20) **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.

Unit I

Android Services - Android Service API, Android Started Service, Bound Service, Android Service Life Cycle.
Storage in Android - Internal, External, Sqlite - Sqlite API, Spinner, Listview, Content Provider- Built-In and Custom.

Unit-II

Android Notification - API, Creating Notification Builder, Setting Notification Properties, Issue Notifications, Attaching Actions, Notification Compact, Builder Class Android Notification Examples

Unit III

Introduction of Multimedia in android - Multimedia API, Playing Audio, Creating Audioplayer, Playing Video, Alarm Manager.
Sensors - Sensor API , Motion Sensor , Position Sensor , Sensor Values , Sensor Manager Class , Sensor Class, Sensor Event Class, Sensor Event Listener Interface, Sensor Examples.

Unit-IV

Android Animation - Animation API, Drawable Class, Rotate Animation, Fade Animation, Zoom Animation, Animation Examples.
Graphics API - 2D Graphics, Android, Graphics Canvas, Android Graphics Paintclass,
Android Map -V2 API, Adding Map, Customizing Map, Google Mapclass, Android Google Map Application.

TEXT BOOKS:

1. Darcey Lauren and Conder Shane, "Android Wireless Application Development", Pearson   Education.

2. Schildt Hervert, "Java The Complete Reference", McGraw Hill Education.

REFERENCE BOOKS:

1. Reto Meier, "Professional android Application Development", Wiley India Pvt. Ltd.

2. Murphy L Mark , "Beginning android", Wiley India Pvt. Ltd.

3. Mednieks Zigurd, Dornin Laird, Meike G. Blake & Nakamura Masumi, "Programming android",   O'Reilly Publications.

Syllabus
Of
Bachelor of Vocation (B.Voc.)

Computer Hardware and Networking Maintenance

KURUKSHETRA UNIVERSITY, KURUKSHETRA
W.e.f. ACADEMIC SESSION 2019-20

Kurukshetra University, Kurukshetra
Scheme of Examination for Bachelor of Vocation (Computer Hardware and Networking Maintenance)
(Three Year Programme) w.e.f. 2019-20 in Phased Manner

Semester 1

Paper Code	Nomenclature	Duration of Exam	External		Internal	Total Marks		Type	Hours per Semester	Credits
			Maximum Marks	Passing Marks		Maximum Marks	Passing Marks			
BVHNM-19-11	Computer Fundamentals	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-12	Computer Networks	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-13	PC Software	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-14	Computer Hardware	3 Hours	80	32	20	100	40	Skill	60	4
BVHNM-19-15	Practical Based on BVHNM-19-13	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-16	Practical Based on BVHNM-19-14	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-17	Tutorial Based on Lab							Skill	30	2
BVHNM-19-18	Soft Skills and Personality Development	3 Hours	40	16	10	50	20	Skill	30	2

Kurukshetra University, Kurukshetra
Scheme of Examination for Bachelor of Vocation (Computer Hardware and Networking Maintenance)
(Three Year Programme) w.e.f. 2019-20

Semester 2

Paper Code	Nomenclature	Duration of Exam	External		Internal	Total Marks		Type	Hours in Semester	Credits
			Maximum Marks	**Passing Marks**		**Maximum Marks**	**Passing Marks**			
BVHNM-19-21	Programming in C	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-22	Trends in Computing Technology	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-23	Logical Organization of Computers	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-24	Fundamentals of Network Cabling-I	3 Hours	80	32	20	100	40	Skill	60	4
BVHNM-19-25	Practical Based on BVHNM-19-21	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-26	Practical Based on BVHNM-19-24	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-27	Tutorial Based on Lab							Skill	30	2
BVHNM-19-28	Project Work*		100	40		100	40	Skill	60	2

* For Project work reports, date of submission shall be 15 December in Odd semester and 30 May in the even semester. After that, candidate has to pay late fee as per university examination norms. Evaluation of Project report shall be carried out by external examiner.

Job Role: Field Technician-Computing and Peripherals

Kurukshetra University, Kurukshetra
Scheme of Examination for Bachelor of Vocation (Computer Hardware and Networking Maintenance)
(Three Year Programme) w.e.f 2020-21

Semester 3

Paper Code	Nomenclature	Duration of Exam	External		Internal	Total Marks		Type	Hours per Semester	Credits
			Maximum Marks	Passing Marks		Maximum Marks	Passing Marks			
BVHNM-19-31	Data Structures	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-32	Software Engineering	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-33	Routing & Switching	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-34	Fundamentals of Network Cabling-II	3 Hours	80	32	20	100	40	Skill	60	4
BVHNM-19-35	Practical Based on BVHNM-19-33	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-36	Practical Based on BVHNM-19-34	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-37	Tutorial Based on Lab							Skill	30	2
BVHNM-19-38	Project Work*		100	40		100	40	Skill	60	2

* For Project work reports, date of submission shall be 15 December in Odd semester and 30 May in the even semester. After that, candidate has to pay late fee as per university examination norms. Evaluation of Project report shall be carried out by external examiner.

Kurukshetra University, Kurukshetra
Scheme of Examination for Bachelor of Vocation (Computer Hardware and Networking Maintenance)
(Three Year Programme) w.e.f 2020-21

Semester 4

Paper Code	Nomenclature	Duration of Exam	External		Internal	Total Marks		Type	Hours in Semester	Credits
			Maximum Marks	Passing Marks		Maximum Marks	Passing Marks			
BVHNM-19-41	Object Oriented Programming with C++	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-42	Operating System	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-43	Windows Server Administration	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-44	Network Administration	3 Hours	80	32	20	100	40	Skill	60	4
BVHNM-19-45	Practical Based on BVHNM-19-43	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-46	Practical Based on BVHNM-19-44	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-47	Tutorial Based on Lab							Skill	30	2
BVHNM-19-48	Project Work*		100	40		100	40	Skill	60	2

* For Project work reports, date of submission shall be 15 December in Odd semester and 30 May in the even semester. After that, candidate has to pay late fee as per university examination norms. Evaluation of Project report shall be carried out by external examiner.

Job Role: Network Support Engineer

Kurukshetra University, Kurukshetra
Scheme of Examination for Bachelor of Vocation (Computer Hardware and Networking Maintenance)
(Three Year Programme) w.e.f 2021-22

Semester 5

Paper Code	Nomenclature	Duration of Exam	External		Internal	Total Marks		Type	Hours per Semester	Credits
			Maximum Marks	Passing Marks		Maximum Marks	Passing Marks			
BVHNM-19-51	Fundamentals of Data base Systems	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-52	Web Designing	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-53	PC Assembling and Troubleshooting	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-54	VMware Workstation	3 Hours	80	32	20	100	40	Skill	60	4
BVHNM-19-55	Practical Based on BVHNM-19-51 & BVHNM-19-52	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-56	Practical Based on BVHNM-19-53 & BVHNM-19-54	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-57	Tutorial Based on Lab							Skill	30	2
BVHNM-19-58	Project Work*		100	40		100	40	Skill	60	2

* For Project work reports, date of submission shall be 15 December in Odd semester and 30 May in the even semester. After that, candidate has to pay late fee as per university examination norms. Evaluation of Project report shall be carried out by external examiner.

Kurukshetra University, Kurukshetra
Scheme of Examination for Bachelor of Vocation (Computer Hardware and Networking Maintenance)
(Three Year Programme) w.e.f July, 2019

Semester 6

Paper Code	Nomenclature	Duration of Exam	External		Internal	Total Marks		Type	Hours in Semester	Credits
			Maximum Marks	Passing Marks		Maximum Marks	Passing Marks			
BVHNM-19-61	Relational Data Base Management System	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-62	Wireless Networks	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-63	Linux & Shell Programming	3 Hours	80	32	20	100	40	General	60	4
BVHNM-19-64	Firewall Technology	3 Hours	80	32	20	100	40	Skill	60	4
BVHNM-19-65	Practical Based on BVHNM-19-61	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-66	Practical Based on BVHNM-19-63	3 Hours	100	40		100	40	Skill	75	5
BVHNM-19-67	Tutorial Based on Lab							Skill	30	2
BVHNM-19-68	Project Work*		100	40		100	40	Skill	60	2

* For Project work reports, date of submission shall be 15 December in Odd semester and 30 May in the even semester. After that, candidate has to pay late fee as per university examination norms. Evaluation of Project report shall be carried out by external examiner.

Job Role: Network and Hardware Engineer

BVHNM-19-11 Computer Fundamentals

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Evolution of Computer – Generations, Types of Computer, Computer System Characteristics, Basic Components of a Digital Computer – Control Unit, ALU, Input/Output Function and Memory, Memory Addressing Capability of a CPU, Word Length of a Computer, Processing Speed of a Computer, Computer Classification.

UNIT II
Input/Output Units - Keyboard, Mouse, Trackball, Joystick, Digitizing Tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-Code Reader, Resolution, Refresh Rate, Dot Pitch, Video Standard – VGA, SVGA, XGA etc., Printers & its Types – Daisy Wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter; Sound Card and Speakers.

UNIT III
Memory – RAM, ROM, EPROM, PROM and Other Types of Memory, Storage Fundamentals – Primary Vs Secondary Data Storage, Various Storage Devices – Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive, Flash Drives, Video Disk, Blue Ray Disc, SD/MMC Memory Cards, Physical Structure of Floppy & Hard Disk, Drive Naming Conventions in PC, DVD, DVD-RW, USB Pen Drive.

UNIT IV
Information Representation - Number Systems, Conversion from one Number System to another Number System, Integer Representation – Sign Magnitude, 1's Complement, 2's Complement, BCD Codes. Floating-point Representation, Binary Arithmetic – Addition, Subtraction, Multiplication, Division.

TEXT BOOKS:
- V. Rajaraman and Neeharika Adabala, Fundamentals of Computers, PHI, Jan., 2015

- P.K. Sinha , Computer Fundamentals, BPB Publication, 2004

REFERENCE BOOKS:
- S.K. Basandra, Computer Today, Galgotia Publications, 2010

- B. Ram, Computer Fundamentals, New Age International Publisher, June, 2007

BVHNM-19-12 Computer Networks

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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 Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; TCP/IP Model;

UNIT – II
Analog and Digital Communications Concepts: Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Modems and modulation techniques;

UNIT - III
Data Link Layer Design issues; Error Detection and Correction methods; Sliding Window Protocols: One-bit, Go Back N and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth;

UNIT – IV
Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Application Layer: Introduction to DNS, E-Mail and WWW services; Network Security Issues: Security attacks; Encryption methods; Firewalls; Digital Signatures;

TEXT BOOKS:
* Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", Pearson Education, 2013.
* Michael A. Gallo, Bill Hancock and William M. Hancock, "Computer Communications and Networking Technologies", Brooks/Cole, 2001.

REFERENCE BOOKS:
* Behrouz A Forouzan, "Data Communications and Networking (SIE)", McGraw Hill, 2017.
* Bhushan Trivedi, "Computer Networks", Oxford University Press, 2012.

BVHNM-19-13 PC Software

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
MS-Windows: Operating System: Definition & Functions, Basics of Windows, Basic Components of Windows, Icons, Types of Icons, Taskbar, Activating Windows, Using Desktop, Title Bar, Running Applications, Exploring Computer, Managing Files and Folders, Copying and Moving Files and Folders.
Control Panel: Display Properties, Adding and Removing Software and Hardware, Setting Date and Time, Screen Saver and Appearance using Windows.

UNIT II
Word Processor: Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features: Mail Merge, Macros, Table, File Management, Printing, Styles, Linking and Embedding Objects, Template.

UNIT III
Spreadsheet : Introduction to Spreadsheet, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance Features -Pivot Table & Pivot Chart, Linking and Consolidation. Database Management - Sorting, Filtering, Table, Validation, Goal Seek, Scenario, What- if Analysis.

UNIT IV
Presentation Software: Presentations, Creating Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering Art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing Through Objects, Inserting Recorded Sound Effect, In Built Sound Effect.

TEXT BOOKS:
- Ravi Kant Taxali, Computer Course: Windows 7 and Office 2010, McGraw Hill Education(India) Pvt. Ltd., 2017

- Michael Busby and Russell A. Stultz., Learn MS Office 2000, BPB Publications, 2017.

REFERENCE BOOKS:
- D. Koers , Microsoft Office XP Fast & Easy, Prima Publishing, 2001.

- Satish Jain, M. Geetha and Kratika, MS-OFFICE 2010 Training Guide, BPB Publication, 2017.

BVHNM-19-14 Computer Hardware

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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 hardware: Peripheral devices of a Computer system, Add On cards: network interface card, sound card and graphics card, functional description of various parts of a PC, UPS, Types of UPS: offline, online and line interactive UPS

UNIT II
Various Components of a PC: Mother Board: Types of Motherboard AT, ATX, and BTX. Ports: Types of Ports, serial and parallel ports. Hard Disk: Types of Hard Disk: PATA, SATA, SCSI. RAM: Types of RAM: SRAM, DRAM, SDRAM, Power supply unit, cabinet, Processor.

UNIT III
Cables: Types of Cables: USB, VGA, DVI, RJ11, RJ45, HDMI, SERIAL, and PARALLEL, Connecting Cables from SMPS to motherboard, hard disk etc, Establishing data connection for mother board, hard disk, and drivers, Fixing wires for power restart switches, fixing wires for power & HDD LED, External USB and Audio Connections. Drivers: Types of drivers: Device drivers, LAN drivers, sound drivers, graphics drivers.

UNIT IV
BIOS: Introduction, Connecting & disconnecting computer peripherals and components Mouse, Keyboard, Monitor, Hard Disk. Window installation, Hard disk: partitioning and formatting, creating, formatting and deleting partitions using DISKPART in Command Prompt and Graphical User Interface. Antivirus: features and Significance, Installing third party application. Firewall: Introduction to firewall, Features of firewall.

TEXT BOOKS:
- B. Govindarajalu, IBM PC and Clones: Hardware, Troubleshooting and Maintenance, McGraw Hill Education, 2002
- S.K. Basandra, Computer Today, Galgotia Publications, 2010.

- Craig Zacker and John Rourke, PC Hardware: The Complete Reference, McGraw-Hill, 2001.

REFERENCES BOOKS:
- Scott Mueller., Upgrading and Repairing PCs, Pearson, 2015
- Jean Andrews., A+ Guide to Hardware, Cengage Learning,2016.

BVHNM-19-18 Soft Skills and Personality Development

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Attitude, Process of attitude formation, building the success attitude, Spot analysis, Self-management techniques, Self-image and self-esteem, Building self -confidence, Power of irresistible enthusiasm, etiquettes and manners in a group, public speaking, oral and written communication, Body language, Importance of listening and responding, tips for technical writing.

UNIT II
Development of Communication & Co-operation, Functions of Communication, Communication Basics, Communication Networks, Tips for Effective Internal Communication, Non-verbal Communication. Ethical Communication: austerity in speech, value, ethics and communication. Communication aids. Suitable behavior towards customers, Influence in skill, Creativity in presentation & projection and Multi-cultural skills

UNIT III
Introduction to Personality-Basic of Personality, Human growth and Behaviour, Theories in Personality, Motivation; Techniques in Personality development – Self-confidence, Mnemonics, Goal setting, Time Management and effective planning, Techniques in Personality Development-Stress Management, Meditation and concentration techniques, Self hypnotism, Self-acceptance and Self-growth.

UNIT IV
Co-ordination while working in a team, Leadership styles, Leader & Team player, Management of conflict, Profiles of great and successful personalities, Role of career planning in personality development, facing personal interviews and group discussions

TEXT BOOKS:
- Rajiv K. Mishra ,Personality Development, Rupa & Company.
- Indrajit Bhattacharya, An Approach to Communication Skills, Dhanpat Rai & Co.
- Varinder Kumar, Bodh Raj, Business Communication, Kalyani Publishers, 2014.

REFERENCES BOOKS:
- Edward E. Smith, Susan Nolen-Hoeksema, Barbara Fredrickson and Geoffrey Loftus, Atkinson and Hilgard's Introduction to Psychology, Wadsworth Publishing, 2002.
- Ravi Aggarwal, Communication: Today & Tomorrow, Sublime Publications.

BVHNM-19-21 Programming in C

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Overview of C: History & Importance of C, Structure of a C Program.
Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant.
Input/output: Unformatted & formatted I/O function, Input functions (scanf(), getch(), getche(), getchar(), gets()), output functions (printf(), putch(), putchar(), puts()).

UNIT II
Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, conditional operators and special operators. Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.
Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement.

UNIT III
Decision making & looping: For, while, do-while loop, jumps in loops, break, continue statement.
Functions: Definition, prototype, passing parameters, recursion.

UNIT IV
Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.
Arrays: Definition, types, initialization, processing an array. Structure and Union.

TEXT BOOKS
- Byron Gottfried, Programming with C, McGraw Hill Education, 2018.
- E. Balagurusamy, Computing Fundamentals and C Programming, McGraw Hill Education, 2017.

REFERENCE BOOKS
- Jeri R. Hanly and Elliot B. Koffman; Problem Solving and Program Design in C; Pearson Education India, 2013.
- Yashvant Kanetker; Let us C, BPB, 2017.

BVHNM-19-22 Trends in Computing Technology

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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 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.
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
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:
- Barrie Sosinsky, Cloud Computing Bible, Wiley Publishing Inc., 2011
- Raj Kumar Buyya and Amir Vahid Dastjerdi; Internet of Things: Principles and Paradigm, Morgan Kaufmann, 2016.

REFERENCE BOOKS:
- C. Baun, M. Kunze , J. Nimis and S. Tai ; Cloud Computing Web based Dynamic IT Services, Springer, 2011
- Peter Waher, Learning Internet of Things, Packt Publishing Limited, 2015.

BVHNM-19-23 Logical Organization of Computers

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC.

UNIT II
Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT III
Digital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. Combinational Circuits: Half-Adder, Full-Adder, Half- Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters.

UNIT IV
Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram. Flip-flop excitation tables.

Shift registers: serial in parallel out and parallel in parallel out. Designing counters-Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

TEXT BOOKS
- M. Morris Mano, Digital Logic and Computer Design, Pearson Education India, 2016.
- V. Rajaraman and T. Radhakrishnan, An Introduction to Digital Computer Design, PHI Learning Pvt. Ltd., 2007.

REFERENCE BOOKS
- Andrew S. Tanenbaum and T. Austin, Structured Computer Organization, Pearson Education India, 2016.
- Nicholas Carter, Schaum's Outlines of Computer Architecture, McGraw-Hill Education, 2002.

BVHNM-19-24 Fundamentals of Network Cabling-I

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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 Cabling: The Golden Rules of Data Cabling, The Importance of Reliable Cabling, The Legacy of Proprietary Cabling System, Cabling and the Need for Speed, Cable Design, Data Communications, Reasons of Data Slow down, Near-End Crosstalk(NEXT), Far End Crosstalk(FEXT), Equal-Level-Far-End Crosstalk(ELFEXT), Pair-to-Pair Crosstalk, Power-Sum Crosstalk, External Interference, Attenuation-to-Crosstalk Ratio(ACR), Propagation Delay, Delay Skew, The future of Cabling Performance.

UNIT II

Cabling Specifications and Standards: Structured Cabling and Standardization, ANSI/TIA/EIA-568-B Purpose and Scope, ISO/IEC 11801, Anixter Cable performance Levels Program, Other Cabling Technologies.
Choosing the Correct Cabling: Topologies, UTP, Optical Fiber and Future Proofing, Network Architectures, Network-Connectivity Devices.

UNIT III

Cable System and Infrastructure Constraints: Origin of Codes, The National Electrical Code, Knowing and Following the Codes, Cabling System Components: The Cable, Wall Plates and Connectors, Cabling Pathways, Wiring Closets.
Tools of the Trade: Building a Cabling Tool Kit, Common Cabling Tools, Cable Testing, Cabling Supplies and Tools, Tools That a Smart Data-Cable Technician Carries, A Preassembled Kit.

UNIT IV

Copper Cable Media: Types of Copper Cabling, Copper Cable for Data Applications, Copper Cable for Voice Applications, Testing, Connectors: Twisted-Pair Cable Connectors, Coaxial Cable Connectors, Fiber-Optic Cable Connectors, Fiber-Optics Media: Introduction to Fiber-Optic Transmission, Advantages and Disadvantages of Fiber-Optic Cabling, Types of Fiber-Optic Cable, Fiber Installation Issues. Unbounded (Wireless) Media: Infrared Transmission, Advantage of Infrared, Radio Frequency (RF) Systems, Microwaves Communications.

TEXT BOOK:
- David Barnett, David Groth and Jim McBee, Cabling: The Complete Guide to Network Wiring**,** Sybex, 2008.

REFERENCE BOOK:
- Bill Woodward and Andrew Oliviero, Cabling: The Complete Guide to Copper and Fiber-Optic Networking , Sybex, Fourth Edition, March 2014.

BVHNM-19-31 Data Structures

Maximum marks: 100   External: 80

Time: 3 hours   Internal: 20

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 Operations, Algorithm Complexity and Time-space Tradeoff, Classification of Data Structures.
String Processing: Storing Strings, String Operations, Pattern Matching Algorithms.
Arrays: Linear Arrays, Operations on Arrays, Multidimensional Arrays, Storage of Arrays, Matrices, Sparse Matrices.

UNIT II
Linked Lists: Representation of Linked List in Memory, Traversal, Searching, Insertion, Deletion, Sorted Linked List, Header List, Two–way List.
Stacks, Queues, Linked and Array Representation of Stacks, Queues, and Dequeues, Priority Queues, Operations on Stacks and Queues.

UNIT III
Applications of Stacks: Recursion, Polish Notation, Quick Sort.
Trees: Binary Trees, Representation of Binary Trees in Memory, Threaded Binary Trees, Balanced Tree, Different Tree Traversal Algorithms, Binary Search Tree: Searching, Insertion, and Deletion in a Binary Search Tree, Heap Sort.

UNIT IV
Representation of Graphs and Applications: Adjacency Matrix, Path Matrix, Shortest Path Algorithm, Linked Representation of a Graph, Traversing a Graph.
Sorting and Searching: Linear Search, Binary Search, Insertion Sort, Selection Sort, Bubble Sort, Radix Sort, Merge Sort.

TEXT BOOKS:
- Seymour Lipschutz, Data Structures(SIE), Mc Graw Hill India; 1st edition, 2014.

- Aaron M. Tanenbaum, Yedidyah Langsam and Moshe J. Augenstein, Data Structures using C, Prentice Hall of India Pvt. Ltd., New Delhi, 2009

REFERENCE BOOKS:
- J.P. Tremblay and P.G. Sorenson, An Introduction to Data Structures with Applications, McGraw Hill Education, 2017.

- Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Pearson Education India, 2002.

BVHNM-19-32 Software Engineering

Maximum marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Software Crisis – Problem and Causes, Software Life Cycle Models: Waterfall, Prototype, Evolutionary and Spiral Models. Software Project Planning: Cost Estimation: COCOMO Model, Putnam Resource Allocation Model, Risk Management, Project Scheduling, Personnel Planning, Team Structure, Software Configuration Management, Quality Assurance, Project Monitoring.

UNIT II
Software Requirement, Analysis and Specifications: Structured Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship Diagrams, Software Requirement and Specifications, Behavioral and non-behavioral Requirements.
Software Design: Design Fundamentals, Problem Partitioning and Abstraction, Design Methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling.

UNIT III
Coding: Programming Style, Structured Programming. Software Testing: Testing Fundamentals, Functional Testing: Boundary Value Analysis.
Equivalence Class Testing, Decision Table Testing, Cause Effect Graphing, Structural Testing: Control Flow Based and Data Flow Based Testing, Loop Testing.

UNIT IV
Software Testing Strategies: Unit Testing, Integration Testing, Validation Testing, System Testing, Alpha and Beta Testing.
Software Maintenance: Type of Maintenance, Management of Maintenance, Maintenance Process, Maintenance Characteristics.
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TEXT BOOKS:
- Roger S. Pressman, Software Engineering – A Practitioner's Approach, McGraw Hill Education, 2009

- Ian Sommerville, Software Engineering, Pearson Education, 2017.

REFERENCE BOOKS:
- Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa , 2005.

- James F. Peters and Witold Pedrycz, Software Engineering: An Engineering Approach, John Wiley and Sons, New Delhi, 2000.

BVHNM-19-33 Routing and Switching

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Router: Introduction, components of routers, Types of Routers: Broadband Routers, Wireless Routers, Edge Router, Subscriber Edge Router, Inter-provider Border Router, Core Router, Wired and Wireless Routers. Functions of routers, router modes, Configuration of Router: names, passwords, password encryption, interfaces name, creating a login banner, saving configuration and erasing configuration.

UNIT II
Routing: Introduction, Types of routing: Static and dynamic routing, Static routing: Configuring a static route, Static routes and Administrative distance, Configuring default route. Dynamic routing: Dynamic Routing Protocols: RIPv1, RIPv2, IGRP, EIGRP and OSPF. Delivery Semantics: Unicast, Anycast, Multicast, Broadcast, Geocast. Configuring and Verifying RIP, IGRP, OSPF, EIGRP.

UNIT III
Switch: Introduction, Roles of switches in network, Types of switches: Managed and Unmanaged Switch. Working of switch in different layers. Configuration of Switch: Command Mode, Setting Host Names, Setting Passwords, Setting IP Addresses and Default Gateways, Setting Operational Speed, Switch Port Security, Sticky MAC Addresses.

UNIT IV
Switching: Introduction, Switching Services, Bridging vs LAN Switching, Switch Functions at Layer 2, Definition of Spanning Tree Protocol (STP), Operations of STP, STP Port States, Definition of VLAN, Typing of VLAN: Static and Dynamic, VLAN Identification Methods, VLAN Trunking Protocol (VTP), VTP Modes of Operation, Routing between VLANs, Configuring Inter-VLAN Routing.

TEXT BOOKS:
- Raymond Lacoste and Kevin Wallace, CCNP Routing and Switching TSHOOT 300 - 135: Official Cert Guide, Pearson India ,2015
- Todd Lammle, CCNA Routing and Switching Study Guide, Wiley India Pvt Ltd, 2nd *Edition, 2016*
- Richard Deal, CCNA Cisco Certified Network Associate Study Guide, Mcgraw Hill Education, 3rd Edition, 2017.

REFERENCES BOOKS:
- Vikas Gupta, Comdex Hardware and Networking Course Kit, Dreamtech Press, 2014.
- Toby J. Velte and Anthony T. Velte, Cisco a Beginner's Guide, Fifth Edition, McGraw-Hill Education, 2013
- Bobbi Sandberg, Networking: The Complete Reference 3rd Edition, McGraw Hill Education, 2015.

BVHNM-19-34 Fundamentals of Network Cabling-II

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Cabling-System Design and Installation: Element of a Successful Cabling Installation, Cabling Topologies, Cabling Plant Uses, Choice of Media, Telecommunication Rooms, Cabling Management, Data and Cabling Security, Cabling Installation Procedures.

UNIT II
Cable Connector Installation: Twisted Pair Cable Connector Installation, Coaxial Cable-Connector Installation, Fiber-Optic Cable-Connector Installation.
Cable-System Testing and Troubleshooting: Installation Testing, Cable-Plant Certification, Cable Testing Tools, Troubleshooting Cabling Problems.

UNIT III
Creating a Request for Proposal (RFP): Request for Proposal, Developing a Request for Proposal, Distributing the RFP and Managing the Vendor Selection Process, Project Administration, Technology Network Infrastructure Request for Proposal.

UNIT IV
Cabling Work-Experience from the Field: Hints and Guidelines, Work Safely, Case Studies: A Small Job, A Large Job, A Peculiar Job, An Inside Job.

TEXT BOOK:
- David Barnett, David Groth and Jim McBee, Cabling: The Complete Guide to Network Wiring**,** Sybex, 2008.

REFERENCE BOOK:
- Bill Woodward and Andrew Oliviero, Cabling: The Complete Guide to Copper and Fiber-Optic Networking , Sybex, Fourth Edition, March 2014.

BVHNM-19-41 Object Oriented Programming with C++

Maximum marks: 100   External: 80

Time: 3 hours   Internal: 20

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 Programming C++: Object-oriented Features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data Members and Member Functions, Inline Functions, Static Data Members and Member Functions, Friend Functions, Preprocessor Directives, Namespace, Comparing C with C++.

UNIT II
Constructors & Destructors: Roles and Types of Constructors, Roles of Destructors, Dynamic Memory Allocation: Pointers and their Manipulation, new and delete Operators 'this' Pointer. Console I/O: Formatted and Unformatted I/O, Manipulators.

UNIT III
Compile-Time Polymorphism: Unary and Binary Operators Overloading Through Member Functions and Friend Functions, Function Overloading.
Inheritance: Types of Derivations, Forms of Inheritance, Roles of Constructors and Destructors in Inheritance.

UNIT IV
Genericity in C++: Template Function, Template Class, Inheritance and Templates. Exception Handling: try, throw and catch constructs, rethrowing an Exception, catch all Handlers.

TEXT BOOKS:
- E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill, 2001

- Robert Lafore, Object Oriented Programming in Turbo C++, The Waite Group Press, 1994

REFERENCE BOOKS:
- Herbert Schildt, The Complete Reference in C++, TMH, 2002.

- Paul Deitel. and Harvey Deitel, C++ How to Program, Pearson Education, 2017.

BVHNM-19-42 Operating System

Maximum marks: 100   External: 80

Time: 3 hours   Internal: 20

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: operating system, architecture, functions, characteristics, historical evolution, types: Serial batch, multiprogramming, time sharing, real time, distributed and parallel. OS as resource Manager.
Computer system structures: I/O structure, storage structure, storage hierarchy.
Operating system structure: system components, services, system calls, system programs, system structures.

UNIT II
Process management: process concepts, process state, process control block, operations, process scheduling, inter process communication.
CPU Scheduling: scheduling criteria, levels of scheduling, scheduling algorithms, multiple processor scheduling.
Deadlocks: Characterization, methods of handling, deadlock detection, prevention, avoidance, recovery.

UNIT III
Storage Management: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.
Process synchronization: critical section problems, semaphores. Mutual exclusion

UNIT IV
Device and file management: Disk scheduling, Disk structure, Disk management, File Systems: Functions of the system, File access and allocation methods, Directory Systems: Structured Organizations, directory and file protection mechanisms.

TEXT BOOKS:
- A. Silberschatz, P.B. Galvin,and G. Gagne, "Operating System Concepts", Wiley, 2017.
- A.S. Godbole and A. Kahate, Operating Systems, McGraw Hill Education, 2017.

REFERENCE BOOKS:
- H.M. Deitel, P.J. Deitel and D.R. Choffnes, "Operating Systems", Pearson Education India, 2007.
- A.S. Tanenbaum and A.S. Woodhull, "Operating System- Design and Implementation", Pearson, 2006.

BVHNM-19-43 Windows Server Administration

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Network Operating Systems: Windows Server Editions, Linux, Unix, Terminal services: Dumb terminals, terminal server configuration, windows server as terminal server, advantages of terminal services.
Windows Server: different ways to install network operating system, pre-installation requirements, Maintaining AD DS, Managing User and Service Accounts, Implementing a Group Policy Infrastructure, Managing User Desktops with Group Policy, Installing, Configuring, and Troubleshooting the Network Policy Server Role.

UNIT II
Installing and Configuring a Network Policy Server: Implementing Network Access Protection, Implementing Remote Access, Implementing Direct Access by Using the Getting Started Wizard, Deploying an Advanced Direct Access Solution, Implementing VPN, Implementing Web Application Proxy, Optimizing File Services, Configuring Quotas and File Screening Using File Server Resource Manager, Implementing Distributed File System, Configuring Encryption and Advanced Auditing, Deploying and Maintaining Server Images, Using Windows Deployment Services to Deploy Windows Server, Implementing Update Management, Monitoring Windows Server

UNIT III
Microsoft Windows Server: Deploying and Managing Windows Server, Introduction to Active Directory Domain Services, Installing Domain Controllers, Managing Active Directory Domain Services Objects, Automating Active Directory Domain Services Administration, Implementing Dynamic Host Configuration Protocol, Implementing DNS, Implementing Local Storage, Implementing File and Print Services.

UNIT IV
Windows Security: Firewalls, Spyware, viruses, User accounts security, Search strategies System performance, Troubleshooting tools, Windows registry, Administering Windows Server: Configuring and Troubleshooting Domain Name System, Configuring and Troubleshooting DNS, Maintaining Active Directory Domain Services.

TEXT BOOKS:
- Windows Server Administration Fundamentals by Microsoft Official Academic Course, 2015
- Darril Gibson, Microsoft Windows Networking Essentials 1st Edition, Sybex, 2011.
- Tom Carpenter, Microsoft Windows Server Administration Essentials, Sybex, 2011.

REFERENCE BOOKS:
- Kris Jamsa, Rescued by Windows, Course technology Inc., 1993.

BVHNM-19-44 Network Administration

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Backing UP and Restoring IOS Software and Configuration: Boot system commands, IOS file system, backing up configuration to a TFTP server, restoring configuration to a TFTP server, backing up the IOS software to a TFTP server, restoring/upgrading the IOS software from a TFTP server, restoring IOS software from ROM Monitor mode using Xmodem.

UNIT II
Password-Recovery Procedures and Configuration Register: The configuration register: A visual representation, bit means, The boot field, Console terminal baud rate setting, Console line speed: CLI & ROM Monitor mode, password recovery procedures for router, Password recovery procedures for switches.

UNIT III
Basic troubleshooting: Viewing routing table, Determining the Gateway of last resort, Last routing update, OSI layer 3 testing, OSI layer 7 testing, Interpreting the show interface command, Using CDP to troubleshooting, show controllers command debug commands, Time stamps, Operating system IP verification commands, the ip http server command, netstat command.

UNIT IV
Security Device Manager: SDM connecting with CLI and GUI, SDM Express Wizard with no CLI pre-configuration, resetting the router to factory defaults, SDM user interfaces, Configuration routing using SDM, SDM monitor mode, SDM to configuration a router as a DHCP server & client, SDM configuration NAT/PAT.

TEXT BOOKS:
- Richard Deal, CCNA Cisco Certified Network Associate Study Guide, Mcgraw Hill Education, 3rd Edition, 2017.
- Troy McMillan, Cisco Networking Essentials, Sybex, 2015.
- Vikas Gupta, Comdex Hardware and Networking Course Kit, Dreamtech Press, 2014.
- William Stallings, Cryptography and Network Security: Principles and Practice, Pearson Education, 2017

REFERENCE BOOKS:
- Toby J. Velte and Anthony T. Velte, Cisco a Beginner's Guide, Fifth Edition, McGraw-Hill Education, 2013
- Bobbi Sandberg, Networking: The Complete Reference 3rd Edition, Mcgraw Hill Education, 2015.

BVHNM-19-51 Fundamentals of Database Systems

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Basic Concepts – Data, Information, Records and files. Traditional file Based Approach- Limitations of Traditional File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS.

UNIT II
Actors on the Scene - Data and Database Administrator, Database Designers, End users Applications Developers and Workers behind the Scene.
Database System Architecture – Three Levels of Architecture, Schemas – External, Conceptual and Internal Level, Database Languages – VDL, DDL, SDL, DML, SQL, Mappings – External/Conceptual and Conceptual/Internal, Instances, Data Independence – Logical and Physical Data Independence

UNIT III
Data Models: High Level, Low Level and Representational – Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Models
Entity-Relationship Model – Concepts, Entity Types, Entity Sets, Attributes, Relationships, Constraints, Keys , Degree, Cardinality etc.
ER Diagrams of any Database Organization- Inventory System, Payroll System, Reservation System, Online Book Store etc.

UNIT IV
Classification of Database Management System, Centralized and Client Server architecture
Relational Data Model:-Brief History, Terminology in Relational Data Structure, Relations, Properties of Relations, Keys – Primary, Secondary, Composite, Candidate, Alternate and Foreign Key, Domains, Integrity Constraints over Relations.

TEXT BOOKS:
- Ramez Elmasri & Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson, 2016.
- C.J. Date, "An Introduction to Database Systems", Pearson Education, 2003.

REFERENCE BOOKS:
- H.F. Korth, A. Silverschatz & S. Sudarshan, "Database Concepts", McGraw Hill Education,2013.

BVHNM-19-52 Web Designing

Maximum marks: 100   External: 80

Time: 3 hours   Internal: 20

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 Internet and World Wide Web , Web Browsers, Web server, Web page, Web site.
Web Publishing: Hosting your site, Internet Service Provider, Planning & Designing Web Site, Steps for Developing Sites, Choosing the Contents, Home Page, Domain Names, Creating a Web Site.
HTML: Introduction, Tags, HTML Standards, Creating Web Pages, Adding Background Colors, Page Formatting, Break Tag, Paragraph Tag, HR Tag, Preformatted Text, Working with Headings, Images, Linking Web Pages, Tables and Lists, Forms, Buttons.

UNIT II

Introduction to CSS, Properties and Values, Defining CSS Styles, Using Links and Style, Importing and Embedding Style Sheets, In lining Styles, Using Attributes, Class Attributes, ID Attributes, Using Elements, Cascading Style Sheets, Selectors, Class Selectors, ID Selectors, Contextual Selectors.

UNIT III

Introduction to JavaScript: Utility and Evolution of the JavaScript, JavaScript Versions; Differences Between Client-Side vs. Server-Side JavaScript, Statements and Operators, Variable Declarations, Operator Precedence; Implementing Control Constructs: Conditional and Looping Constructs; Implementing Functions: Defining Functions, Calling Functions, Passing Arguments, Local vs. Global Variables, Using the Return Statement, Nested Functions. JavaScript Objects: JavaScript Object Model and Hierarchy, Object properties and Methods, New Keyword, This Keyword.

UNIT IV

Fundamental JavaScript Directives: In-Line JavaScript, Linking Web Pages to External JavaScript Files, Tags and Attributes; Implementing Arrays; The delete Keyword, Introduction to Server-Side JavaScript. Cookies: Introduction and Uses of Cookie, Components of a Cookie, Using Cookies on a Web Page; Form Validation and Testing; Event Handling: Event-Driven Programming Model.

TEXT BOOKS:
- Ivan Bayross, Web Enabled Commercial Applications Development using HTML, Javascript, DHTML & PHP, BPB Publication, 2005

- Thomas Powell, The Complete Reference HTML & CSS, McGraw Hill Education, 2017.

REFERENCE BOOKS:
- Robert Reinhardt and Snow Dowd, Macromedia Flash MX Bible, Wiley Dreamtech India Pvt Ltd, 2003.

BVHNM-19-53 PC Assembling and Troubleshooting

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Components of PC: Identifying the Major Components of a PC : System Unit, Monitor, Keyboard, Mouse Devices, Handling PC Connections.
Identifying the Internal Components of a PC: Opening a System Unit, Handling Expansion Cards.
Identifying the Right CPU for Any Motherboard: CPU Manufacturers, Processor Models, CPU Speeds, Processor Packages Installing and Upgrading CPUs, Heat Sink and Fan Assemble.
Ram Packages: SIMMs, DIMMs And RIMMs, Adding and Upgrading Ram..

UNIT II
Motherboard: Common Motherboard Features, Installing a Motherboard.
Expansion Bus: Expansion Buses, Internal Buses: ISA, PCI, AGP. Expansion Card, External Expansion Buses: USB.
Power Supply: Wattage, Connectors, Common Power Supply problems.
Cooling: Power Supply Fan, Case Fans.
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UNIT III
Sound: Working of Sound in a PC, MIDI, Purchasing the Right Sound Card: Processor Capabilities, Speaker Support, Recording Quality, Installing a Sound Card in a Windows System, Troubleshooting Sound.
Hard Drive Maintenance and Troubleshooting: Scandisk, Defragmentation, Disk Cleanup.
CD Media: Understanding CD Media Technologies: CD Data Storage, CD-Rom, Speeds, CD-R, CD-RW, DVD, Installing CD Media Drives, Using CD Media : Autoplay in Windows XP, Burning CDs.
CD Media Troubleshooting: Drive Problems, Disk Problems.

UNIT IV
Video : Selecting The Right Monitor, CRTs : How CRTs Work. LCDs : How LCDs Work. Selecting The Right Video Card: Graphics Processor, Video RAM. Installing And Configuring Video Software. Troubleshooting Monitor Problems: Fuzziness, Missing Color, Missing Pixels, Dim Screen, No Image, Video Card Problems.

TEXT BOOKS:
- Craig Zacker and John Rourke, PC Hardware: The Complete Reference, McGraw-Hill, 2001.

- Stephen J. Bigelow, Troubleshooting, Maintaining, Repairing PC's, McGraw Hill Education, 2017.

REFERENCE BOOKS:
- B. Govindarajalu, IBM PC and Clones: Hardware, Troubleshooting and Maintenance, McGraw Hill Education, 2002.
- Ron Gilster, PC hardware a Beginners Guide, McGraw-Hill Education, 2001.

BVHNM-19-54 VMware Workstation

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Installing Workstation: Installing Workstation Basics, Installing Debuggers, Upgrading Workstation, Workstation Window Tour, Setting Workstation Preferences, Getting Help, Finding Your License Key, Creating Virtual Machines, Preparing to Create a VM, Understanding Memory Options, Understanding Page Faults, Understanding Virtual Disk, Understanding Virtual Disk Options, Creating a VM, Working with Easy Install, Installing a Guest OS, Installing a Guest OS , Virtualizing a Physical Machine, Importing Virtual Machines, Importing Virtual Box VMs, Installing VMware Tools, VM Files, VMDK File Names

UNIT II
Using Virtual Machines: Starting a Virtual Machine, Stopping a Virtual Machine, Stopping a Virtual Machine, Resuming a Virtual Machine, Closing VMs and Exiting Workstation, Drag / Drop / Cut / Paste, Shared Folders, Mapping a Virtual Disk, Adding a Printer, Using Removable Devices, Removable Devices and Lost Data, VM Snapshot Overview, Creating Snapshots, Snapshot Best Practices, Installing New Software, Recording a VM, Deleting a VM, Goodbye Teams Hello Folders, Converting a Team

UNIT III
Manage and Configure VMs: Workstation Display Preferences, Unity Mode, Encrypting VMs, Moving VMs, Understanding the UUID, Understanding Cloning, Cloning VMs, Changing Hardware Compatibility, Exporting VMs. Configuring Devices: Configuring DVDs, Configuring USB Controllers, Managing the VHD, Compacting the VHD, Expanding the VHD, Defragmenting the VHD, The Virtual Disk Manager, Configuring Keyboard Features

UNIT IV
VM Networking: Understanding VM Networking, Common Network Configurations, Changing Default Network Configuration, Understanding Bridged Networking, Understanding NAT, Understanding Host-Only Networking, Add a Virtual Network Adapter, Modify a Virtual Network Adapter, Disconnect a Virtual Network Adapter, Configure Bandwidth and Packet Loss, VM MAC Addresses, Changing MAC Addresses, Sharing and Remoting: Understanding Workstation Server, Shared Virtual Machines, Connecting to a Remote Server.

TEXT BOOKS:
- Brian Ward, Book of VMware: The Complete Guide to VMware Workstation, No Starch Press, 2002
- Steven S. Warren, The VMware Workstation 5 Handbook, Charles River Media Networking & Security Series, Charles River Media, 2005.
- Dannielle Ruest and Nelson Ruest, Virtualization: A Beginner's Guide, McGraw-Hill Education, 2009

BVHNM-19-61 Relational Data Base Management System

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Relational Model Concepts, Codd's Rules for Relational Model, Hierarchical Data Model– Introduction, Features, Components, Example, Network Data Model– Introduction, Features, Components, Example, Differences between Hierarchical Data Model and Network Data Model Comparison of Relational Data Model with Hierarchical Data Model and Network Data Model Relational Algebra:-Selection and Projection, Set Operation, Join and Division.

UNIT II
Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.
Functional Dependencies and Normalization -- Purpose, Data Redundancy, Update Anomalies, Partial/Fully Functional Dependencies, Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

UNIT III
SQL: Data Definition and data types, Create Table, Insert Data, Viewing Data, Filtering Table Data, Sorting data, Creating Table from a Table, Destroy table, Update, View, Delete, Join, Concatenating data from Table Specifying Constraints in SQL; Primary Key, Foreign Key, Unique Key, Check Constraint, Using Functions

UNIT IV
PL/SQL-Introduction, Advantages of PL/SQL
The Generic PL/SQL Block: PL/SQL Execution Environment; PL/SQL Character Set and Data Types, Declaration and Assignment of Variables
Control Structure in PL/SQL: Conditional Control, Iterative Control, Sequential Control

TEXT BOOKS:
* Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Pearson, 2016.
* Ivan Bayross, SQL, PL/SQL: The Programming Language of Oracle, BPB Publication, 2002.

REFERENCE BOOKS:
* C.J. Date, An Introduction to Database Systems, Pearson Education, 2003.
* H.F. Korth, A. Silverschatz & S. Sudarshan, Database Concepts, McGraw Hill Education, 2013.

BVHNM-19-62 Wireless Networks

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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 Wireless Networks Architecture - Characteristics, Applications, Issues, Wireless vs. Wired Networks, Circuit Switched Networks and Packet Switched Networks in Details.
Multiple Radio Access - Medium Access Alternatives, Fixed-Assignment for Voice Oriented Networks, Random Access for Data Oriented Networks, Hand-off and Roaming Support.

UNIT II
Cellular Network Generations- GSM, CDMA, GPRS with its Architectures and Application Areas.
Wireless LANs - Introduction to Wireless LAN (IEEE-802.11)-Architecture, Services, Physical layer, MAC Sub-Layer, MAC management Sub-Layer, Other IEEE 802.11 standards, HIPERLAN, Wi-Max standard.

UNIT III
Ad-Hoc Networks - Introduction, Issues in Ad-Hoc Wireless Networks, Ad-Hoc Wireless Internet, Ad-Hoc vs Wireless Networks.
MAC Protocol - Issues in Designing a MAC Protocol for Ad-Hoc Wireless Networks, Design Goals of a MAC Protocol for Ad-Hoc Wireless Networks, Classification of MAC Protocols.

UNIT IV
MANET Routing Protocols – Types of MANET Protocol (On Demand Protocol, Table-Driven and Hybrid Protocols), Wireless Sensor Networks Classification, MAC and Routing Protocols. Wireless MANs and PANs, Wireless MAN-Physical and MAC Layer Details, Wireless PAN-Architecture of Bluetooth Systems, Physical, MAC Layer Details, Standards, Examples of Wireless Network Standards.

TEXT BOOKS:
* C.Siva Ram Murthy and B.S. Manoj, Ad-Hoc Wirelss Networks: Architecture and Protocol, Pearson Education India, 2006.

REFERENCE BOOKS:
* Andrew S. Tanenbaum and David J. Wetherall, Computer Networks, Pearson Education, 2013.
* William Stallings, Data and Computer Communications, Pearson Education, 2017.

BVHNM-19-63 Linux and Shell Programming

Maximum marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Definition of Operating System, Types of Operating System, Features of Unix, Basic Architecture of Linux System, Features of Kernel and Shell;
Linux File System: Boot Block, Super Block, Inode Table, Data Blocks, How Linux Kernel Access Files, Linux Standard File System.

UNIT II
Structure of File System, Essential Linux Commands - Commands for Files and Directories, Creating and Viewing Files using cat, cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, file comparisons- cmp & comm, View Files, Disk Related Commands, Checking Disk Free Spaces, chmod with its options, cal, date, who, tty, lp, stty;
Filter and Pipes: head, tail, wc, pr, cut, paste, sort, uniq, grep, egrep, fgrep,tee;
The Process: Shell Process, Parent and Children, Process Status, System Process, Multiple Jobs in Background and Foreground, Changing Process Priority with nice, Premature Termination of Process, Mathematical Commands - bc, expr, factor, and units.

UNIT III
Creating and Editing Files with VI Editor with their Command Options, Operators, Text Deletion, Text Movement, Changing Text, Yanking Text, Filtering Text, The ex mode, Moving Text from one File to another.
Communication: The Bulletin Board- News, Write, Mesg, Talk, Mail, elm, Pine, Finger, Vacation and Connecting to Remote Machine.

UNIT IV
System Administration Common Administrative Tasks, Identifying Administrative Files - Configuration and Log Files, Role of System Administrator, Managing User Accounts - Adding and Deleting Users, Changing Permissions and Ownerships.
Installation of Linux System- Linux Installation Requirement, Complete Procedure Steps, Partitioning the Hard Drive, System Startup and Shutdown Process, init and run Levels, File System Mounting, lpstat, Backup Strategy, Installing Software on Linux.

TEXT BOOKS:
- David Bandel, R. Napier, Using Linux, Que, 2000.

REFERENCE BOOKS:
- Syed Mansoor Sarwar, Robert Koretsky, Unix: The Textbook, Chapman and Hall/CRC, 2016.

- Sumitabha Das, Unix Concepts & Applications, McGraw Hill Education, 2017.

BVHNM-19-64 Firewall Technology

Maximum Marks: 100   External: 80

Time: 3 hours   Internal: 20

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
Firewall: Introduction, Need of Firewall, Working of Firewall, Network   Layer Firewall, Application Layer Firewall, Windows Firewall, Types of firewall: Hardware and Software Firewalls, Firewall Filtering Techniques: Packet Filter, Application Gateway, Circuit-level Gateway, Proxy Server. Installation of Firewall: key functions during installation, special options during installation, installing UTM, Basic Configuration, Backup Restoration.

UNIT II
Web Admin: Web Admin Menu Button bar, lists searching in lists, dialog boxes, buttons and icons, Object lists. Dashboard: Dashboard settings, Flow monitor, Management: System settings, Organizational, Hostname, Time and date, Scan Settings, Reset configuration or passwords. Web admin settings: general, Access control, User rights HTTPs Certificate, User preferences, Licensing, Backup/Restore, User portal, Notifications, Hardware and Software requirements, Status system status configuration, Shutdown and Restart.

UNIT III
Definitions & Users: Network definitions, MAC address definitions, Service definitions, Time period definitions, Users and Groups, Global Settings Interfaces and Routing; DNS: Global, forwarders, Request routing, Static entries, DynDNS, DHCP: Servers, Relay, DHCPv6 Relay, Static Mappings, IPv4 table, Network Protection : Firewall, Rules, Country Blocking, Country Blocking Exceptions, ICMP, NAT: Masquerading, Advanced Threat Protection, Intrusion Prevention: Global attack patterns, Anti-Dos/Flooding, Anti-Port scan, Exceptions, Server Load Balancing: Balancing Rules

UNIT IV
Web Protection: Web filtering: Some key differences, Common tasks, migration, Global, Https, Policies : Filter action wizard, Categories, Websites, Downloads, Antivirus, Web filter Profile: Filter profiles, Filter actions, parent proxies, Filtering options: Exceptions, Websites, Bypass users, Potentially unwanted applications categories, Logging & Reporting : View Log Files, Today's Log Files, Archived Log Files, Search Log Files, Hardware Daily, Weekly, Monthly, Yearly.

TEXT BOOKS:
- D. Hucaby, D. Garneau & A. Sequeira, CCNP Security FIREWALL 642-618 Official Cert Guide, Pearson India, 2012.
- D. Burns, O. Adesina, K. Barker, CCNP Security IPS 642-627 Official Cert Guide, Pearson India, 2012.
- S. Wilkins, F. H. Smith, CCNP Security Secure 642-637 Official Cert Guide, Pearson Education, 2011.

REFERENCES BOOKS:
- Dameon D Welch-Abernathy, Essential Check Point Firewall-1 NG: An Installation, Configuration, and Troubleshooting Guide, Addison Wesley, 2004.

KURUKSHETRA UNIVERSITY, KURUKSHETRA

SCHEME OF COMPUTER AWARENESS TO BE INTRODUCED AT UNDER GRADUATE LEVEL (2nd Year)

Paper Code	Paper Name	Maximum Marks	Pass Marks	Examination Duration
COMPUTER AWARENESS (LEVEL – II) w.e.f. 2019 - 20				
L2 – (I)21	Web Designing	100	35	3 hours
L2 – (II)22	Practical - Web Designing	100	35	3 hours
OR				
L2 – (I)23	Data Handling	100	35	3 hours
L2 – (II)24	Practical - Data Handling	100	35	3 hours
OR				
L2 – (I)25	Designing with Computers	100	35	3 hours
L2 – (II)26	Practical - Designing	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 – II)
L2 – (I)21 WEB DESIGNING (w.e.f. 2019 - 2020)

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.

Web Publishing: Hosting your Site; Internet Service Provider; Planning and designing your Web Site; Steps for developing your Site; Choosing the contents; Home Page; Domain Names; Creating a Website and the Markup Languages (HTML, DHTML);

Web Development: Introduction to HTML; Hypertext and HTML; HTML Document Features; HTML command Tags; Creating Links; Headers; Text styles; Text Structuring; Text colors and Background; Formatting text; Page layouts; Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes;

Cascading Style Sheets: Creating Style Sheets; Common Tasks with CSS: Text, Fonts, Margins, Links, Tables, Colors; Marquee; Mouseovers; Filters and Transitions;

REFERENCES BOOKS
1.   Internet and Web Technologies, Raj Kamal, Tata McGraw-Hill.
2. Multimedia and Web Technology, Ramesh Bangia, Firewall Media.
3. Internet and Web Design, ITLESL Research and Development Wing, Macmillan India .
4. Web Design: The Complete Reference , 4/e, Thomas A. Powell, Tata McGraw-Hill
5. Internet and World Wide Web, How to Program, Deitel and Goldberg, PHI.

L2 – (II)22 PRACTICAL – WEB DESIGNING

Max. Marks: 100   **Pass Marks: 35**

Exam Duration: 3 Hrs   **Workload: 6 periods/week**

Based on the syllabus mentioned above.

The following are some of the sample exercises, but the practical is not limited to these exercises only.

- Create a website for a Computer Hardware firm. The firm deals in various output units and various types of memory. Collect information about various brands of printers, scanners, memory etc. available in market. Show the various product details in tabular form on each web page.

- Create following online forms:
  - Adhaar Card
  - Railway Reservation form

- Using HTML design a web site for your school.

- Using HTML design a web site providing information about Open source, free ware, licensed software(s).

- Create a simple HTML page with title heading paragraph emphasise strong and image elements

- Create a complex HTML table

- Create a simple HTML Form covering major form elements

- Embed Video in an HTML page

- Create a Navigation bar (with dropdown) with CSS

- Create a CSS Grid

- Create a CSS3 based Zebra striped table

- Use CSS3 to make an image rounded shape

- How to center the alignments for one of the items inside a flexible element?

- How to bind an animation to a division element?

- How to Specify the duration of an animation takes to complete?

- How to Specify the duration of an animation takes to complete?

- How to define a dialog box or window with an HTML tag?

- How to define an inline frame?

- How to define a keyboard input?

- How to represent the progress of a task?

COMPUTER AWARENESS (LEVEL – II)
L2 – (I)23 DATA HANDLING (w.e.f. 2019 - 2020)

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.

Formulas and Functions, more useful functions such as the IF, nested IF, VLOOKUP and HLOOKUP functions in Excel; Connect (or link) cells and ranges and their behavior, Fixed or absolute references (dollar signs) for cells; partially fixed references. Using Macros to automate repetitive tasks; Cell formatting; Conditional Formatting.

Introduction to the Data filtering capabilities of Excel, the construction of Pivot Tables to organize data, calculate margins and other common ratios using calculation on pivot table, Multiple pivot tables and pivot charts to create dashboard, Connect multiple slicers to the pivot tables.

Constructing various Line, Bar and Pie charts. Using the Pivot chart features of Excel. Understanding and constructing Histograms and Scatterplots.

Linking and Consolidation: Links between workbooks; benefits and precautions; Missing links and auditing;

Protecting Workbooks: Uses; Locking cells; Worksheet protection, Workbook protections, allowing users to edit ranges;

Database Management using Excel-Sorting, Filtering, Table, Data validation, Goal Seek, Scenario.

REFERENCES BOOKS

1.   William Fisher, Excel: Quick Start Guide from Beginner to Expert
2. Scott Proctor, Building Financial Models with Microsoft Excel: A Guide for Business Professionals, Wiley Publishers.
3. Conrad Carlberg, Predictive Analytics: Microsoft Excel
4. Madhan Kumar, Advanced Excel Formulas and Functions

L2 – (II)24 PRACTICAL – DATA HANDLING

Max. Marks: 100   **Pass Marks: 35**

Exam Duration: 3 Hrs   **Workload: 6 periods/week**

Based on the syllabus mentioned above.

The following are some of the sample exercises, but the practical is not limited to these exercises only.

- How to Calculate Percentages in Excel?
- How To Sort Data In Excel*?*
- How to Delete Blank Rows in Excel?
- How to Insert a Checkbox in Excel?
- How To Use The COUNTIF Function in Excel?
- How to Transpose Data in Excel?
- How To Find Duplicates in Excel And Then Remove Them (Or Merge)?
- How To Password Protect An Excel File – Lock Cells and Formulas?
- How To Calculate The Average In Excel?
- How to Freeze Cells, Rows, and Columns in Excel?
- How To Use The HLOOKUP Function In Excel?
- How to Combine Texts with the Concatenate Function?
- How to Add and Modify Error Bars in Excel?
- How to Calculate Standard Deviation in Excel?
- How to Make a Macro in Excel?
- How To Make Graphs in Excel?
- How To Use The SUBTOTAL Function In Microsoft Excel?
- How To Format Numbers?
- How To Fix The #VALUE Formula Error In Excel + Solve #REF And #NAME Too!?
- How To Import CSV Files Into Excel – And Other Text Files As Well?
- How To Insert A Comment In Excel + How To Edit And Delete It!?
- How to Convert an Excel Spreadsheet to XML (Import And Export Data Easily)?
- How To Share Excel Workbooks And Track Changes Easily?

COMPUTER AWARENESS (LEVEL – II)

L2 – (I)25 DESIGNING WITH COMPUTERS (w.e.f. 2019 - 2020)

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.

GIMP (General Image Manipulation Program): Toolbox; Move tool, Alignment tool, Scale tool, Shear tool, Perspective tool, Flip tool, Blend tool, Blur/Sharpen tool, Smudge tool, Dodge / Burn tool, Painting in GIMP-Pencil and paintbrush tool; Operations on Layers: Adding, Renaming, Deleting, Merging, Scaling, Duplicating; Masking: Introduction and example, editing a mask.

Visual effects: History, 3-D general principles, Downloading and installing Blender; Basic principles: Datablocks, Edit mode, separating and joining objects, object modifiers, mesh and curve, Materials, Textures, Surfaces, Lighting setup, Sculpting, Baking, Retopologizing, Automatic Tessellation and 3D Sketching; Scene: Breakdown, Buildup, color correction, texture editing, sweetening and VFX;

Animation: Introduction, constraints for automating animation, animated textures, output as a video file; Animation of characters: Armature, bones, poses and keyframes;

Particle basics, Working with sound/video sequence editor, compositor, sound effects and final output.

Introduction and Features of Adobe Photoshop; Introduction; Features; Title Bar; Menu bar; Style, Font Face and Formatting Bar; Scroll Bars;

REFERENCES BOOKS

1. Blender - freely available open-source software (http://www.blender.org)

2. 2-D editing software such as freely available open-source GIMP (http://www.gimp.org/)

3. Audio-editing software such as freely available open-source Audacity (http://audacity.sourceforge.net/)

4. Synfig, A 2-D animation freely available open source software. (http://www.synfig.org/)

5. Openshot, A video editor software freely available open source software. (http://www.openshot.org/)

6. Bittu Kumar, Adobe Photoshop : The world's Best Imaging and Photo Editing Software.

L2 – (II)26 PRACTICAL – DESIGNING WITH COMPUTERS

Max. Marks: 100   **Pass Marks: 35**

Exam Duration: 3 Hrs   **Workload: 6 periods/week**

Based on the syllabus mentioned above.

The following are some of the sample exercises, but the practical is not limited to these exercises only. The exercises are based on GIMP, Blender, Adobe Photoshop, Audacity, Synfig and Openshot software.

- Create a collage from the pictures of any recent event held in college.

- Design a digital poster for any state of your choice in India depicting their tourist spots and thus promoting tourism.

- Collect and import few pictures or images of important monuments (tourist spots). Add layers and place a picture in each layer. Merge layers and edit layers and use mask to selectively colour the images.

- How can you perform following using GIMP (i) Changing the Size (ii) (Dimensions) of an Image (Scale) (iii) Changing the Size (Filesize) of a JPEG (iv) Crop an Image (v) Rotate or Flip an Image (vi) Simple floating logo (vii) Design a circle shaped image (viii) Adding and modifying masks to the layers (ix) Editing a photo.

- How can you perform following using Blender (i) Make a simple chair (ii) Make a simple sword (iii) Make a simple animated snowman (iv) Creating a human head

- How can you perform following using Audacity (i) Make an audio/radio advertisement (ii) Create podcasts (iii) Record speeches (iv) Create Sound Stories (v) Record Comments (vi) Record Composition (vii) Record Soundtracks for animations

- How can you perform following using Synfig (i) Create basic tweened animation using bitmap images (ii) Use skeleton to construct and animate complex characters (iii) Construct and animate simple cutout characters

- How can you cut, edit and modify a video using Openshot?

- How can you perform following using Photoshop (i) Scanning and simple image editing (ii) Colour change, image extraction and merging of images (iii) Smoothening of sharp edges (iv) Text on images.

B.A. (General) Part-III Syllabus
Examination Scheme
w.e.f. 2019-20
Fifth Semester

Paper	Name of the Paper	Internal Marks	Maximum Marks	Total	Time
Paper-I	Ancient World	20	80	100	3 Hours

Sixth Semester

Paper	Name of the Paper	Internal Marks	Maximum Marks	Total	Time
Paper-I	Introduction to Archaeology	20	80	100	3 Hours

Syllabus of B.A. (Part-III) w.e.f. the academic session 2019-20 onwards is divided into two semesters. For each semester one paper is compulsory and each paper shall carry 100 Marks. Total aggregate marks for each semester is (100+100) 200 (Marks). Students have choice of Language (Hindi/English) for their exams.

1. There will be Internal Assessment of 20 marks in each paper as per the following criteria:

   (i)   Two Handwritten Assignments   : 10%
         (1st Assignment after one month &
         2nd Assignment after two months)
   (ii) One Class Test (one period duration)   : 5%
   (iii) Attendance   : 5%
         Marks for attendance will be given as under:
         91% onwards   : 5 marks
         81% to 91%   : 4 marks
         75% to 80%   : 3 marks
         71% to 74%   : 2 marks*
         65% to 70%   : 1 marks*
         (*For students engaged in co-curricular activities of the collage only/authenticated medical grounds duly approved by the concerned principal)

2. Theory paper will consist of 80 marks

Paper: Ancient World

Max. Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: - At Least *ten* questions will be set in five sections. The candidatets will have to attempt *five* questions in all, selecting at least on question from each section.

Question No. 10 carrying 16 marks (10 for map work and 6 for explanatory note). Visually handicapped candidate may not attempt the map question. In lieu of the map question, they may attempt any other question. However, in case, they wish to attempt the map question, the part relating to the explanatory note will carry full marks.

There shall be *one* objective type question. The question will be divided into three sections. Section 1st shall have snap shot type questions of 6 marks. Section 2nd will have multiple choice questions of 5 marks. Section 3rd will have matching type questions of 5 marks.

Unit-I
Sumerian civilization: Socio-economic Structure; Polity and Administration; Religion and Philosophy

Unit-II
Egyptian Civilization: Socio-economic Structure; Polity and Administration

Unit-III
Greek and Roman Civilization: Polity, Society and Economy

Unit-IV
Objective type Question (Covering entire syllabus, Section I to III)

Unit-V
Show the following in the given World Map:-
(i)   Extent of Sumerian Civilization
(ii)   Important sites of Mesopotamian Civilization
(iii)   Extent of Egyptian Civilization
(iv)   Important cities of Greek Civilization
(v)   Extent of Roman Civilization

Reference Books:-

1. ik.Ms;] vkjñ ,uñ   % izkphu fo"o dh lH;rk,a ¼izUnzgok¡ laLdj.k½ bfrgkl ihB]] bykgkckn] 1999

2. izlkn] vkse izdk"k % izkphu fo"o dk mn; ,oa fodkl] jktdey izdk"ku] fnYyh&2011

3. ikBd] lq"khy ek/ko % fo"o dh izkphu lH;rkvksa dk bfrgkl] fcgkj fgUnh xzUFk vdkneh] iVuk] 1972 ¼uohu laLdj.k½

4. flUgk] fofiu fcgkjh % izkphu rFkk e/; dkyhu fo"o bfrgkl] Kkunk izdk"ku] ubZ fnYyh] 1994

5. izlkn] xksiky   % izkphu ,ao e/;dkyhu fo"o] y{eh ifCyf"kax gkÅl] jksgrd

6th SEMESTER
ANCIENT INDIAN HISOTRY, CULTURE AND ARCHAEOLOGY

Paper: Introduction to Archaeology

Max. Marks: 80
Internal Assessment: 20
Time: 3 Hours

Note: -   At Least *ten* questions will be set in four sections. The candidates will have to attempt *five* questions in all, selecting at least on question from each section.

There shall be *one* objective type question. The question will be divided into three sections. Section 1st shall have snap shot type questions of 6 marks. Section 2nd will have multiple choice questions of 5 marks. Section 3rd will have matching type questions of 5 marks.

Unit-1
Definition of Archeology, Aim & Scope, Relation with other Sciences, Development of Archaeology in India

Unit-II
Methods of Exploration & Excavation, Preservation

Unit-III
Methods of dating, Photography, Stratigraphy

Unit-V
Archaeological Museums: Importance, Methods of Displaying antiquities.

(Prof. J.K. Sharma)   **(Dr. S.K. Vashisht)**
                                                           (Dr. Sukhdev Saini)

(External Member)
                                                              Chairman

Unit-V
Objective type Question (Covering entire syllabus, Section I to III)

Reference Books:-

1. ik.Ms;] t; ukjk;.k   : iqjkrÙo foe"kZ] izkP; fo|k laLFkku] bykgkckn] 2009

2. FkiY;ky] fdj.k dqekj   : iqjkrÙo izosf"kdk] Hkkjr cqd lasUVj] y[kuÅ] 1999
    ,ao 'kqDy] ladVk çlkn

3. Singh, Madan Mohan   : iqjkrÙo dh #ijs[kk

4. Srivastava, K. M.   : New Era of Indian Archaeology

5. Wheeler, R.E.M.   : Archaeology from the Earth (i`Foh ls iqjkrÙo), Harmondworth,
    1956

6. iqjh] cSt ukFk   : iqjkrÙo foKku]y[kuÅ] 1955,

B.A. II
English (Additional)
Semester-III
Session 2019-20

Scheme of Examination

Total Marks: 100
Theory   : 80
Internal Assessment: 20
Time   : 3 hrs.

Section A

Prescribed Texts:
1. *Anthology of English Essays by R.P. Singh, Oxford University Press.*

Section B

2. *A guide to Patterns and Usage in English by A.S. Hornby.*

Instructions for paper-setter and students

1. Explanation with reference to the context; the students will be required to attempt one

    passage (with internal choice) from the prescribed book.   10

2. One essay-type question (with internal choice) from the prescribed book Anthology of

    English Essays.   10

3. Short-answer type question based on the book of prose (five questions to be attempted out of

    the given eight).   10

4. One comprehension passage (with internal choice) from the prescribed text.   10

5. Vocabulary and usage (based on the text book).   10

6. Paragraph writhing.   10
     Students will be required to write paragraph of about 200 words (out of 4)   .

7. Verb Patterns.   20

B.A. II
English (Additional)
Semester-IV
Session 2019-20

Scheme of Examination

Total Marks: 100
Theory   : 80
Internal Assessment: 20
Time   : 3 hrs.

Section A

Prescribed Texts:
1. One Act Plays for Colleges by V.A. Shaharie, B.N. Joshi, Oxford University press.

Section B

2. Grammar and Composition.
   Instructions for paper-setter and students

1. Explanation with reference to the context; the students will be required to attempt one passage (with internal choice) from the prescribed book.   10

2. One essay-type question (with internal choice) from the prescribed book.   10

3. Short-answer type question based on One Act Plays for Colleges (Five questions to be attempted out of the given eight).   10

4. One unseen comprehension passage of about 250 words followed by five questions.   10

5. Letter writing (Formal and informal)   10

6. One word substitutes, Pair of words, Synonyms & Antonyms and their usage based on text book.

                                                                                                                                       20

7. Email writing, Notice, Report writing.   10

DEPARTMENT OF HISTORY
KURUKSHETRA UNIVERSITY KURUKSHETRA

B.A. (GENERAL) HISTORY (SEMESTER SYSTEM)

Rectified Scheme of Examination to be Implemented W.E.F. 2018-19

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 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 No.	Nomenclature	Internal Assessment	Theory Paper Marks	Total Marks	Time
Option-i	**Ancient India (From Earliest Times to Gupta Age)**	20	80	100	3 Hrs.
Option-ii	**History of Haryana (From Harappan Age to 1526 A.D.)**	20	80	100	3 Hrs.

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.

Revised

BFSI- 401: Entrepreneurship

Max. Marks: 100
Theory: 80
Practical: 20

Note: There will be eight questions in all. A candidate is required to attempt five questions including the question no. 1 which is compulsory. Question no. 1 will comprise of four short answer questions. All questions shall carry equal marks.

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

Role of government and various institutions in developing entrepreneurship in India; women entrepreneurship.

Suggested Readings:

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

M. P. Ed. –Syllabus

Modification/Revision in M.P.Ed Syllabus of Semester C.B.C.S. System w.e.f. 2019-20

The duration of the course leading to the degree of Master of Physical Education (M.P.Ed) shall be of four semesters. In the first year, there shall be two semester consisting of Nineteen courses (9 Courses in Ist Semester + 10 Courses in IInd Semester) in which 5 Theory, 4 Practical in Ist Semester & 5 Theory, 1 Open Elective, 4 Practicals in IInd Semester. In the second/final year there will be two semesters consisting of Eighteen papers (10 Courses in IIIrd Semester + 8 Courses in IVth Semester) in which 5 Theory, 1 Open Elective, 4 Practicals in IIIrd Semester & 5 Theory (Including Dissertation), 3 Practicals in IVth Semester.

Theory papers will be of 100 marks each (80 marks for external evaluation and 20 marks for internal assessment). Dissertation will be of 100 marks (80 marks for Evaluation + 20 marks for internal assessment). Practical will be of 100 marks & 50 marks mentioned according to the Scheme. External and Internal examiners will evaluate dissertation and practical jointly.

Internal Assessment will be based on the guidelines released by University.

In each theory paper, the candidate will be required to attempt five questions, including one compulsory question comprising of 10 short notes, in three hours.

All theory papers in all the four semesters are of four credits and Open Elective Course will have 2 Credits, Consisting of 50 marks (40 for Theory + 10 for internal assessment). Open Elective course will comprise of 2 Units out of which candidates are required to attempt 3 questions in total i.e. 2 Long questions having 16 marks each from each unit (1st & 2nd Unit) and 1 question comprising of 4 short questions having 2 marks for each question covering both the units.

First Year
Semester – I

Course- I: (Course Code: M.P.Ed -101): Research process in Physical Education = 100 (80 External + 20 Internal).
Course- II: (Course Code: M.P.Ed -102): Principles of Sports training = 100 (80 External + 20 Internal).

Course- III: (Course Code: M.P.Ed -103): Kinesiology = 100 (80 External + 20 Internal).

Course- IV: (Course Code: M.P.Ed -104): Health Education and Sports Nutrition = 100 (80 External + 20 Internal).

Course- V: (Course Code: M.P.Ed -105): Information & Communication Technology (ICT) in Physical Education = 100 (80 External + 20 Internal).

Course- VI: (Course Code: M.P.Ed -106): Athletics- (Track Events & Jumps) = 100 marks External.

Course- VII: (Course Code: M.P.Ed -107): Game = 100 marks External.

Course- VIII: (Course Code: M.P.Ed -108): Health Education = 50 marks External.

Course- IX: (Course Code: M.P.Ed -109): Information & Communication Technology (ICT) in Physical Education = 50 marks External.

Semester – II

Course- I: (Course Code: M.P.Ed -201): Research process in Physical Education = 100 (80 External + 20 Internal)

Course- II: (Course Code: M.P.Ed -202): Physiology of Exercise = 100 (80 External + 20 Internal)

Course- III: (Course Code: M.P.Ed -203): Applied Statistics in Physical Education and Sports = 100 (80 External + 20 Internal)

Course- IV: (Course Code: M.P.Ed -204): Physical Fitness and Wellness = 100 (80 External + 20 Internal)

Course- V: (Course Code: M.P.Ed -205): Yogic Science = 100 (80 External + 20 Internal)

Course- VI: (Course Code: M.P.Ed -206): Athletics (Throws & Conduct of Athletic Meet) =100 marks External.

Course- VII: (Course Code: M.P.Ed -207): Game = 100 marks External.

Course- VIII: (Course Code: M.P.Ed -208): Yoga = 50 marks External.

Course- IX: (Course Code: M.P.Ed -209): Applied Statistic and ICT = 50 marks External.

Course- X: (Course Code: M.P.Ed -210): Philosophy of Yoga = 50 marks (40 Theory + 10 internal assessment).

Second Year

Semester – III

Course- I: (Course Code: M.P.Ed -301): Sports Psychology = 100 (80 External + 20 Internal)

Course- II: (Course Code: M.P.Ed -302): Sports Medicine = 100 (80 External + 20 Internal)

Course- III: (Course Code: M.P.Ed -303): Tests, Measurement and Evaluation in Physical Education = 100 (80 External + 20 Internal)

Course- IV: (Course Code: M.P.Ed -304): Athletic Care and Rehabilitation = 100 (80 External + 20 Internal).

Course- V: (Course Code: M.P.Ed -305): Value and Environmental Education = 100 (80 External + 20 Internal).

Course- VI: (Course Code: M.P.Ed -306): Game – I (Hockey and Basketball) = 100 marks External.

Course- VII: (Course Code: M.P.Ed -307): Game – II (Kabaddi & Kho-Kho) = 100 marks External.

Course- VIII: (Course Code: M.P.Ed -308): Sports Psychology = 50 marks External.

Course- IX: (Course Code: M.P.Ed -309): Tests, Measurement and Evaluation in Physical Education = 50 marks External.

Course- X: (Course Code: M.P.Ed -310): Wellness = 50 marks (40 Theory + 10 internal assessment).

Semester – IV

Course- I: (Course Code: M.P.Ed -401): Sports Journalism and Mass Media = 100 (80 External + 20 Internal).

Course- II: (Course Code: M.P.Ed -402): Education Technology in Physical Education = 100 (80 External + 20 Internal)

Course- III: (Course Code: M.P.Ed -403): Sports Bio Mechanics = 100 (80 External + 20 Internal)

Course- IV: (Course Code: M.P.Ed -404): Sports Technology = 100 (80 External + 20 Internal).

Course- V: (Course Code: M.P.Ed -405): Dissertation & Sports management = 100 (80 External + 20 Internal).

Course- VI: (Course Code: M.P.Ed -406): Game – I (Baseball, Softball & lawn tennis) = 100 marks External.

Course- VII: (Course Code: M.P.Ed -407): Game – II (Football & Lawn Tennis) = 100 marks External.

Course- VIII: (Course Code: M.P.Ed -408): Class Room Teaching = 100 marks External.

Kurukshetra University, Kurukshetra

CBCS Scheme of Examination for Master in Physical Education (M.P.Ed)

(Changes will be implement from Session 2019-2020)

Semester-Ist

Total Credits= 26   **Total Marks = 800**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd-101	Research Process in Physical Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd- 102	Principles of Sports Training	CFC	04	--	04	04	--	04	20	80	--	100
MPEd- 103	Kinesiology	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -104	Health Education and Sports Nutrition	CCC	04	--	04	04	--	04	20	80	--	100
MPEd- 105	Information & Communication Technology(ICT) in Physical Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd- 106	Practicum: Athletics- (Track Events & Jumps)	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd- 107	Game	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd-108	Health Education	CCC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd-109	Information & Communication Technology(ICT) in Physical Education	CCC	--	01	01	--	0.5	0.5	--	--	50	50
Total			**20**	**12**	**32**	**20**	**06**	**26**	**100**	**400**	**300**	**800**

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**

Kurukshetra University, Kurukshetra
CBCS Scheme of Examination for Master in Physical Education (M.P.Ed)
(Changes will be implement from Session 2019-2020)
Semester-IInd

Total Credits= 26   **Total Marks = 800**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd -201	Research Process in Physical Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd – 202	Physiology of Exercise	CFC	04	--	04	04	--	04	20	80	--	100
MPEd – 203	Applied Statistics in Physical Education and Sports	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -204	Physical Fitness and Wellness	CCC	04	--	04	04	--	04	20	80	--	100
MPEd – 205	Yogic Science	CFC	04	--	04	04	--	04	20	80	--	100
MPEd – 206	Practicum: Athletics (Throws & Conduct of Athletic Meet)	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd – 207	Game	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd -208	Yoga	OEC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd -209	Applied Statistic and ICT	CCC	--	01	01	--	0.5	0.5	--	--	50	50
MPED – 210	**Philosophy of Yoga// Mooc (Massive Open Online Courses)**	OEC	02	--	02	02	--	02	10	40	--	50
	Total		20	12	32	20	06	26	100	400	300	800

*Note: The credits and marks of the Open Elective course are not included in the grand total score.

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**   **O.E.C = Open Elective Course**

Kurukshetra University, Kurukshetra
CBCS Scheme of Examination for Master in Physical Education (M.P.Ed)
(Changes will be implement from Session 2020-2021)
Semester-IIIrd

Total Credits= 26   **Total Marks = 800**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd -301	Sports Psychology	CCC	04	--	04	04	--	04	20	80	--	100
MPEd – 302	Sports Medicine	CFC	04	--	04	04	--	04	20	80	--	100
MPEd – 303	Tests, Measurement and Evaluation in Physical Education	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -304	Athletic Care and Rehabilitation	CCC	04	--	04	04	--	04	20	80	--	100
MPEd – 305	Value and Environment Education	CCC	04	--	04	04	--	04	20	80	--	100
MPEd – 306	Practicum: Game – I	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd – 307	Game - II	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd -308	Sports Psychology	CCC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd -309	Tests, Measurement and Evaluation in Physical Education	CCC	--	01	01	--	0.5	0.5	--	--	50	50
MPEd – 310	*Wellness / Mooc (Massive Open Online Courses)*	*OEC*	*02*	*--*	*02*	*02*	*--*	*02*	*10*	*40*	*--*	*50*
Total			**20**	**12**	**32**	**20**	**06**	**26**	**100**	**400**	**300**	**800**

*Note: The credits and marks of the Open Elective course are not included in the grand total score.

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**   **O.E.C = Open Elective Course**

Kurukshetra University, Kurukshetra
CBCS Scheme of Examination for Master in Physical Education (M.P.ED)
(Changes will be implement from Session 2020-2021)
Semester-IVth

Total Credits= 26   **Total Marks = 800**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
MPEd -401	Sports Journalism and Mass Media	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 402	Education Technology in Physical Education	CFC	04	--	04	04	--	04	20	80	--	100
MPEd - 403	Sports Bio Mechanics	CFC	04	--	04	04	--	04	20	80	--	100
MPEd -404	Sports Technology	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 405	Options: i) – Dissertation ii) – Sports Management	CCC	04	--	04	04	--	04	20	80	--	100
MPEd - 406	Practicum: Game – I	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd - 407	Game - II	CCC	--	05	05	--	2.5	2.5	--	--	100	100
MPEd -408	Class Room Teaching	CCC	--	02	02	--	01	1.0	--	--	100	100
Total			**20**	**12**	**32**	**20**	**06**	**26**	**100**	**400**	**300**	**800**

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**

Programme Specific Outcomes:

The students will be able to:

1. Gain opportunity to the student at PG Level towards specialized knowledge in Physical Education.
2. Understand a broad based spectrum of study that crosses discrete portion of Physical, biological, Psychology & Social Science in an integrated, orderly and logical sequence.
3. Integrate the multi- facet discipline aiming at physical education specialists who can develop & promote physical education at schools, colleges, universities across nation.
4. Identify, summarize, plan & design physical activity, exercise, teaching & coaching programme as per needs of society
5. Communicate professionally and effectively both oral and written instruction.
6. Give value to Physical activity, enjoy helping others in learning motor & sport skills.
7. Willing to serve as a role model for fitness & skill development for others.

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 1st
Part – A (Theory Courses)

M.P.Ed 101:- Research Process in Physical Education

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus..

Course Objectives:-

1. Acquaint the students will basic concept of research, need and characteristics of research in Physical Education & sports.
2. Acquaint the students with type of research, research problem and its selection and formulation with delimitation.
3. Make students aware about concept of sampling, methods of sampling and hypothesis and its testing.
4. Acquaint the students with the concept of review of related literature, types and its sources & variables.
5. Make the students understand the concept of ethical issues regarding copy right and tools of research.

Learning Outcomes:-

The students will be able to:-

1. Understand the basic concept of research and its need and characteristics in Physical Education and Sports.
2. Know about type of research, research problem it selection and formulation with delimitation.
3. Understand the concept of sampling, methods of sampling and hypothesis testing.
4. Know about review of related literature, its types sources &writing and variables.
5. To make students understand the concept of ethical issues in Physical Education & Sports and various tools of research.

Unit – I: Introduction

Meaning and Definition of Research, Need and importance of Research in Physical Education and Sport, Characteristics of Research in Physical Education & Sport.
Types of Research: Analytical, Descriptive, Experimental, Qualitative and Meta Analysis.
Research Problem: Meaning of the term Research Problem, location and criteria of Selection of Problem, Formulation of a Research Problem, Limitations and Delimitations.

UNIT II – Concept of Sampling and Hypothesis

Meaning and Definition of Sample and Population.
Types of Sampling: Probability Methods- Systematic Sampling, Cluster sampling, Stratified Sampling. Area Sampling, Multistage Sampling.
Non- Probability Methods: Convenience Sample, Judgement Sampling, Quota Sampling.
Meaning and definition of Hypothesis, Importance Hypothesis in research, Types of Hypothesis,
Type 1 and Type 2 errors in Hypothesis testing.

UNIT-III Review of related literature

Survey of Related Literature: Need for surveying related literature, Kinds of Related Literature, Literature Sources – Primary and Secondary, Steps in Literature Search. Writing of Literature review.
Variables: Meaning and Definition of Variables, types of variables: Dependent, Independent, Control, Extraneous, Moderator and Predictor, Source of variables.

Unit – IV Ethical Issues and tools in Research

Ethical Issues in Research: Areas of Scientific Dishonesty, Ethical Issues regarding Copyright, Responsibilities of Researchers, Working Ethics with Faculty, Protecting Human Participants.
Tools of Research: Observation, Interviews, questionnaires, opinion or attitude scales, Psychological Tests and Personality Inventories.

Suggested Readings:
Best J. W (1971) Research in Education, New Jersey; Prentice Hall, Inc
Clarke David. H & Clarke H, Harrison (1984) Research processes in Physical Education, New Jersey; Prentice Hall Inc.
Craig Williams and Chris Wragg (2006) Data Analysis and Research for Sport and Exercise Science, Londonl Routledge Press
Jerry R Thomas & Jack K Nelson (2000) Research Methods in Physical Activities; Illonosis; Human Kinetics;
Kamlesh, M. L. (1999) Reserach Methodology in Physical Education and Sport, New Delhi Moses, A. K. (1995) Thesis Writing Format, Chennai; Poompugar Pathippagam
Rothstain, A (1985) Research Design and Statistics for Physical Education, Englewood Cliffs: Prentice Hall, Inc
Subramanian, R, Thirumalai Kumar S & Arumugam C (2010) Research Methods in Health, Physical Education and Sport, New Delhi; Friends Publication
Moorthy A. M. Research Processes in Physical Education (2010); Friend Publication, New Delh

M.P.Ed.-102: Principles of Sports Training

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

To enable students to:-

1. Understand the meaning of training load, adaptation recovery and over load in sports training.
2. Know about various motor components like strength, speed, endurance, flexibility and coordinative abilities.
3. Understand the meaning, aim, characteristics and implications of technique training and its methods in various phases.
4. Know about meaning of types of training plans, periodization and competition.

Learning Outcomes:-

After going through the course contents, the students will be able to understand:-
1. Meaning of training load, adaptation, recovery and over load in sports training.
2. The various motors components like strength, speed, endurance, flexibility and coordinative abilities.
3. Meaning aim, characteristics implications and methods of technique training in various phases.
4. Training plans and its types, periodization and competition.

Unit-I: Training load, adaptation and recovery:

(i) Training of Load: Meaning and Characteristics of training load
(ii) Adaptation - Meaning, conditions for adaptation of training load.
(iii) Over load - Meaning and causes, Symptoms of overload, tackling overload.
(iv) Recovery - Meaning and phases of recovery, Methods of recovery.

UNIT –II: Development of various motor components:

   (i) Strength: Meaning, Different types of Strength**,** Methods of improving different forms of Strength
                   (Maximum Strength, Explosive Strength and Strength Endurance).
   (ii) Speed: Different types of Speeds, Methods of improving different types of Speed abilities.
   (iii) Endurance: Different types of Endurance**,** Methods of improving different types of Endurance
                    abilities.
   (iv) Flexibility: Different types of Flexibility, Methods of improving different types of Flexibility abilities.
   (v) Co-ordinative Abilities: - Methods of improving different forms of co-ordinative abilities.

UNIT – III: Technique and Tactical Training:

   (i) Meaning and definition of technique, skill, and style.
   (ii) Aim of technique and tactical training in different Sport.
   (iii) Different phases of technique training.
   (iv) Charactertics and implications of different phases of technique training.
   (v) Methods of technique and tactical training.

UNIT – IV: Training Plans, Periodisation and Competition

   (i)   **Meaning of Training Plan and cyclecity of training: -** Macro Cycle, Meso Cycle, Micro
             Cycle and Training session plan.
   (ii)   **Periodisation:** Meaning, Aim, Contents/Parts of Periodisation, Type of Periodisation.
   (iii)   **Competition:** Importance and Preparation (Direct and Psychological preparations).

Suggested Readings:

Beotra Alka, (2000), Drug Education Handbook on Drug Abuse in Sport. Delhi: Sport Authority of India
Bunn, J.N. (1998) Scientific Principles of Coaching, New Jersey Engle Wood Cliffs, Prentice Hall Inc.
Cart, E. Klafs & Daniel, D. Arnheim (1999) Modern Principles of Athletic Training St. Louis C.V. Mosphy Company
Daniel, D. Arnheim (1991) Principles of Athletic Training, St. Luis, Mosby Year Book
David R. Mottram (1996) Drugs in Sport, School of Pharmacy, Liverpool: John Moore University
Gray, T. Moran (1997) – Cross Training for Sport, Canada: Human Kinetics
Hardayal Singh (1991) Science of Sport Training, New Delhi, DVS Publications
Jensen, C.R. & Fisher A.G. (2000) Scientific Basic of Athletic Conditioning, Philadelphia
Ronald, P. Pfeiffer (1998) Concepts of Athletics Training 2nd Edition, London: Jones and Bartlett Publications
Yograj Thani (2003), Sport Training, Delhi: Sport Publications

M.P.Ed.-103: Kinesiology

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To acquaint students about meaning of kinesiology, axsis, plane, medical terminology of body positions and different body movements.
2. To develop understanding about functional classification musles, their origin, insertion & functions of important muscles of the body.
3. To enable the students to have understanding about joints of upper extremity and structural & functional aspects of upper extremity joints(shoulder & elbow joint).
4. To acquaint the students to have knowledge about joints of lower extremity & structural and functional aspects of lower extremity joints (knee & hip joint).

Learning Outcomes:

After undergoing/understanding the course contents the students will have:
1. Understanding and knowledge of kinesiology, axsis, plane, medical terminology of body positions and different body movements.
2. Clarity regarding functional classification muscles, their origin, insertion & functions of important muscles of the body.
3. Understanding and knowledge of joints of upper extremity and structural & functional aspects of upper extremity joints(shoulder & elbow joint).
4. Knowledge of joints of lower extremity & structural and functional aspects of lower extremity joints (knee & hip joint).

Unit – I: Introduction

 (i) Meaning, importance and scope of Kinesiology in Physical Education.
(ii) Meaning of axis and planes.
(iii) Types of axis and planes.
(iv) Medical Terminology of Body Position
 (v) Terminologies of different Body movements

Unit – II: Muscles of various regions

(i)   Functional classification of Skelton Muscles
(ii) Origin, Insertion and Actions of Muscles present on back and abdominal region:
   Latissimus Dorsi, Trapezius, Rhomboid Major, Rhomboid Minor and Rectus Abdominal
(iii) Origin, Insertion and Actions of Muscles of Hip region
   Gluteus maximus, Gluteus medius and Gluteus minimus Muscles
(iv) Origin, Insertion and Action of Muscles present on Neck region
   Sternocleidomastoid muscle

Unit - III: Joints of Upper Extremity

(i) Shoulder joint – Structure, Ligaments, Muscle reinforcement and Movements.
(ii) Elbow joint - Structure, Ligaments, Muscle reinforcement and Movements.
(iii) Origin, Insertion and Actions of Muscles present on upper extremity:
   Deltoid, Biceps, Triceps and Pactroralis Major.

Unit - IV: Joints of Lower extremity

(i)   Hip Joint - Structure, Ligaments, Muscle reinforcement and Movements.
(ii) Knee joint – Structure, Ligaments, Muscle reinforcement and Movements.
(iii) Origin, Insertion and Action of Muscles present on lower extremity:
   Hamstrings group of Muscles, Quadriceps group of Muscles, Sartorius Muscle,
   Gastrocnemius Muscle

Suggested Readings:
Gowitzke, B.A and Milner, M (1988). Scientific Basis of Human Movement (3rd. ed.) Baltimore: Williams and Wilkins.
 Groves, R and Camaine, D. (1983). Concepts in Kinesiology. (2nd.ed) Philadelphia: Saunders College Publishing.
Hay, J. & Reid, J (1982). The Anatomical and Mechanical Basis of Human Motion. Englewood Cliffs: Prentice – Hall
Luttegens, Kathryn, Deutsch, Helga, Hamilton, Nancy. Kinesiology- Scientific Basis of Human Motion. 8th. Ed., Brown & Bench mark.
Rasch, P. (1989) Kinesiology and Applied Anatomy. Philadelphia: Lea & Febiger.
Thompson, C. (1985). Manual of Structural Kinesiology. (10th. ed.) St. Louis: Times Mirror/ Mosby College Publishing.

M.P.Ed. - 104: Health Education and Sport Nutrition

Time: Three Hours   **Maximum Marks: 100(External: 80 + Internal: 20)**

Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To understand the concept of health & health education, dimensions & determinants of health, aim objectives & Principles of Health education, health services, instructions in personal hygiene, health records, First-Aid & emergency care in different conditions.
2. Explain the various health problems in India like alcohol, tobacco, hypertension, diabetes, stress their causes effects and management.
3. Describe the meaning and role of nutrition in sports, various nutrients, energy metabolism, and calories in different food stuff, preparation of diet chart for sports persons, normal people children and elderly persons.
4. Explain concept of BMI, obesity its causes and management, weight control, maintain healthy life style, role of diet in weight management, designing diet plan and exercise schedule for weight gain and weight loss.

Learning Outcomes:

After going through the course contents the students will be able to understand:

1. the concept of health & health education, dimensions & determinants of health, aim objectives & Principles of Health education, health services, instructions in personal hygiene, health records, First-Aid & emergency care in different conditions.
2. Various health problems in India like alcohol, tobacco, hypertension, diabetes, stress their causes effects and management.
3. The meaning and role of nutrition in sports, various nutrients, energy metabolism, calories in different food stuff and preparation of diet chart for sports persons, normal people children and elderly persons.
4. concept of BMI, obesity its causes and management, weight control , maintain healthy life style, role of diet in weight management, designing diet plan and exercise schedule for weight gain and weight loss.

Unit – I: Health Education

Definition of Health, Dimensions and Determinants of Health, Health Education, Health Instruction, Health Supervision Aim, objective and Principles of Health Education, Health Service and guidance instruction in personal hygiene, Care of skin, Nails, Eye health service, Nutritional service, Health appraisal, Health record, Healthful school environment, first- aid and emergency care in different conditions.

Unit – II: Health Problems in India

Effect of Alcohol on Health, Effect of Tobacco on Health, Effect of different types of drugs on Health, Meaning of Hypertension, Causes of Hypertension, Management of Hypertension, Meaning of Diabetics, Types of Diabetics, Causes of Diabetics,   Management of Diabetics, Meaning of Stress, Causes of stress, management of Stress, Objective of school/college health service, Role of health education in school/college.

Unit – III- Introduction to Sport Nutrition

Meaning and Definition of Sport Nutrition, Role of nutrition in Sport, Basic Nutrition guidelines, Nutrients: Ingestion to energy metabolism (Carbohydrate, Protein and Fat), Role of carbohydrates, Fat and protein during exercise. Calories in different food stuffs. Preparation of diet chart for Sport personal, normal male and female, children and elderly persons.

Unit – IV Nutrition and Weight Management

Concept of BMI (Body mass index), Meaning of Obesity, Causes of Obesity, Management of Obesity, Obesity and its hazard, Dieting versus exercise for weight control, maintaining a Healthy Lifestyle, Weight management program for children, adolescence, adulthood and elderly. Role of diet and exercise in weight management, Design diet plan and exercise schedule for weight gain and loss.

Suggested Readings:
Bucher, Charles A. "Administration of Health and Physical Education Programme". Delbert, Oberteuffer, et. al." The School Health Education".
Ghosh, B.N. "Treaties of Hygiene and Public Health".
Hanlon, John J. "Principles of Public Health Administration" 2003. Turner, C.E. "The School Health and Health Education".
Moss and et. At. "Health Education" (National Education Association of U.T.A.) Nemir A. 'The School Health Education" (Harber and Brothers, New York). Nutrition Encyclopedia, edited by Delores C.S. James, The Gale Group, Inc.
Boyd-Eaton S. et al (1989) The Stone Age Health Programme: Diet and Exercise as Nature Intended. Angus and Robertson.
Terras S. (1994) Stress, How Your Diet can Help: The Practical Guide to Positive Health Using Diet, Vitamins, Minerals, Herbs and Amino Acids, Thorons.

M.P.Ed.- 105: Information & Communication Technology (ICT) In Physical Education

Time: Three Hours   **Maximum Marks: 100(External: 80 + Internal: 20)**
                                                                    Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

Making the students to:

1. Understand basic concept of ICT & its scope in teaching learning process publication, evaluation on Research administration of sports tournaments. Challenges in integrating ICT in Physical Education & visual classroom.
2. Use, computer, internal on various communication search origins & their user.
3. Understand the methods of MS Office application in Physical Education.
4. Understand the use of ICT supported leading/teaching strategy and E-learning, web based learning, role of EDUSA and viruses and its management.

Learning Outcomes:

After undergoing & understanding the course contents of this paper, the students will have clear understanding of basic concept of information & communication technology, its scope in teaching-learning process & challenges in ICT in Physical Education & visual classroom.

1. They will have knowledge & understanding of uses of computer & internet for communication & learn about search engine & its uses.
2. They will gain the knowledge & means of Ms Office application in Physical Education.

Unit - I Information & Communication Technology in Physical Education

(i) Meaning & Nature of Information & Communication Technology
(ii) Scope of ICT in Physical Education
   a) Teaching Learning Process b) Publication   c) Evaluation   d) Research
   e) Administration   f) Organisation of Sport tournaments
(iii) Challenges in integrating Information & Communication Technology in Physical Education.
(iv) Visual Classroom: Meaning of visual class room, Audio-visual aid and equipments   of class room.

Unit - II Introduction to Computer and Internet

(i) Computer - Definition & structure

    Hardware - i) Input devices - Key Board, Mouse, Scanner, Microphone, Digital camera.

             ii) Output devices - Monitor, Printer, Speaker, Screen image projector

             ii) Storage devices - Hard Disk, CD & DVD, Mass Storage, Device (Pen drive)

   Software - i) Operating System - Concept and function.

             ii) Application Software (It uses in Physical Education)

              1) Word Processors 2) Presentation 3) Spread sheet, 4) Database Management

  ii) Internet: Facilities available for Communication - E-mail, chat, online

            Conferencing, e- Library, websites, Blog etc.

            Search Engines - Concept and uses.

Unit III – MS Office Applications

1.   MS Excel: Main Features & its Applications in Physical Education
2.   MS Access: Main features and its Uses in Physical Education
3.   MS Power Point: Preparation of Slides with Multimedia Effects
4.   MS Publisher: Newsletter & Brochure

Unit- IV   ICT Supported Teaching / Learning Strategies and E – Learning

Computer Assisted Learning, Project Based Learning, Collaborative Learning, Technology Aided Learning E - Learning - Concept & Nature, Web Based Learning, Role of EDUSAT, Viruses & its Management

Suggested Readings:

B. Ram, New Age International Publication, Computer Fundamental, Third Edition-2006 Brain under IDG Book.

India (p) Ltd Teach Yourself Office 2000, Fourth Edition- 2001

Douglas E. Comer, The Internet Book, Purdue University, West Lafayette in 2005.

Irtegov, D. (2004). Operating system fundamentals. Firewall Media.

Marilyn, M.& Roberta, B.(n.d.).Computers in your future. 2nd edition, India: PrenticeHall. Milke, M.(2007).

Absolute beginner's guide to computer basics. Pearson Education Asia. Sinha, P. K. & Sinha, P.

(n.d.).Computer fundamentals. 4th edition, BPB Publication.

Heidi Steel Low price Edition, Microsoft Office Word 2003- 2004

ITL Education Solution Ltd. Introduction to information Technology, Research and Development Wing-2006

Pradeep K. Sinha & Priti; Sinha, Foundations computing BPB Publications -2006. Rebecca Bridges Altman Peach pit Press, Power point for window, 1999

Sanjay Saxena, Vikas Publication House, Pvt. Ltd. Microsoft Office for ever one, Second Edition-2006

Part – B
Practical Courses
Semester – I

M.P.Ed. – 106: Athletics (Track Events and Jumps)

Marks – 100
Credits=2.5

Course Objectives:-

1. The students will acquire the knowledge of track marking (standard & according to space available, 400M & 200M).
2. To provide practical knowledge of skills related to different types of starts with & without starting blocks.
3. To give knowledge about teaching of long jump (hang style), triple jump & high jump.
4. The students will provided the knowledge of interpretation of rules related to various jumps.

Learning Outcomes:

1. The students will have clarity about track marking of 400M & 200M track (standard track & according to space available.
2. The students will be able to teach different skills related various types of starts with & without starting blocks.
3. The students will able to teach the long jump, triple jump & high jump with appropriate teaching methods.
4. The students will be able to interpretate the rules of these above jumps.

Track Events

(i) Marking of standard Track: 400m and 200m.   (Marks – 20)
(ii) Marking of track according to space available   (Marks – 20)
(iii)Teaching ability of different types of Starts (with & without starting blocks)   (Marks – 20)
(vi) Teaching ability of Long Jump (hang Style), Triple Jump and High Jump.   (Marks – 20)
(v) Interpretation of rules related to jumps   (Marks – 20)

Note: Candidate have to take at least 5 teaching lessons on various techniques.

MPEd – 107: Game – (Handball and Cricket)

Marks – 100
Handball: 50 Cricket; 50

Credits=2.5

Course Objectives:-

1. To provide knowledge & practical experience about marking of handball court & cricket pitch.
2. To give knowledge about teaching ability of basic skill of handball & cricket.
3. To provide information to students about interpretation of various skills of handball & cricket.
4. To provide knowledge about filling the score sheets of handball & cricket & their officiating symbols.

Learning Outcomes:-

After understanding the course contents of this paper:

1. The students will be able to have practical knowledge & experience of marking handball court & cricket pitch.
2. The students will have knowledge of teaching ability of basic skills of handball & cricket.
3. The students will have clarity about interpretation of various skills of handball & cricket.
4. They will gain knowledge of filling score sheets of these games & able to use officiating symbols.

i) Handball   Marks – 50

(i) Marking of Handball Court	(Marks – 10)
(ii) Teaching ability of various Basic skills of Handball	(Marks – 10)
(iii) Interpretation of Various rules of Handball	(Marks – 10)
(iv) Filling the score sheet of Handball	(Marks – 10)
(v) Officiating Symbols	(Marks – 10)

ii) Cricket   Marks – 50

(i) Marking of Cricket Court	(Marks – 10)
(ii) Teaching Ability of various Basic skills of Cricket	(Marks – 10)
(iii) Interpretation of Various rules of Cricket	(Marks – 10)
(iv) Filling the score sheet of Cricket	(Marks – 10)
(v) Officiating Symbols	(Marks – 10)

Note: Candidate have to take at least 5 teaching lessons of each game.

M.P.Ed. – 108 - Health Education

Marks – 50

Credits=0.5

Course Objectives:-

1. The students will learn about methods of keeping health records.
2. The students will be provided knowledge about providing first aid in various conditions & articles of first aid box.
3. They will gain knowledge of identifying various forms of postural deformities and their remedial exercise.

Learning Outcomes:

After understanding the course contents of this paper:

1. The students will gain knowledge about the methods of keeping health records.
2. They will have clarity about first aid provided in different conditions & articles of first aid box.
3. The students will able to identify different postural deformities & can apply remedial exercise to over come deformities.

(i) Method of keeping health record
(ii) First Aid for various conditions and articles of first aid box
(iii) Identification of various forms of postural deformities and their remedial exercises

M.P.Ed. – 109 – Information & Communication Technology (ICT) in Physical Education

Course objectives:

1. To provide knowledge of writing different types of notices for sports activities in MS Word.
2. To acquaints students about writing different types of letters for purchase, sports activities, annual athletic meet etc. in MS Word.
3. To provide knowledge of preparing of score sheets for different games & athletic events in MS Word.

Learning Outcomes:

1. The students will able to write different types of notices for sports activities in MS word.
2. They will able to write different types of letters for purchase, sports activities, annual athletic meet etc. in MS Word.
3. The students will be able to prepare score sheets for different games & athletic events in MS word.

(i)   Writing different types of Notices for Sport Activities in MS Word.
(ii) Writing different types of letters for Purchase, Sport Activities, Annual Athletic Meet etc. in MS Word.
(iii) Preparation of score sheets for Different Games and Athletic Events in MS Word.

M. P. Ed. –Syllabus
(From session 2019-2020)
Semester – 2nd
Part – A (Theory Courses)
M.P.Ed. - 201: Research Process in Physical Education

Time: 3 Hours **Maximum Marks: 100 (External Marks: 80 + Internal Assessment: 20)**
Total Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:

1. To explain about historical & philosophical research, their meaning, sources, historical criticism, tools of philosophical research & steps in critical thinking.
2. To illustrate meaning, tools of survey research, meaning of questionnaire & interview, procedure construction for conducting interview.
3. To describe about normative survey its meaning and factors affecting normative survey , case studies: meaning & steps of case study.
4. To explain experimental research, design of experimental research. To provide knowledge about research proposal and its significant steps of research proposal/synopsis format of synopsis.
5. To define research, research report & methods of writing abstract method of writing paper for conferences, footnotes & Bibliography.

Learning Outcomes:

After Undergoing the course contents of his paper the students will be able to understand:-

1. About historical & philosophical research, their meaning, sources, historical criticism, tools of philosophical research & steps in critical thinking.
2. The meaning of tools of survey research, meaning of questionnaire & interview, procedure construction for conducting interview.

3. Normative survey, its meaning and factors affecting normative survey , case studies: meaning & steps of case study.
4. The experimental research, design of experimental research. To provide knowledge about research proposal and its significant steps of research proposal/synopsis format of synopsis.
5. The research, research report & methods of writing abstract method of writing paper for conferences, footnotes & Bibliography.

Unit – I: Historical and Philosophical Research

Historical Research: Meaning and definition of Historical Research, Sources of Historical Research: Primary Data and Secondary Data, Historical Criticism: Internal Criticism and External Criticism.
Philosophical Research: Meaning of Philosophical Research, Tool of Philosophical Research, Steps in Critical Thinking.

UNIT-II: Survey Research

Survey Studies: Meaning of Survey, Tools of Survey Research: Questionnaire and Interview, Meaning of Questionnaire and Interview, Construction, Appearance and Development of Questionnaire, Procedure of Conducting interview, Suggestions to enhance response.
Normative Survey: Meaning of Normative Survey, Factors affecting Normative Survey.
Case Studies: Meaning of Case Studies, steps of case studies.

UNIT-III Experimental and Research Proposal

Experimental Research – Meaning, Nature and Importance, Experimental Design - Single Group Design, Reverse Group Design, Repeated Measure Design, Static Group Comparison Design, Equated Group Design and Factorial Design.
Research Proposal: Meaning and Significance of Research Proposal, Steps of
preparing Research proposal/synopsis, Format of a synopsis.

Unit – IV Research Report

Research Report: Meaning of Research Report, Chapterization of Thesis/ Dissertation, Title page, Preliminary documents, Text (introductions and chapters), Back matter (notes, bibliography or references, appendices, glossary.
Method of writing abstract , method of writing full paper for presenting in a conference and to publish in journals, technicalities of writing: Footnote and Bibliography.

Suggested Readings:
Best J.W.Research in Education, Prentice Hall Inc. : Delhi-1982
Clarke, H.David., Research Processes in Physical Education , Recreation & Health Prentice
Hall Inc.1985.
Thomas Jerry R. and Nelson Jack K., Research Methods, Physical Activity. Human Kinetics
Champaign, 1996.
Weimer, Jon, Research Techniques in Human Engineering. Prentice Hall: New Jersy.1994.
C.V.Good : Methods of Research , Appleton Century Crofts Inc., New York,1954.
W.R.Mouly : Educational Research Introduction, David Making CO. Inc. Yew York, 1975.
J.W.Best : Research in Education, Prentice Hall, 1980.
D.H. Clarke: Research Processes in Physical Education, Recreation and Health , Premice
Hall, 1970

M.P.Ed. - 202: Physiology of Exercise

Time: 3 Hours **Maximum Marks: 100 (External Marks: 80 + Internal Assessment: 20)**

Total Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:

To enable the students to:

1. Understand the Macro & Micro structure of skeletal muscle, sliding filament theory of muscular contraction, composition of muscle & effects of training on muscular system.
2. Describe about cardiovascular conduction system, Various forms of blood circulation, Cardiac cycle, ECG & effects of training on cardiovascular system.
3. Define the respiratory system, mechanism of Gaseous exchange, Aerobic & Anaerobic metabolism and effects of exercise on respiratory system.
4. Explain the body composition and its assessment through various techniques & sports performance in different climatic condition (hot, cold, and at high altitude).

Learning Outcomes:

After undergoing the course contents of this paper, the students will be able to understand:-

1. The Macro & Micro structure of skeletal muscle, sliding filament theory of muscular contraction, composition of muscle & effects of training on muscular system.
2. About cardiovascular conduction system, Various forms of blood circulation, Cardiac cycle, ECG & effects of training on cardiovascular system.
3. The respiratory system, mechanism of Gaseous exchange, Aerobic & Anaerobic metabolism and effects of exercise on respiratory system.
4. The body composition and its assessment through various techniques & sports performance in different climatic condition (hot, cold, and at high altitude).

UNIT – I: Skeletal Muscles and Exercise:

Macro & Micro Structure of the Skeletal Muscle, Chemical Composition of Skeletal Muscle, Sliding Filament Theory of Muscular Contraction, Composition of slow and fast twitch muscle fibers, Muscle Tone, Short and long term Effects of exercises and training on the muscular system

UNIT – II: Cardiovascular System and Exercise

Conduction system of the Heart, Blood Circulation and its classification, Cardiac Cycle – Stroke Volume, Cardiac Output, Heart rate, Effect of different types of training on the Cardio-vascular system, **Electrocardiogram (ECG),** Method of reading ECG

UNIT – III: Respiratory System and Exercise

Mechanism of Breathing, Respiratory Muscles, Mechanism of Exchange of Gases in the Lungs and Tissues, Ventilation at rest and during exercise, Oxygen debt, Effect of Exercise on Respiratory System, Aerobic and Anaerobic metabolism

UNIT – IV: Body Composition and Sport

Body Build, Body Size, Body Composition, Techniques of Assessing Body Composition (Skin Fold Fat Thickness and Bioelectric impedance), Sport performance in hot climate, Cool Climate and high altitude.

Suggested Readings:

Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: Poompugar Pathipagam.
Beotra Alka, (2000) Drug Education Handbook on Drug Abuse in Sport: Sport Authority of India Delhi.
Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs.
David, L Costill. (2004). Physiology of Sport and Exercise. Human Kinetics.
Fox, E.L., and Mathews, D.K. (1981). The Physiological Basis of Physical Education and Athletics. Philadelphia: Sanders College Publishing.
Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sanders co. Richard, W. Bowers. (1989). Sport Physiology. WMC: Brown Publishers.
Sandhya Tiwaji. (1999). Exercise Physiology. Sport Publishers.
Shaver, L. (1981). Essentials of Exercise Physiology. New Delhi: Subject Publications. Vincent, T. Murche. (2007). Elementary Physiology. Hyderabad: Sport Publication. William, D. Mc Aradle. (1996). Exercise Physiology, Energy, Nutrition and Human Performance. Philadelphia: Lippincott Williams and Wilkins Company.

M.P.Ed. – 203: Applied Statistics in Physical Education & Sports

Time: 3 Hours   **Maximum Marks: 100 (External Marks: 80 + Internal Assessment: 20)**
Total Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:

This course will enable students to understand:

1. Basic concept of statistics, data, methods of organizing data, explain & illustrate the concepts & application of measures of central tendency & its computation and merits & demerits of mean, median, mode.
2. Explain variability, range, quartile deviation, percentile & quartile with computation, percentile, rank & its computation.
3. Illustrate the meaning, computation & significance of probability curve, Meaning & type of skewness & kurtosis, Calculation of probability, meaning, types, computation of correction.
4. Illustrate the graphical representation of data & testing of hypothesis.

Learning Outcomes:

After undergoing the course contents of this paper, the students will be able to understand:-

1. Understand the basic concept of statistics, data, methods of organizing data, explain & illustrate the concepts & application of measures of central tendency & its computation and merits & demerits of mean, median, mode.
2. Explain variability, range, quartile deviation, percentile & quartile with computation, percentile, rank & its computation.
3. Understand the meaning, computation & significance of probability curve, Meaning & type of skewness & kurtosis, Calculation of probability, meaning, types, and computation of correction.
4. Identify and illustrate the significance of graphical representation of data & hypothesis testing through various graphical representation techniques.

Unit – I: Introduction to Statistics and Measures of Central Tendency

Meaning of Statistics. Need and importance of statistics in Physical Education,
Meaning of Data, Methods of organizing Data through Frequency Distribution.
Meaning of the Measures of Central Tendency, Computation of Measures of Central
Tendency i.e. Mean, Median and Mode.
Merits and limitations of Mean, Median and Mode

Unit-II: Introduction of Variability

Meaning of Variability, Meaning of Measures of variability: Range, Quartile Deviation,   Average Deviation and Standard Deviation.
Computation of Range, Quartile Deviation, Average Deviation and Standard Deviation.
Meaning of term Percentile, Computation of Percentile & Quartiles.
Meaning of Percentile Rank, Computation of Percentile Rank.

Unit – III: Introduction to Normal Probability Curve and Correlation

Meaning of Normal Probability Curve, Properties of Normal Curve.
Meaning and types of Skewness and kurtosis, Sigma Scores, Z- Scores, Hull Scores
Calculation of probability for various combinations of Heads and Tails.
Meaning and Types of Linear Correlation. Computation of Correlation Coefficient with
Product Movement Method and Rank Difference Method.

Unit – IV: Graphical representation of data and testing of Hypothesis

Meaning and advantage of Graphical Representation of Data, Principle of Graphical Representation of Data. Types of
Bar Diagrams, Method of preparing Histogram, Frequency Polygon, Cumulative-Frequency Graph, Bar-Diagram and
Pie Diagram.
Meaning of two – tailed and one tailed test of significance, computing significance of difference between two means
with t – Test (independent samples), One way ANOVA Test.

Suggested Readings:
 Clarke.HH.The Application of Measurement in Health and Physical Education,1992.
 Clarke,David H.and Clake H.Hares N. Research Process in Health Education Physical Education and Recreation .
Englewood Cliffs, New Jersey, Prentice Hall, Inc.1986.
 Shaw. Dhananjoy. Fundamental statistics in Physical Education & Sport sciences, Sport   publication,2007.
 Margaret J. Safrit : Introduction to Measurement in Physical Education and Exercise Science, Time Mirror/ Mosy,
College Publishing St. Louis. Toronte Bosion (2Nd. Edition-1998.
 Morey E. Garrett : Statistics in Psychology and Educated, David Meka Company Inc.
Devinder K. Kansal : Test and Measurement in Sport and Physical Education, D.V.S.Publications, Kalkaji, New Delhi
–110019.

M.P.Ed. – 204: Physical fitness & Wellness

Time: 3 Hours
                    Maximum Marks: 100 (External Marks: 80 + Internal Assessment: 20)
                                                                Total Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

This course will enable students to understand:

1. Define Physical fitness & Wellness, dimension of wellness, principles of fitness, wellness & recreation, components of fitness & wellness assessment.
2. Understand categorization of sports according to energy needs, diet plan, fluid & electrolyte balance in sports performance, Fluid guidelines before during and after exercise.
3. Explain in detail about aerobic and anaerobic fitness, benefits of aerobic and anaerobic EXS. Assessment of fitness & goal setting to improve aerobic and anaerobic fitness.
4. Illustrate meaning and type of ergogenic aids, Nation & World anti doping agency, anti doping rules of WADA, Banned substances and effects of doping on health.

Learning Outcomes:

After undergoing the course contents of this paper, the students will be able to understand:-

1. The Physical fitness & Wellness, dimension of wellness, principles of fitness, wellness & recreation, components of fitness & wellness assessment.
2. Categorization of sports according to energy needs, diet plan, fluid & electrolyte balance in sports performance, Fluid guidelines before during and after exercise.
3. About aerobic and anaerobic fitness, benefits of aerobic and anaerobic EXS. Assessment of fitness & goal setting to improve aerobic and anaerobic fitness.
4. Meaning and type of ergogenic aids, Nation & World anti doping agency, anti doping rules of WADA, Banned substances and effects of doping on health.

Unit I – Introduction of Physical Fitness and Wellness

Meaning and Definition of Physical Fitness and Wellness, Dimensions of Wellness, Principles of physical fitness and wellness, Primary and Secondary components of fitness, Assessment of wellness, Meaning of recreation, Types of recreation activities, Principles of recreation and Leisure time physical activity.

Unit II – Sport Nutrition

Categorisation of Sport according to energy requirements, Body Weight and Energy Expenditure for different categories of Sport, Pre event Meal (3-4 hrs. , 1-2 hrs and less than 1 hr), Diet plan for Sport requiring 7000 k.cal., 6000 k.cal., 5200k. Cal., 4500 k.cal. and 3600 k. Cal.

Role of Fluid and electrolytes balance in Sport performance, Symptoms and Results of Dehydration, Fluid Replacement Guidelines: before, during and after exercise.

Unit III – Aerobic and Anaerobic Exercise

Difference between aerobic and anaerobic fitness, aerobic and anaerobic metabolic threshold, Health benefits of aerobic and anaerobic exercise, calculation to aerobic and anaerobic training zone, Monitoring of heart rates during activity. Assessment of aerobic and anaerobic fitness, aerobic and anaerobic training methods, goal setting to maintain or improve aerobic and anaerobic fitness levels.

Unit IV – Ergogenic Aids and doping

Meaning of Ergogenic Aids, Ergogenic Aids: Mechanical Aids, Pharmacological Aids, Physiological Aids, Nutritional Aids and Psychological Aids.

World and National Anti Doping Agency, Anti doping rules of WADA, Category of Banned substances and methods. Side effects of doping on health.

Suggested Readings:
David K. Miller & T. Earl Allen, Fitness, A life time commitment, Surjeet Publication Delhi 1989.
Dificore Judy, the complete guide to the postnatal fitness, A & C Black Publishers Ltd. 35 Bedford row, London 1998
Dr. A.K. Uppal, Physical Fitness, Friends Publications (India), 1992. Warner W.K. Oeger & Sharon A. Hoeger,
Fitness and Wellness, Morton Publishing Company, 1990.
Elizabeth & Ken day, Sport fitness for women, B.T. Batsford Ltd, London, 1986.
Emily R. Foster, Karyn Hartiger & Katherine A. Smith, Fitness Fun, Human Kinetics Publishers 2002.
Lawrence, Debbie, Exercise to Music. A & C Black Publishers Ltd. 37, Sohe Square, London 1999
Robert Malt. 90 day fitness plan, D.K. publishing, Inc. 95, Madison Avenue, New York 2001

M.P.Ed. – 205: Yogic Science

Time: 3 Hours   **Maximum Marks: 100 (External Marks: 80 + Internal Assessment: 20)**
                                                                Total Credits: 4

Note:-   **Paper setter will set nine questions in all out of which students will be required to attempt five questions.**

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.

2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

This course will enable students to understand:

1. Explain philosophy of yoga, types of yoga & yogic practices.
2. Meaning & basic principles and methods of naturopathy, chakras and their benefits.
3. Explain in detail about the Shatkriya, Bandhas, and Mudras meanging, techniques & their benefits.
4. Describe role of yoga on psychological preparation of athletes, physiological aspects of body systems and effects of meditation on body.

Learning Outcomes:

After undergoing the course contents of this paper, the students will be able to understand:-

1. philosophy of yoga, types of yoga & yogic practices.
2. Meaning & basic principles and methods of naturopathy, chakras and their benefits.
3. the Shatkriya, Bandhas, and Mudras meanging, techniques & their benefits.
4. The role of Yoga on psychological preparation of athletes, physiological aspects of body systems and effects of meditation on body.

Unit- I Philosophy and types of Yoga

1. Philosophy of Yoga
2. Types of Yoga – Ashtang Yoga, Raj Yoga, Karma Yoga, Bhakti, Yoga, Hath Yoga, Kriya Yoga, Gyan Yoga and Mantra Yoga.
3. Yogic Practice: Place, Time, Clothes, Bathing, Diet before and after.

Unit- II
1. Spiritual development through Yogic Practices.
2. Naturopathy: Meaning, concept and philosophy, brief history of naturopathy, basic principles of nature cure. Various methods of Naturopathy
3. Chakras: Major Chakaras- Benefits of clearing and balancing Chakras

Unit III – Kriyas, Bandhas and Mudras

1. Shat Kriyas: Meaning of Kriya, Techniques and Benefits of Neti, Dhati, Kapalapathi, Trataka, Nauli, Basti.
2. Bandhas: Meaning, Techniques and Benefits of Jalendra Bandha, Jihva Bandha, Uddiyana Bandha, Mula Bandha.
3. Mudras: Meaning, Techniques and Benefits of Hasta Mudras, Asamyukta hastam, Samyukta hastam, Mana Mudra, Kaya Mudra, Banda Mudra, Adhara Mudra.

Unit IV – Psychological, Physiological and Meditative effects of yoga

1. Role of Yoga in Psychological Preparation of athlete: Mental Wellbeing, Anxiety, Depression Concentration, Self Actualization.
2. Effect of Yoga on Physiological System: Circulatory, Skeletal, Digestive, Nervous, Respiratory, Excretory System.
3. Meditation: Meaning, Techniques and Benefits of Meditation – Passive and active.

Suggested Readings:
George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.
Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004),
The Yoga Adventure for Children. Netherlands: A Hunter House book.
Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.
Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal
Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.
Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.
Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.
Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.
Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.
Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.
Swami Sivananda, (1971), The Science of Pranayama. Chennai: A Divine Life Society Publication.
Thirumalai Kumar. S and Indira. S (2011) Yoga in Your Life, Chennai: The Parkar Publication.
Tiwari O.P. (1998), Asanas-Why and How. Lonavala: Kaivalyadham.

Part – B
Practical Courses
Semester – 2nd

M.P.Ed. –206: Athletics (Throws and Conduct of Athletic Meet)
Marks – 100

Credits=2.5

Course Objectives:-

1. To provide knowledge related to marking of Shot Put, Discus & Javeliu Throwing Sectors.
2. To provide teaching ability of Shot Put techniques (standing & Parry O' Brien Technique).
3. To provide teaching ability of Javelin Throw echniques.
4. To give knowledge about interpretation of various rules of Throwing events.
5. To provide knowledge about Baton exchange in relay races.
6. The students will gain proficiency in officiating & organizing (Opening, closing & medal ceremony) of athletic meet.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand:-

1. Marking of Shot Put, Discus & Javeliu Throwing Sectors.
2. Teaching ability of Shot Put techniques (standing & Parry O' Brien Technique).
3. Teaching ability of Javelin Throw echniques.
4. Knowledge about interpretation of various rules of Throwing events
5. Knowledge about Baton exchange in relay races.
6. Understand about organizing & officiating (Opening, closing & medal ceremony) of athletic meet.

Track Events

i.	Marking of Short Put, Discus and Javelin throw Sector	(Marks – 20)
ii.	Teaching ability of Short Put Techniques (Standing and Parry O'brien Technique)	(Marks – 20)
iii.	Teaching ability of Discus Throw Technique	(Marks - 20)
iv.	Teaching ability of Javelin Throw Technique	(Marks - 20)
v.	Interpretation of various rules of Throwing Events (Preparation of result sheet of Short Put, Discus and Javelin throw)	(Marks - 10)
vi	Baton exchange of relay races	(Marks - 10)

Note: Candidate have to take at least 5 teaching lessons of Throwing Events.

M.P.Ed.–207: Game (Volleyball, Wrestling & Boxing)
Marks – 100

Credits=2.5

Course Objectives:-

To enable the students to:

1. Marking of Volley Court, teaching of basic skills of volleyball, interpretation of rules, filling he score sheet-B officiating symbols.
2. Dimension of Wrestling mat & arena, teaching ability of basic skill & interpretation of various rule sof wrestling & boxing.

Learning Outcomes:

1. Marking of Volley Court, teaching of basic skills of volleyball, interpretation of rules, filling he score sheet-B officiating symbols.
2. Dimension of Wrestling mat & arena, teaching ability of basic skill & interpretation of various rule sof wrestling & boxing.

i)Volleyball   **Marks – 50**

1. Marking of Volleyball Court	(Marks – 10)
2. Teaching ability of various basic skills of Volleyball	(Marks – 10)
3. Interpretation of Various rules of Volleyball	(Marks – 10)
4. Filling the score sheet of Volleyball	(Marks – 10)
5. Officiating Symbols	(Marks – 10)

ii) Wrestling & Boxing   **Marks – 50**

Practicals

Dimensions of Boxing Ring	(Marks - 20)
Teaching ability of various basic skills of Boxing	(Marks - 20)
Interpretation of Various rules of Boxing	(Marks - 10)

Practicals

Dimensions of Wrestling mat and arena	(Marks - 20)
Teaching ability of various basic skills of Wrestling	(Marks - 20)
Interpretation of Various rules of Wrestling	(Marks - 10)

Assessment Task: Evaluation of Presentation and lesson planning (Internal and External).

1. Teaching ability of various basic skills of Wrestling & Boxing	(Marks – 20)
3. Interpretation of Various rules of Wrestling & Boxing	(Marks – 10)
4. Filling the score sheet of Wrestling & Boxing	(Marks – 10)
5. Officiating Symbols of Wrestling & Boxing	(Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

M.P.Ed. – 208: Yoga
(Marks – 50)

Credits=0.5

Course Objectives:

1. To provide knowledge & understanding of teaching precaution & effects of various Asanas and Pranayam on Body.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand:-

1. To provide knowledge & understanding of teaching precaution & effects of various Asanas and Pranayam on Body.

2. LIST OF YOGIC PRACTICES
3. ASANA   PRANAYAMA
4. 1. Shirsh Asana   1. Anulome-vilome
5. 2. Vipratakarani   2. Ujjai
6. 3. Hal Asana   3. Bhastrika
7. 4. Bhujang Asana   4. Shitali
8. 5. Ardh-Shalbh Asana   5. Kapalbhati
9. 6. Vakra Asana   6. Suryabhedan
10. 7. Ardha Matasyaendrasana 7. Bhramri
11. 8. Paschimottan Asana
12. 9. Vajra Asana
13. 10. Supta Vajra Asana
14. 11. Yoga Mudra
15. 12. Nauka Asana
16. 13. Bak Asana
17. 14. Mayur Asana
18. 15. Ustra Asana
19. 16. Vriksh Asana
20. 17. Padma Asana
21. 18. Trikon Asana
22. 19. Sarvang Asana
23. 20. Manduk Asana
24. 21. Pavan Muket
25. 22. Chakra Asana
26. 23. Pad-hast Asana
27. 24. Katichakra Asana
28. 25. Surya Namaskar

Note: Students are required to do any 10 asana form above mentioned Asanas and three Pranayama

M.P.ED. – 209 : Applied Statistics and ICT

(Marks – 50)

Credits=0.5

Course Objectives:

The students will be provided the knowledge of some statistical techniques with excel & SPSS to calculate.

- i) Mean, Median & Standard deviation.
- ii) t-test, ANOVA and Correlation.
- iii) Plotting different types of diagrams.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand the use of following statistics techniques with excel & SPSS:-

- i) Mean, Median & Standard deviation.
- ii) t-test, ANOVA and Correlation.
- iii) Plotting different types of diagrams.
- iv) Following statistical techniques with Excel & SPSS
- v)   i)   Calculation of Mean, Median & Standard Deviation   (Marks - 10)
- vi) ii)   t - test, ANOVA & Correlation   (Marks - 20)
- vii) iii) Plotting different types of graphs   (Marks - 20)

M.P.Ed. - 210: Philosophy of Yoga

Time: Two Hours   **Total Marks: 50 (Theory Marks: 40 + Internal Assessment: 10)**

Credits=2

Note:-

1. **Two long answer type questions will be set from each units (1st, IInd,), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 16 marks each.**
2. **Question No. 1 will be compulsory and will carry 8 marks. It will comprises of 4 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:-

To enable the students to:-

1. Understand Indian Philosophy of Yoga, its types , five blossoms & Yogic practices.
2. Gain knowledge about Sankhya, Gyan, Karma & Bhakti Yoga and characteristics of Yogi in Bhagwad Gita.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand :-

1. Indian Philosophy of Yoga, its types , five blossoms & Yogic practices.
2. About Sankhya, Gyan, Karma & Bhakti Yoga and characteristics of Yogi in Bhagwad Gita.

Unit- I   Indian Philosophy of Yoga

- o Meaning and Concept of Yoga
- o Brief introduction of Indian yoga philosophy
- o Types of Yoga – Ashtang Yoga, Raj Yoga, , Hath Yoga and Kriya Yoga,
- o Five Blossoms (Panchkalesh) of Yoga and Pramana
- o Yogic Practice: Place, Time, Clothes, Bathing, Diet before and after.

Unit- II   Yoga in Shrimad Bhagwad Geeta

- Introduction and Historical background to Bhagwat Gita
- Sankhya Yoga
- Gyan Yoga
- Karma Yoga
- Bhakti Yoga
- Characteristics of a Yogi

Suggested Readings:

George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.

Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004),

The Yoga Adventure for Children. Netherlands: A Hunter House book.

Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.

Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal

Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.

Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.

Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.

Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.

Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.

Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.

Swami Sivananda, (1971), The Science of Pranayama. Chennai: A Divine Life Society Publication.

Thirumalai Kumar. S and Indira. S (2011) Yoga in Your Life, Chennai: The Parkar Publication.

Tiwari O.P. (1998), Asanas-Why and How. Lonavala: Kaivalyadham.

M. P. Ed. –Syllabus
(From session 2020-2021)
Semester – 3rd
Part – A (Theory Courses)
Paper 301: Sport Psychology

Time: 3 Hours   **Maximum Marks: 100 (External Marks: 80 + Internal Assessment: 20)**
                                                       Total Credits: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

The students will be able to:-

1. Explain the sports & Exercise Psychology and theories of learning.
2. Describe the Psychological skill traning and types, its phases in game and sports, meaning, types and principles of gold setting.
3. Understand the concept of motivation, its models and theories, meaning, causes symptoms of stress and its management through various means.
4. Understand the meaning, structure and different theories of personality.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand :-

1. The sport and exercise psychology and various theories like Thorndike's theory, Pavlov Theory, Kohler's Insight learning and Bandura's Social Learning Theory.
2. The psychological skill training its type and various phases in games and sports and goal meaning, types and principles of gold setting.
3. the concept of motivation, its models and theories, meaning, causes symptoms of stress and its management through various means.
4. the meaning, structure and different theories of personality like Sigmund Freud's, Psychoanalytic theory, Hippocrate's, Kretschmer's , Sheldon and Jung's etc. classification.

UNIT- I Introduction of Sport Psychology & Learning

1. Introduction to Sport and Exercise Psychology?
2. Multidimensional components of the field of Sport Psychology.
3. Thorndike's theory (Connectionism or Trial and Error Learning)
4. Pavlov's Theory of Classical Conditioning
5. Kohler's Insight Learning
6. Bandura's Social Learning Theory

UNIT- II Psychological Skills Training and Goal Setting

1. Introduction to Psychological Skills Training (PST) and Types
2. Advantages of PST in Sport
3. Phases of Psychological Skills Training Programmes in games and Sport
4. Define Goal Setting and Types of Goals
5. Principles of Goal Setting

UNIT- III Motivation and Stress

1. Meaning of Motivation, Basic Motivational concepts Interactional model of Motivation.
2. Strategies for Motivating Athletes and Teams.
3. Theories of achievements Motivation (Atkinson's theory and Attribution theory)
4. Maslow's need-hierarchy theory
5. Meaning and Definition of Stress, Causes, Symptom
6. Effective Strategies of Stress, through Yoga & Meditation

UNIT- IV Personality and Its Theories

1. Meaning and Structure of Personality
2. Sigmund Freud: Psychoanalytic Theory of Personality
3. Types theories of Personality (Hippocrate's classification, Kretschmer's classification, Sheldon's and Jung)
4. Trait theories of Personality (Allport, Cattell, & Eysenck Personality)

REFERENCE:
Bhatia, Hans Raj, Test Book of Education Psychology, Delhi: Macmillan, 2003
Roben. B. Frost: Psychological concepts applied to Physical Education and Coaching,   Edition, Wesley Publishing Co. London.
Dridge & Hung: Psychological foundation of Education. Harper and Row Publishers. Jain, D., Introduction to Psychology, New Delhi: K.S.K, 2003.
Kamlesh, M.L. Education Sport Psychology, New Delhi, Friends Pub., 2006

Kamlesh, M.L., Key Ideas in Sport Psychology, New Delhi, Friends Pub., 2007 Kutty, S.K. Foundations of Sport & Exercise Psychology, New Delhi: Sport, 2004

Robert. S. Weinberg – Foundations of Sport and Exercise Psychology (Third Edition Daniel Gould

Jack H.Liewellyn – Psychology of Coaching: Theory and Application (Surjeet Publisher New Judy A. Blucker Delhi)

Jashwant Kaur Virk – Psychology of Training and Learning (Twenty First Century Publication Pardeep Kumar Sahu Patiala, 2008.

Dr. Arun Kumar Singh – Advanced General Psychology, Moti Lal Banarasi Das Bunglow Road Jawahar Nagar Delhi.

M.P.Ed – 302: SPORT MEDICINE

Time: Three Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**
Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

1. To provide knowledge about meaning concept principles purposes and carrier opportunities in sport medicine.
2. To provide knowledge about meaning and types of sport injuries their symptoms, aiding equipments, strapping and their treatment.
3. To acquaint students about various therapeutic modalities, their physiological effects, indication, contraindication in rehabilitation.
4. To provide knowledge about meaning and type of physical therapy used in rehabilitation process for sports injuries.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand:-

1. The meaning, concept, principles purposes and carrier opportunities in sport medicine.
2. The meaning and various types of sport injuries (Soft & Hard tissue), their symptoms, aiding equipments, strapping and their treatment.
3. The various therapeutic modalities (Hydro therapy, Cryo therapy, PRICE, Manual therapy), their physiological effects, indication, contraindication in rehabilitation.
4. The meaning and types of physical therapies (Strengthening, Balance & Flexibility exercises) being used in rehabilitation process for sports injuries.

UNIT- I: Introduction to Sport Medicine

i   Meaning, Definition and Importance of Sport Medicine in field of Sport.
ii   Principle, purposes and concept of Sport Medicine.
iii   Different aspects of Sport Medicine.
iv   Career opportunities in Sport Medicine.
v   Role of Athletic Trainer in Sport Medicine.

UNIT- II: Sport Injuries

i   Sport Injuries: Meaning and their different classifications.
ii   Sprain & Strain: Meaning, Pathological Symptoms and their treatment.
iii   Dislocation & Fracture:, Meaning, Pathological Symptoms and their treatment.
iv   Strapping and Aiding Equipments for Sprain, Strain, Dislocation and Fracture.

UNIT- III: Physiotherapeutic Modalities
i   PRICE treatment: Its advantages and Physiological Effects.
ii   TENS treatment: Its advantages and Physiological Effects.
iii   Hydrotherapy: Its advantages and Physiological Effects.
iv   Cryotherapy: Indications, Contra Indications and Precautions, its benefits and Physiological Effects.
v   Manual Therapy: Its benefits, Techniques and Physiological Effects.

UNIT- IV: Exercise Therapy
i   Meaning, definition and importance of exercise therapy
ii.   Strengthening Exercises and their benefits in rehabilitation from injuries.
iii   Flexibility Exercises and their benefits in rehabilitation.
iv   Aquatic Therapy and its benefits in rehabilitation.
v   Balance Exercises and their benefits in rehabilitation.

REFERENCE:
Christopher M. Norris. (1993). Sport Injures Diagnosis and Management for Physiotherapists. East Kilbride: Thomson Litho Ltd.
James, A. Gould & George J. Davies. (1985). Physical Therapy. Toronto: C.V. Mosby Company.
Morris B. Million (1984) Sport Injuries and Athletic Problem. New Delhi: Surjeet Publication.
Pande. (1988). Sport Medicine. New Delhi: Khel Shitya Kendra.
The Encyclopedia of Sport Medicine. (1998). The Olympic Books of Sport Medicine, Australia: Tittel Blackwell Scientific Publications.
Mellion (1995) Office of Sport Medicine II Edition Publisher Hanley & Belfus Inc. Philadelphia.
Steven J Karageanes: (2005) Principles of Manual Sport Medicine Lippincott Williums and Wilkins A Wolter Kluwer Company.

M.P.Ed – 303: TEST, MEASUREMENT AND EVELUATION IN PHYSICAL EDUCATION.

Time: Three Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**
Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

1. To acquaint the students with basic concepts and practices adapted in measurement and evaluation in the field of physical education and sport.
2. To orient the students about technical standards of tests such as
3. To provide knowledge about various motor ability and fitness tests.
4. To provide knowledge about specific skill tests related to various sports.
5. To provide knowledge of Anthropometric measurements of body, body fat measurement in both sexes.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand:-

1. The basic concepts and practices adapted in measurement and evaluation in the field of physical education and sport.
2. About technical standards of tests such as Validity, Reliability, Objectivity and Norms.
3. About various motor ability and fitness tests like AAHPER Youth fitness, Barrow motor Ability, Scott Motor ability, etc.
4. About specific skill tests related to various sports like French-short serve, Johnson-Basketball Test, Schmithals-French test, Mor-Christian general soccer ability test, etc.
5. The knowledge of Anthropometric measurements of body, body fat measurement in both sexes.

Unit -1: Introduction of Test, Measurement and Evaluation

Meaning and definition of Test, Evaluation and Measurement. Need and Importance of measurement and evaluation in Physical Education and Sport. Criteria for test selection: a) Technical Standards – i) Validity ii) Reliability iii) Objectivity and iv) Norms, b) Practical Standards for administration of Test – i) Advance Preparations ii) Duties During Testing iii) Duties after testing.

Unit – 2: Motor Ability and Fitness Tests

Meaning of Motor Ability, Test of Motor Ability – a) Barrow Motor Ability test b) Scott Motor Ability Test. Test of Fitness and Endurance – a) AAHPER Youth Fitness Test b) Harvard Step Test c) Copper 12 Min run test. Muscular Fitness – Kraus Weber Minimum Muscular Fitness Test. LUS Agility Obstacle test, Nelson - Hand Reaction test , Foot Reaction test and Speed of the movement test

Unit – 3: Skill test

Test of specific Sport skill - Badminton - French Short Serve, Scott Long Serve and French Clear Test. Basket Ball – Johnson Basketball Test, AAHPER Basketball Test, Hockey – Schmithals-French Test   in Field Hockey& Harbans Hockey Test. Mor-Christian General Soccer Ability Skill Test Battery.

Unit – 4 : Anthropometric and Sport skill test

Method of Measuring Skin folds of different regions, Measurement of Body fat percentage with skinfold measurement in men and women with skin fold measurement. Meredith Physical Growth Records and Iowa Posture Test. Broer – Miller Forehand and Backhand Drive test for Tennis skills. Modified Brady Volleyball Test. Cricket- Sutcliff cricket test.

REFERENCES:

Authors Guide (2013) ACSM's Health Related Physical Fitness Assessment Manual, USA: ACSM Publications
Collins, R.D., & Hodges P.B. (2001) A Comprehensive Guide to Sport Skills Tests and Measurement (2nd edition) Lanham: Scarecrow Press
Cureton T.K. (1947) Physical Fitness Appraisal and Guidance, St. Louis: The C. Mosby Company
Getchell B (1979) Physical Fitness A Way of Life, 2nd Edition New York, John Wiley and Sons, Inc
Jenson, Clayne R and Cynt ha, C. Hirst (1980) Measurement in Physical Education and Athletics, New York, Macmillan Publising Co. Inc
Kansal D.K. (1996), "Test and Measurement in Sport and Physical Education, New Delhi: DVS Publications
Krishnamurthy (2007) Evaluation in Physical Education and Sport, New Delhi; Ajay Verma Publication
Vivian H. Heyward (2005) Advance Fitness Assessment and Exercise Prescription, 3rd Edition, Dallas TX: The Cooper Institute for Aerobics Research
Wilmore JH and Costill DL. (2005) Physiology of Sport and Exercise: 3rd Edition. Champaigm IL: Human Kinetics
Yobu, A (2010), Test, Measurement and Evaluation in Physical Education in Physical Education and Sport. New Delhi; Friends Publications

M.P.Ed – 304: Athletic Care and Rehabilitation.

Time: Three Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**
                                                                                                Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

1. To provide knowledge about mechanism of tissue injury and their healing (Soft & Hard tissue), Pain pathway and its relief mechanism.
2. To acquaint students with identification of injuries through inspection, palpation and special tests with provision of line of treatment.
3. To provide knowledge about various Therapeutic modalities such as PNF, Short way diathermy, Ultra sound therapy, infrared rays & Ultra-violet rays.
4. To provide understanding about various specific sports injuries, symptoms and their treatments like muscle soreness, tennis elbow, shin splint, rotator cuff, jumpers knee, etc.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand:-

1. The mechanism of tissue injury and their healing (Soft & Hard tissue), Pain pathway and its relief mechanism.
2. The identification of injuries through inspection, palpation and special tests with provision of line of treatment.
3. Various Therapeutic modalities such as PNF, Short way diathermy, Ultra sound therapy, infrared rays & Ultra-violet rays.
4. Various specific sports injuries, symptoms and their treatments like muscle soreness, tennis elbow, shin splint, rotator cuff, jumpers knee, etc.

UNIT I – Mechanics of Tissue Injury and Healing

Force and its effects in injury, torque and its effect in injury, Tissue response to injury in synovial membrane, synovial fluid, soft tissue and bone. Healing of soft tissue, bone tissue healing, nerve healing, Neurological basis of pain, referred pain and radiating pain, pain pathway and pain relief mechanism.

UNIT II – Identification of injury and treatment plan

Inspection of injury site: palpation- component of palpation, Special test for identifying nature of injury.

Short term goals and long term goals in the treatment of musculoskeletal problems, Development of treatment plan: Phase one, Phase two, Phase three and Phase four.

UNIT III – Therapeutic Modalities

Proprioceptive Neuromuscular Facilitation (PNF): Meaning, benefits, pattern and technique.

Pathology of Rehabilitation in injuries with Short wave Diathermy, Micro wave Diathermy, Ultra Sound Therapy, Electric Wave Stimulation, Infra Red Rays and Ultra Violet Rays

UNIT IV – Specific Sport Injuries

Symptoms and treatment of Muscle Soreness, Tennis/Golfer Elbow, Shin Splint, Rotaters Cuff injury, Spondylolysis, Hoffar's syndrome, Charley House, ITFB Syndromes, Jumper's Knee, Tennis Leg, Achilles tendonitis, Abdominal wall Contusion and Abdominal muscle strain.

REFERENCES:
Christopher M. Norris. (1993). Sport Injures Diagnosis and Management for Physiotherapists. East Kilbride: Thomson Litho Ltd.
James, A. Gould & George J. Davies. (1985). Physical Physical Therapy. Toronto: C.V. Mosby Company.
Morris B. Million (1984) Sport Injuries and Athletic Problem. New Delhi: Surjeet Publication.
Pande. (1998). Sport Medicine. New delhi: Khel Shitya Kendra
The Encyclopedia of Sport Medicine. (1998). The Olympic Book of Sport Medicine, Australia: Tittel Blackwell Scientific publications.
Practical: Anthropometric Measurement.

M.P.Ed – 305: Value and Environmental Education.

Time: Three Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**
Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:

1. To acquaint students about meaning and concept of value education, its Classification, factors effecting, need and theories of values.
2. To provide knowledge about Sports Ethics, its theories and guiding values of anti-doping.
3. To provide meaning and concept of Environmental education and different types of pollution.
4. To acquaint students with Natural resources and environmental issues such as Water pollution, Soil contamination, and various Hazardous waste.

Learning Outcomes:-

After undergoing the course contents of this paper, the students will be able to understand:-

1. About the meaning and concept of value education, its Classification, factors effecting, need and theories of values.
2. About Sports Ethics, its theories, guiding values of anti-doping and Ethical guidelines for Physical Education professionals.
3. The meaning and concept of Environmental education and different types of pollution such as outdoor and indoor smog pollution, greenhouse effect, Global warming, Bio degradable and Non-Bio degradable products
4. Thoroughly about Water pollution and its controlling techniques, preventing and controlling Soil pollution and means of dealing Hazardous wastes.

UNIT I – Introduction to Value Education

Values: Meaning, Definition and Concepts of Values.

Value Education: Importance and Objectives of Value Education.

Moral Values: Need and Theories of Values.

Classification of Values: Basic Values of Religion and Classification of Values.

Factors effecting Values

UNIT II – Ethics System

Meaning and Definition of Ethics in Sport, Need of ethics in Sport,

Types of ethics, Mainstream Ethical Theories in Sport.

Ethics for a coach, a physical education teacher and a player.

WADA Ethical Panel: Guiding Values in Sport and Anti-Doping

Unit- III – Environmental Education

Definition, Scope and Need of environmental studies, Historical background of environmental education. Air Pollution: Parameters of outdoor and indoor air pollution, smog pollution, greenhouse effects, global warming, ozone depletion, Renewable and renewable mineral resources, Bio – degradable and non bio – degradable products.

Unit - V Natural Resources and related environmental issues

Water Pollution: Parameters of water quality, Prevention and controlling groundwater and surface water pollution, water harvesting techniques

Soil contamination by salinisation and pesticides, Desertification by human impact, Preventing and controlling soil pollution

Hazardous waste: types and production, dealing with hazardous waste .

REFERENCE:
Miller T.G. Jr., Environmental Science (Wadsworth Publishing Co.) Odum, E.P. Fundamentals of Ecology (U.S.A.: W.B. Saunders Co.) 1971.
Rao, M.N. & Datta, A.K. Waste Water Treatment (Oxford & IBH Publication Co. Pvt. Ltd.) 1987
Townsend C. and others, Essentials of Ecology (Black well Science)
Heywood, V.H. and Watson V.M., Global biodiversity Assessment (U.K.: Cambridge University Press), 1995.
Jadhav, H. and Bhosale, V.M. Environmental Protection and Laws (Delhi: Himalaya Pub. House), 1995.
Mc Kinney, M.L. and Schoel, R.M. Environmental Science System and Solution (Web enhanced Ed.) 1996.
Miller T.G. Jr., Environmental Science (Wadsworth Publishing Co.)

MPEd – 306: Game – (Hockey and Basketball)
Marks – 100

Hockey: 50 Basketball; 50

Credits=2.5

Course Objectives:-

1. To provide knowledge & practical experience about marking of Hockey Ground & Basketball court.
2. To give knowledge about teaching abilities of basic skill of Hockey & Basketball.
3. To provide information to students about interpretation of various skills of Hockey & Basketball.
4. To provide knowledge about filling the score sheets of Hockey & Basketball & their officiating symbols.

Learning Outcomes:-

After understanding the course contents of this paper:

1. The students will be able to have practical knowledge & experience of marking of Hockey ground and Basketball court.
2. The students will be able to teach basic skills of Hockey and Basketball.
3. The students will have clarity about interpretation of various skills of Hockey & Basketball.
4. They will gain knowledge of filling score sheets of these games & able to use officiating symbols.

i) Hockey   **Marks – 50**
1. Marking of Hockey Court   (Marks – 10)
2. Teaching ability of various basic skills of Hockey   (Marks – 10)
3. Interpretation of Various rules of Hockey   (Marks – 10)
4. Filling the score sheet of Hockey   (Marks – 10)
5. Officiating Symbols   (Marks – 10)

ii) Basketball   **Marks – 50**
1. Marking of Basketball Court   (Marks – 10)
2. Teaching ability of various basic skills of Basketball   (Marks – 10)
3. Interpretation of Various rules of Basketball   (Marks – 10)
4. Filling the score sheet of Basketball   (Marks – 10)
5. Officiating Symbols of Basketball   (Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

M.P.Ed – 307: Game – (Kabaddi andKho-Kho)
Marks – 100

Kabaddi: 50, Kho-Kho; 50

Credits=2.5

Course Objectives:-

1. To provide knowledge & practical experience about marking of Kabaddi Court & Kho-Kho ground.
2. To give knowledge about teaching abilities of basic skill of Kabaddi & Kho-Kho.
3. To provide information to students about interpretation of various skills of Kabaddi & Kho-Kho.
4. To provide knowledge about filling the score sheets of Kabaddi & Kho-Kho & their officiating symbols.

Learning Outcomes:-

After understanding the course contents of this paper:

1. The students will be able to have practical knowledge & experience of marking of Kho-Kho ground and Kabaddi court.
2. The students will be able to teach basic skills of Kabaddi & Kho-Kho.
3. The students will have clarity about interpretation of various skills of Kabaddi & Kho-Kho.
4. They will gain knowledge of filling score sheets of these games & able to use officiating symbols.

i) Kabaddi   **Marks – 50**

1. Marking of Kabaddi Court   (Marks – 10)
2. Teaching ability of various basic skills of Kabaddi   (Marks – 10)
3. Interpretation of Various rules of Kabaddi   (Marks – 10)
4. Filling the score sheet of Kabaddi   (Marks – 10)
5. Officiating Symbols   (Marks – 10)

ii) Kho – Kho   **Marks – 50**

1. Marking of Kho -Kho Court   (Marks – 10)
2. Teaching ability of various basic skills of Kho -Kho   (Marks – 10)
3. Interpretation of Various rules of Kho -Kho   (Marks – 10)
4. Filling the score sheet of Kho -Kho   (Marks – 10)
5. Officiating Symbols of Kho -Kho   (Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

M.P.Ed – 308: Game – Sports Psychology
Marks – 50

Credits=0.5

Course Objectives:-

To provide information about different psychological tests and their application in various sports conditions.

Learning Outcomes:-

After understanding the course contents of this paper:

Students will gain knowledge about different psychological tests such as (i) Co-operation and competition test research series of – APRC, Agra, 1997, (ii) Sport aggression inventory,(iii) self concept questionnaire, etc and their application in various sports conditions.

*Note***: Candidate has to evaluate any of the following three questionnaires**　　　　　**Marks - 30**

1. Co-operation and competition test Research Series of –APRC, Agra, 1997
2. Sport Aggression Inventory – Prof. Anand Kumar Srivastava.
3. Self concept questionnaire- Dr. Raj Kumar Saraswat.
4. ASAAP (A Socio- Metric measure- Dr. S.L. Chopra, Lucknow.)
5. Leader Behaviour Scale – Dr. Asha Hingar, Jaipur.
    Viva – Voce related to these questionnaires　　　　　　　　**Marks – 20**

M.P.Ed – 309: Tests, Measurement and Evaluation in Physical Education
Marks – 50

Credits=0.5

Course Objectives:-

1. To acquaint students with knowledge of measuring of body fat.
2. To provide practical knowledge of Measuring circumference of various body parts.
3. To provide knowledge of calculation of Physical fitness index.
4. To acquaint students with knowledge of Analysis of posture.
5. To acquaint students with knowledge of methods of measuring the height.

Learning Outcomes:-

After understanding the course contents of this paper:

1. To acquaint students with knowledge of measuring of body fat with Skin fold Caliper.
2. To provide practical knowledge of Measuring circumference of various body parts i.e. Arm, Waist, Hip and Thigh.
3. To provide knowledge of calculation of Physical fitness index with Harvard Step test.
4. To acquaint students with knowledge of Analysis of posture with Iowa Posture test.
5. To acquaint students with knowledge of methods of measuring the Standing and Sitting height.

Marks - 50

1. Measuring of Body Fat with Skin fold Caliper	= 10 Marks
2. Method of measuring Circumference: Arm, Waist, Hip and Thigh	= 10 Marks
3. Calculating Physical Fitness Index with Harvard Step test	= 10 Marks
4. Analysis of posture with Iowa posture test	= 10 Marks
5. Method of Measuring the Standing Height and Sitting Height.	= 10 Marks

M.P.Ed. - 310: Wellness

Time: Two Hours   **Total Marks: 50 (Theory Marks: 40 + Internal Assessment: 10)**

Credits=2

Course Objectives:-

1. Students will learn about Physical fitness, wellness, aerobic and anaerobic fitness.
2. Students will gain knowledge of Nutritional aspects of wellness necessary for healthy lifestyle.

Learning Outcomes:-

After understanding the course contents of this paper:

1. The students will learn about Physical fitness and wellness, their principles and its components, Difference between Aerobic and Anaerobic fitness along with its calculations and Health benefits.
2. The students will learn about Balanced diet, Classification of nutrients (Macro and Micro), role of fluid and Electrolyte balance, Weight management through exercise and Diet planning.

Unit I – Introduction of Wellness

- Meaning of Physical Fitness and Wellness
- Dimensions of Wellness
- Principles of physical fitness and wellness
- Primary and Secondary components of fitness
- Assessment of wellness
- Difference between aerobic and anaerobic fitness
- Calculation to aerobic and anaerobic training zone
- Health benefits of aerobic and anaerobic exercise

Unit II –Nutritional aspect of Wellness

- Meaning and concept of Balance Diet
- Component of Balance diet.
- Factor effecting balance diet.
- Meaning and classification of Nutrients: Brief introduction of Micro and Macro Nutrients
- Role of Fluid and electrolytes balance in healthy living
- Symptoms and Results of Dehydration
- Weight management through exercise and diet
- Principles of Diet planning

Suggested Readings:

David K. Miller & T. Earl Allen, Fitness, A life time commitment, Surjeet Publication Delhi 1989.
Dificore Judy, the complete guide to the postnatal fitness, A & C Black Publishers Ltd. 35 Bedford row, London 1998
Dr. A.K. Uppal, Physical Fitness, Friends Publications (India), 1992. Warner W.K. Oeger & Sharon A. Hoeger,
*   Fitness and Wellness, Morton Publishing Company, 1990.*

Elizabeth & Ken day, Sport fitness for women, B.T. Batsford Ltd, London, 1986.
Emily R. Foster, Karyn Hartiger & Katherine A. Smith, Fitness Fun, Human Kinetics Publishers 2002.
Lawrence, Debbie, Exercise to Music. A & C Black Publishers Ltd. 37, Sohe Square, London 1999
Robert Malt. 90 day fitness plan, D.K. publishing, Inc. 95, Madison Avenue, New York 2001

M.P.Ed.-401: SPORTS JOURNALISM & MASS MEDIA

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To develop the understanding of meaning, elements and ethical standards of professionalism. To provide knowledge about experts of professionalism in physical education and Sport, Various sports, news, agencies and broadcasting channels and their role in sports.
2. To explain the students about mass media and its different forms, role of media in sports and commercialization and privatization changes in sports media.
3. To provide understanding about basic concept of sport sociology, relationship of sports with culture, social interaction through sports and role of physical education in handling social problems.
4. To enable the students to learn about group cohesion, interaction, morale in group and about counseling and its skills in sports.

Learning Outcomes:-

After going through the course contents, the students will be able to understand:-
1. The meaning, elements and ethical standards of professionalism. To provide knowledge about experts of professionalism in physical education and Sport, Various sports, news, agencies and broadcasting channels and their role in sports.
2. About mass media and its different forms, role of media in sports and commercialization and privatization changes in sports media.
3. About basic concept of sport sociology, relationship of sports with culture, social interaction through sports and role of physical education in handling social problems.
4. About group cohesion, interaction, morale in group and about counseling and its skills in sports.

UNIT- I: Sport Journalism

1. Meaning, Definition and Elements of Journalism
2. Ethical Standards of Professional in Journalism
3. Sport as a Pondra of Jobs and Courses:- Sport Schemes and Incentives
4. Sport Journalists and Sport Writers Commentators, Broadcaster.
5. Sport News Agencies & Sport Broadcasting Channels.

UNIT- II: Mass Media and Functions of Mass Media in Sport

1. Mass Media in Journalism and Types of Mass Media (Print media, Electronic media and Folk media)
2. Sport coverage in different types of media
3. Advantage to a Sport person from Sport coverage
4. Role of media in making and breaking images in sport.
5. Impact of Commercialization and Privatization change in sport media.

UNIT- III: Sport Sociology

1. Meaning, Definition and Importance of Sport Sociology in Sport
2. Meaning, Definition, Structure and Relationship of Sport with Culture.
3. Meaning, Types and Processes of social interaction through Sport.
4. Relationship of Sport with Social Institution.
5. Role of Physical Education in context of social problems.

UNIT- IV: Group Cohesion in Sport

1. Nature and Group Dynamics in Sport
2. Group Cohesion in Sport
3. Group Interactions and Morale in Sport
4. Meaning and Types of Sport Society
5. Meaning of Counselling & its Need in Sport, fundamental of counseling Skills in Sport

REFERENCE:
Ahiya B.N. (1988) Theory and Practice of Journalism: Set to Indian context Ed3.
          Delhi: Surjeet Publications
Ahiya B.N. Chobra S.S.A. (1990) Concise Course in Reporting. New Delhi: Surjeet
          Publication
Bhatt S.C. (9193) Broadcast Journalism Basic Principles. New Delhi. Haranand Publication Dhananjay Joshi (2010)
Value Education in Global Perspective. New
          Delhi: Lotus Press.
Kannan K (200() Soft Skills, Madurai: Madurai: Yadava College Publication
Mohit Chakrabarti (2008): Value Education: Changing Prespective, New Delhi:
          Kanishka Publication.

Padmanabhan. A & Perumal A (2009), Science and Art of Living, Madurai: Pakavathi Publication

Shiv Khera (2002), You Can Win, New Delhi: Macmillan India Limited.

Varma A.K. (1993) Journalism in India from Earliest Times to the Present Period. Sterling publication Pvt. Ltd.

Bhusan, V.and Sachdeva, An introduction to Sociology, Delhi: Kitab, 2003.

Jain, Rachna, Sport Sociology, New Delhi: KSK, 2005

Kanwaljeet, S., Sport Sociology, ND: Friends Pub. 2000.

Yadvinder Singh, Sociology in Sport, Sport Publication, 7/26 Ansari road, Darya Ganj New Delhi- 110 002.

Sharma, R.N. Urban Sociology, ND: Surjeet Pub., 1993.

Singh, Bhupinder, Sport Sociology, New Delhi: Friends, 2004.

IGNOU, The Study of Society – Understanding Sociology, Delhi- IGNOU, 2007.

Turner, B., Cambridge Dictionary of Sociology, U.K., Cambridge, U.N. Press, 2006.

Prof. A Yobu, Sociology of Sport, Friends Publications (India) 1014787/23, Ansri road, Darya Ganj, New Delhi- 110 002.

Dr. Arun Kumar Singh – Advanced General Psychology, Moti Lal Banarasi Das Bunglow Road Jawahar Nagar Delhi.

M.P.Ed.-402: EDUCATION TECHNOLOGY IN PHYSICAL EDUCATION.

Time: 3 Hours　　　　　　　　　　**Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To develop the understanding of meaning, characteristics, types and scope of education technology and to provide knowledge about communication and its related aspects.
2. To enable the students to differentiate between teaching and training their nature and characteristics, phases and principles of teaching in physical education and sports.
3. To explain about the meaning, need, types and structure of lesson plan
4. To learn and apply multimedia approach in teaching-learning process.

Learning Outcomes:-

After going through the course contents, the students will be able to understand:-

1. The meaning, characteristics, types and scope of education technology and to provide knowledge about communication and its related aspects.
2. The difference between teaching and training their nature and characteristics, phases and principles of teaching in physical education and sports.
3. About the meaning, need, types and structure of lesson plan
4. The multimedia approach in teaching-learning process and how to apply it.

Unit I – Introduction to Educational technology and Communication

Educational technology: meaning, characteristics and Scope. Types of educational technology: teaching technology, instructional technology, and behavior technology.

Communication: meaning, main features and need. Process of communication, barriers in effective communication and principles of communication.

Unit II – Concept of teaching in Physical Education

Meaning of Teaching, Difference between Teaching and training, difference between teaching and instructions, teaching as science, Nature and characteristics of teaching. Phases of teaching: Pre – active phase, Inter – active phase and Post active phase.

General principles of teaching in physical education.

Unit III – Lesson Planning

Meaning of lesion Plan, Need of lesson plan, essentials of a good lesson plan. Different Types of lesson plans, Pre-requisites of a lesson plan.
Structure of a lesson plan: Herbart's approach - Outline of lesson plan. Recent trends of Research in Educational Technology and its future with reference to physical education.

Unit IV – Audio Visual Media in Physical Education

Meaning of Audio-visual media Aids, Classification of Audio-visual media Aids. Characteristics of Audio-visual media Aids.

Procedure and organization of Teleconferencing/Interactive video-experiences in schools and colleges. Audio Conferencing and Interactive Radio Conference, its strengths and Limitations. Video/Educational Television: Telecast and Video recordings, its Strengths and limitation

REFERENCE:

Amita Bhardwaj, New Media of Educational Planning".Sarup of Sons, New Delhi-2003
Bhatia and Bhatia. The Principles and Methods of Teaching (New Delhi : Doaba House), 1959.
Education and Communication for development, O. P. Dahama, O. P. Bhatnagar, Oxford Page 68 of 71 IBH Publishing company, New Delhi
Essentials of Educational Technology, Madan Lal, Anmol Publications
K. Sampath, A. Pannirselvam and S. Santhanam. Introduction to Educational Technology (New Delhi: Sterling Publishers Pvt. Ltd.) : 1981.
Kochar, S.K. Methods and Techniques of Teaching (New Delhi, Jalandhar, Sterling Publishers Pvt. Ltd.), 1982
Kozman, Cassidy and kJackson. Methods in Physical Education (W.B. Saunders Company,Philadelphia and London), 1952.

M.P.Ed.-403: SPORTS BIOMECHANICS

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To understand the concept of kinematics and kinetics and various terms used in biomechanics such as (distance, displacement, speed, velocity, acceleration, mass, motion & its forms)
2. To understand the concept of lever and force with motion and their application in sports.
3. To have the knowledge of centre of gravity, equilibrium, projectile and buoyancy force.
4. To have knowledge about spin, mechanical analysis of gate cycle, jump and short put.

Learning Outcomes:-

After going through the course contents, the students will be able to:-
1. Understand the concept of kinematics and kinetics and various terms used in biomechanics such as (distance, displacement, speed, velocity, acceleration, mass, motion & its forms).
2. Understand basic terminology of biomechanics, explain mechanical aspects of force, lever with motion and their application in sports.
3. Understand the concept of centre of gravity, equilibrium, projectile and use of buoyancy force in different sports events.
4. Gain knowledge of spin and mechanical analysis of walking, running, take off and landing in jump and short put.

Unit- I

Meaning and Scope of Biomechanics in Physical Education

Basic concepts of kinematics and kinetics

Definition of terms: Distance, Displacement, Speed, Velocity, Acceleration, Mass and Weight.

Meaning of Motion and types of Motion

Unit- II

Newton's Laws of Motion and their application in Sport.

Lever: (a) Classification of Levers and Lever Arms
        (b) Concept of Mechanical advantage
        (c) Human body levers.

Force: (a) Definition and Effects of Forces.
        (b) Properties of Force
        (c) Internal and External Forces
        (d) Centripetal and Centrifugal Forces
        (e) Friction: Meaning, Coefficient of friction, factors effecting friction

Unit – III

Meaning of Center of Gravity and Line of Center of Gravity

Meaning Equilibrium, types of equilibrium & principles of stability

Meaning of Projectile, Characteristics of Projectile, Range of Projectile, Height of Projectile

and Time of Projectile

Buoyancy Force and Principle of Flotation

Unit – IV

Meaning of Spin, Types of Spin, Effect of Spin on angle of rebound and velocity

Magnus Effect

Meaning of Work, Power and Energy

Mechanical Analysis of Gait Cycle Walking and Running

Mechanical Analysis of Long Jump (Takeoff and landing)

Mechanical Analysis Shot Put (Power Position and Delivery Phase)

REFERENCES

Gowitzke, B.A and Milner, M (1988). Scientific Basis of Human Movement. (3rd. ed.)Baltimore: Williams and Wilkins.
Groves, R and Camaine, D.(1983) . Concepts in Kinesiology. (2nd.ed.) Philadelphia: Saunders College Publishing.
Hay, J & Reid, J (1982). The Anatomical and Mechanical Bases of Human Motion.Englewood Cliffs: Prentice – Hall
Luttegens, Kathryn, Deutsch, Helga, Hamilton, Nancy. Kinesiology – Scientific Basis of Human Motion. 8th.Ed, Brown & Bench mark.
Rasch, P. (1989). Kinesiology and Applied Anatomy. Philadelphia: Lea & Febiger.
Thompson, C. (1985). Manual of Structural Kinesiology. (10th. ed.) St. Louis: Times Mirror/ Mosby College Publishing.
Grabiner. M.D. Current Issue is Biomechanics, New Delhi, 1993.
Mood, S.D., Beyond Biomechanics, New York: Taylor, 1996.9. Shaw, D. Mechanical Bases of Biomechanics, Delhi: Sport Pub. 2000
Shaw, D. Mechanical Bases of Biomechanics, London- A & C, 2003

M.P.Ed.-404: SPORTS TECHNOLOGY

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit: 4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To provide basic knowledge of sports technology, instrumentation, and various foams in sports.
2. To provide knowledge about nanotechnology, its variations, uses in sports material, equipments, play surfaces.
3. To provide knowledge about surface of playfields and measuring gadgets in sports activities.
4. To provide information about modern sports facilities and training machines.

Learning Outcomes:-

After going through the course contents, the students will be able to:-
1. Gain basic knowledge of sports technology, instrumentation, and various foams (Polyurethane, polystyrene, etc) and their uses in sports.
2. Gain knowledge about nanotechnology, its variations, uses in sports material, equipments, play surfaces such as synthetic and cinder tracks, turf and cemented pitches, etc.
3. Gain knowledge about surface of playfields and measuring gadgets in sports activities.
4. Gain information about modern sports facilities and training machines for enhancing training and competition performance.

Unit I – Sport Technology

Meaning and definition of Sport technology.

Significance of technology in Sport

General Principles of instrumentation in Sport.

Meaning of Foams, Types of foams (Polyurethane, Polystyrene, Styrofoam, closed-cell, open- cell foams and Neoprene) and there uses in different Sport.

Unit II – Nanotechnology in Sport Materials

Meaning and definition of Nanotechnology

Meaning of nano glue and nano moulding technology.

Uses and benefits of Nanotechnology in Sport uniforms, and safety equipments

Uses and benefits of Nanotechnology in Sport equipments and playing surfaces

Unit III – Surfaces of Playfields and Measuring Gadgets

Method of construction and installation for Synthetic and Cinder tracks.

Method of construction for Cricket pitches: Turf and Cemented.

Meaning and types of flooring materials for different Sport: synthetic (polyurethane and poly grass) and wooden.

Modern Measuring Equipments used in Running, Throwing and Jumping Events.

Unit IV – Modern Stadiums and Training Machines

Cricket: Bowling Machine, Mechanism and Advantages,

Tennis: Serving Machine, Mechanism and Advantages,

Dimensions of Sport Infrastructure - Gymnasium, Pavilion, Swimming Pool, Indoor Stadium and Out-door Stadium.

Lighting Facilities: Method of erecting and luminous in indoor and outdoor stadiums. Methods of measuring luminous.

REFERENCE:
Charles J.A. Crane, F.A.A. and Furness, J.A.G. (1987) "Selection of Engineering Materials"
UK: Butterworth Heiremann.
Finn, R.A. and Trojan P.K. (1999) "Engineering Materials and their Applications" UK: Jaico
Publisher.
John Mongilo, (2001), "Nano Technology 101 "New York: Green wood publishing group. Walia,
J.S. Principles and Methods of Education (Paul Publishers, Jullandhar), 1999.
Kochar, S.K. Methods and Techniques of Teaching (New Delhi, Jullandhar, Sterling
Publishers Pvt. Ltd.), 1982
*Kozman, Cassidy and Jackson. Methods in Phy*sical Education (W.B. Saunders Company, Philadelphia
and London), 1952.

M.P.Ed – 405: Option – (i) - Dissertation

Maximum Marks: 100 (Evaluation Marks =80+ Int. Assessment = 20)

Note: Students must submit their Dissertation in the office of the Department before the Start of 4th semester theory exams.

Course Objectives:-

Students will be acquainted with various processes of Research work

Learning Outcomes:-

To acquaint students with basic processes of research work like selection of problem, framing objectives and hypotheses, delimitations, methodology & analysis of data and research report writing.

M.P.Ed – 405 Option – (ii): Sport Management

Time: Three Hours   **Maximum 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.

Course Objectives:-

1. To provide basic concept of sports management, its element and processes.
2. To acquaint the students with leadership and communication in sports management.
3. To provide information and understanding about planning and public relation in sports management.
4. To provide information about Human resource in sports management.

Learning Outcomes:-

After going through the course contents, the students will be able to:-

1. Understand the scope and carrier opportunities in sports management.
2. Gain knowledge about Leadership & communication skills application in sports condition.
3. Gain knowledge about steps of planning and public relation guidelines for organizing any sports event.
4. Gain knowledge of Staff recruitment, selection and their responsibility for organizational functions.

UNIT- I: Introduction to Sport Management

i   Meaning, Definition and need of Sport Management.

ii   Scope of Sport Management.

iii   Career Opportunities in Sport Management.

iv   Functional Elements of Sport Management.

v   Different Processes of Sport Management.

UNIT- II: Leadership & Communication in Sport Management.

i   Meaning of Leadership, Leader Skills and Features of Sport Leader.

ii   Various Approaches of Leadership in Sport Management.

iii   Meaning, Purpose & Importance of Communication.

iv   Principles of Effective Communications.

v   Major Problems in Communication and Information System.

UNIT- III: Planning and Public Relation in Sport Management.

i   Meaning, Definitions and Importance of Planning.

ii   Steps and Principles of Planning.

iii   Developing Planning Premises & Categories of Plans.

iv   Meaning and Importance of Public Relation in Sport Management.

v   Guidelines for Sound Public Relation and Essential of Public Relation Programme.

UNIT- IV: Human Recourse in Sport Management.

i   Staff Recruitment and Selection.

ii   Guidelines for Staff Recruitment and Selection.

iii   General Qualifications of Staff in Sport Management.

iv   Responsibilities of Staff Members

v   Supervisory Working Relationship with Staff.

REFERENCE:

Bonnie, L. (1991) The Management of Sport. St. Louis: Mosby Publishing Company
Bucher A. Charles, (1993) Management of Physical Education And Sport. St. Louis: Mosby Publishing Company
Chelladurai, P.(1999), Human Resources Management in Sport and Recreation. Human Kinetic.
Lisa Pike Masteralexis, Carol A. Barr.(2005) Principles and Practice of Sport Management (Second Edition) Jones and Barlett Publishers.
Harold Koontze, Cyril O' Donnel Management – A system and contingency Analysis of Managerial Function VI Edition.
Koontze & O Donnel – Essentials of Management. Mc graw Hill, Kogakusha Ltd.

MPEd – 406: Game – (Baseball, Softball & Lawn tennis)
Marks – 100

Hockey: 50 Basketball; 50

Credits=2.5

Course Objectives:-

1. To provide knowledge & practical experience about marking of baseball ground, softball ground and lawn tennis court.
2. To give knowledge about teaching abilities of basic skill of baseball, softball and lawn tennis.
3. To provide information to students about interpretation of various skills of baseball, softball and lawn tennis.
4. To provide knowledge about filling the score sheets of baseball, softball and lawn tennis & their officiating symbols.

Learning Outcomes:-
After undergoing the course contents of this paper:
1. The students will be able to have practical knowledge & experience of marking of baseball ground, softball ground and lawn tennis court.
2. The students will be able to teach basic skills of baseball, softball and lawn tennis.
3. The students will have clarity about interpretation of various skills of baseball, softball and lawn tennis.
4. They will gain knowledge of filling score sheets of these games & able to use officiating symbols.

i) Baseball &Softball	
	Marks – 50
1. Marking of baseball& Softball court	(Marks – 10)
2. Teaching ability of various basic skills of baseball& Softball	(Marks – 10)
3. Interpretation of Various rules of baseball& Softball	(Marks – 10)
4. Filling the score sheet of baseball& Softball	(Marks – 10)
5. Officiating Symbols	(Marks – 10)
ii) Lawn Tennis/Table tennis	**Marks – 50**
1. Marking of Lawn Tennis Court/T.T. table	(Marks – 10)
2. Teaching ability of various basic skills of Lawn Tennis/T.T	(Marks – 10)
3. Interpretation of Various rules of Lawn Tennis/T.T	(Marks – 10)
4. Filling the score sheet of Lawn Tennis/T.T	(Marks – 10)
5. Officiating Symbols of Lawn Tennis/T.T	(Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

MPEd – 407: Game – II (Football & Badminton)

Marks – 100

Credits=2.5

Course Objectives:-

1. To provide knowledge & practical experience about marking of Football ground and Badminton court.
2. To give knowledge about teaching abilities of basic skill of Football and Badminton.
3. To provide information to students about interpretation of various skills of Football and Badminton.
4. To provide knowledge about filling the score sheets of Football and Badminton & their officiating symbols.

Learning Outcomes:-

After undergoing the course contents of this paper:

1. The students will be able to have practical knowledge & experience of marking of Football ground and Badminton court.
2. The students will be able to teach basic skills of Football and Badminton.
3. The students will have clarity about interpretation of various skills of Football and Badminton.
4. They will gain knowledge of filling score sheets of these games & able to use officiating symbols.

i) <u>**Football**</u>	**Marks – 50**
1. Marking of Football Court	(Marks – 10)
2. Teaching ability of various basic skills of Football	(Marks – 10)
3. Interpretation of Various rules of Football	(Marks – 10)
4. Filling the score sheet of Football	(Marks – 10)
5. Officiating Symbols	(Marks – 10)

ii) <u>**Badminton**</u>	**Marks – 50**
1. Marking of Badminton Court	(Marks – 10)
2. Teaching ability of various basic skills of Badminton	(Marks – 10)
3. Interpretation of Various rules of Badminton	(Marks – 10)
4. Filling the score sheet of Badminton	(Marks – 10)
5. Officiating Symbols of Badminton	(Marks – 10)

Note: Candidate have to take total 5 teaching lessons of different skills of both games.

M.P.Ed – 408: III Classroom Teaching

Marks – 100

Credits=1

Course Objectives:-

The students will be provided with the basic knowledge of presenting the subject matter in an effective manner through various Pedagogical techniques.

Learning Outcomes:-

Students will be able to present their subject matter with more confident and impressive manner with greater impact.

Note: Candidate have to take total 5 classroom teaching lessons on different topics related to physical education.

 (i)   Candidate has to preparation five lessons delivered in the class during teaching practice
    in the notebook.

(ii)   Assessment will be made by the external and internal examiners on the basis on performance, confidence level, body language in teaching and use of audio visual aids related to subject matter.

Kurukshetra University, Kurukshetra

Scheme of Examination for P.G. Diploma in Yoga (One Year Course)
Credit Base Semester System implemented form session 2019-2020

Semester - I

Credits= 21   **Total Marks = 600**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total	Duration of Exam
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical		
PG DY 101	Yog Parichya	CCC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 102	Anatomy and Physiology for Yogic Practices	CFC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 103	Traditional Yoga	CFC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 104	Teaching Methodology of Yogic Practices	CCC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 105	**Practical**: Demonstration of Asana	CCC		05	05	-	2.5	2.5	-	-	100	100	--
PG DY 106	**Practical**: Demonstration of Pranayama and Shatkarmas	CCC	--	05	05	--	2.5	2.5	--	--	100	100	--
	Total		16	10	26	16	5	21	80	320	200	600	

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**

Kurukshetra University, Kurukshetra

Scheme of Examination for P.G. Diploma in Yoga (One Year Course)

Credit Base Semester System implemented form session 2019-2020

Semester - II

Credits= 21   Total Marks = 600

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total	Duration of Exam
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical		
PG DY 201	Naturopathy	CCC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 202	Anatomy and Physiology for Yogic Practices	CFC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 203	Hathyog	CFC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 204	Yoga and Health	CCC	04	--	04	04	--	04	20	80	--	100	3 hours
PG DY 205	**Practical**: Demonstration of Asana, Pranayama and Shudhikriya	CCC		05	05	-	2.5	2.5	-	-	100	100	--
PG DY 206	**Practical**: Teaching Practices of Asana, Pranayama and Shath	CCC	--	05	05	--	2.5	2.5	--	--	100	100	--
Total			**16**	**10**	**26**	**16**	**5**	**21**	**80**	**320**	**200**	**600**	

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**

PG Diploma in Yoga –Syllabus
Modification/Revision in PG Diploma in Yoga Syllabus of Semester C.B.S.S. Scheme w.e.f. 2019-20

The duration of the course leading to the PG Diploma in Yoga will be one year having two semesters. In the first & second semesters there will be twelve courses in which eight Theory & two Practicals each.

Theory papers will be of 100 marks each (80 marks for external evaluation and 20 marks for internal assessment). Practical will be of 100 marks mentioned in the Scheme. External and Internal examiners will evaluate practical jointly.

Internal Assessment will be based on the guidelines released by University.

In each theory paper, the candidate will be required to attempt five questions having fifteen marks for each long answer type question and ten questions having two marks of short type questions which is compulsory.

All theory papers in both semesters are having four credits.

P.G. Diploma in YOGA – 1ST   SEMESTER
(From session 2019-2020)
Paper- (101): YOG PARICHAYA

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit: 4

Note:-   Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

Students will be educated with the knowledge of Yoga along with its elements and activities.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understand basic concept of yoga and its developmental aspects as philosophy, meditation and its various forms.
2. Gain knowledge about various forms of yoga such as Hath yoga, Raj yoga, Bhakti yoga, karma yoga, Gyan yoga and Laya yoga.
3. Adopt knowledge about various yogic practices such as asanas, pranayamas and kriyas along with their processes and benefits.
4. Gain knowledge about yogic therapies, chakras, prayers and mantras and their uses in physical and psychological well being.

UNIT-I

(i)   Origin of Yoga & developmental aspect.
(ii)   Meaning & importance of Yoga in modern Era.
(iii) Yoga as a Science or Art, Yog Philosophy.
(iv)   Meaning of meditation according to Charandass and Gherand its types & principles.

UNIT- II

   (i)   Various types of Yoga
   (ii)   Hatha Yoga, Raja Yoga, Laya Yoga,
          Bhakti Yoga, Gyan Yoga, Karma Yoga.
   (iii)   Asthang Yoga.

UNIT -III

   (i)   Principles of Yogic Practices.
   (ii)   Meaning of Asana, its types and principles.
   (iii)   Meaning of Pranayama, its types and principles.
   (iv)   Meaning of Kriya its types and principles.

UNIT -IV

   (i)   Yogic therapies and modern concept of Yoga
   (ii)   Chakra its types and Role in yogic Practices
   (iii)   Meaning and importance of prayer.
   (iv)   Psychology of mantras.

References:
Brown, F. Y.(2000). How to use yoga. Delhi:Sports Publication.
Gharote, M. L. &Ganguly, H. (1988). Teaching methods for yogic practices.Lonawala: Kaixydahmoe.
Rajjan, S. M. (1985). Yoga strenthening ofrelexation for sports man. New Delhi:Allied Publishers.
Shankar,G.(1998). Holistic approach of yoga. New Delhi:Aditya Publishers.
Shekar,K. C. (2003). Yoga for health. Delhi: Khel Sahitya Kendra.

PAPER- (102): ANATOMY AND PHYSIOLOGY FOR YOGIC PRACTICES

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To acquaint the students with basic knowledge of Human Anatomy, Physiology and effects of yogic practices on body.
2. To provide knowledge about functions and types of bones, variations and functioning of joints along with anatomy and physiology of muscles.
3. To provide knowledge about structure of respiratory and cardio-vascular system.
4. To acquaint the students with different processes of digestive and nervous system.

Learning Outcomes:

After completion of the course contents of this paper, the student will be able to:

1. Gain knowledge about basic knowledge Human Anatomy, Physiology and effects of yogic practices on body.
2. Adopt knowledge about functions and types of bones, variations and functioning of joints along with anatomy and physiology of muscles.
3. Adopt knowledge about blood, its constituents and functioning of cardio-vascular system.
4. Understand about different processes of digestion and anatomy and physiology of nervous system.

UNIT-I

(i)   Meaning and definition of Anatomy and Physiology.
(ii) Importance of Anatomy and Physiology for Yogic Practice.
(iii) Introduction of Living Cell.
(iv) Introduction of Tissue and Organ.

UNIT-II

(i) Skeleton system; Meaning and Function of Skeleton, Types of Bones in Human Body.

(ii) Joints; Meaning and Types of joints in human body.

(iii) Muscular System: Types of muscles, Gross Structure of Skeletal Muscle, Functions of Muscles.

UNIT-III

(i) Blood and Circulatory System: Constituents of blood and their functions, structure of the heart, types of blood circulation: Systematic, Pulmonary and Coronary, Meaning of Blood Pressure, Heart Rate, Stroke Volume and Cardiac output.

(ii) The Respiratory System: Organs of Respiratory system and their functions, Structure of lungs, exchange of gases in the lungs and tissues, Meaning of various lung capacities and volumes, oxygen debt, second wind.

UNIT-IV

(i) The Digestive System: Organ of Digestive System, Structure and Functions of the Digestive System.

(ii) Nervous System: Organs, Structure and Functions of the Nervous System.

References:
Gupta, A. P. (2010). Anatomy and physiology. Agra: SumitPrakashan.
Gupta, M. and Gupta, M. C. (1980). Body and anatomical science. Delhi: Swaran Printing Press.
Guyton, A.C. (1996). Textbook of Medical Physiology, 9th edition. Philadelphia: W.B.Saunders.
Karpovich, P. V. (n.d.). Philosophy of muscular activity. London: W.B. Saunders Co.
Lamb, G. S. (1982). Essentials of exercise physiology. Delhi: Surjeet Publication.
Moorthy, A. M. (2014). Anatomy physiology and health education.Karaikudi: Madalayam Publications.
Morehouse, L. E. & Miller, J. (1967). Physiology of exercise. St. Louis: The C.V. Mosby Co.
Pearce, E. C. (1962). Anatomy and physiology for nurses. London: Faber & Faber Ltd.
Sharma, R. D. (1979). Health and physical education, Gupta Prakashan.
Singh, S. (1979). Anatomy of physiology and health education. Ropar: Jeet Publications

PAPER-(103): TRADITIONAL YOGA

Time:3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

To provide detailed information about Patanjali Yog Sutra.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain knowledge about concept of chiit, bhumi and avastha.
2. Gain knowledge about vritties, achievement of raj yog and constraints in practices of yoga.
3. Adopt information about famous and renowned yog gurus in enhancing yogic tradition.
4. Understand Pnachikaran prakirya, Panchkosh theory and ashthha siddhi.

UNIT -1   Patanjali Yog Sutra

(i)   Meaning, definition and of yoga according to Patanjali Yoga Sutra.
(ii)   Concept of Chiit.
(iii) Chiit Ki Bhumi.
(iv) Chiit Ki Avastha.

UNIT -II

(i) Meaning and types of Vritties
(ii) Different ways to achieve Raj Yog.
(iii) Disturbance inYogic Practices
(iv) Sahayak Tatav in Yog Sadhana

UNIT -III

  (i) Maharishi Patanjali
  (ii) Bodh Dharam Ki Shiksha.
  (iii) Mahavir Ji Ki Shiksha
  (iv) Swami Vivekanand

UNIT –IV

  (i) Panchikaran Prakriya.
  (ii) Panch Kosh Theory.
  (iii) Navdha Bhakti
  (iv) Astha Sidhi according to Yogi Charan Dass.

References:

Pritam Amrita (2007) Yoga Prichya and parampara, Khel Sahitya Kendra, New Delhi
Yogender D. (2010) Yoga shiksha khel Shitya Kendra, New Delhi
Shukla Atul, D. (2007) Yoga sadna, Khel Shitya Kendra, New Delhi
Parmanik, T.N. D(2018) yoga education sports publication, New Delhi

PAPER-(104): TEACHING METHODOLOGY OF YOGIC PRACTICES

Time:3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To provide information about methods of teaching, their variations and principles in teaching and learning processes.
2. Acquaint the students about presentation techniques with different pedagogical aids.
3. To provide information about lesson plan, concept of library and demonstration with its variations.
4. To provide information about class management, organization and administration of yoga tournaments with its eligibility conditions for participation.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understand the methods of teaching, their variations and principles in teaching and learning processes.
2. Gain information about presentation techniques with different pedagogical aids.
3. Adopt knowledge about lesson plan, concept of library and demonstration with its variations.
4. Gain information about class management, organization and administration of yoga tournaments with its eligibility conditions for participation.

UNIT -I

(i) Meaning and types of teaching methods.
(ii) Factors affecting teaching.
(iii) Need and importance of teaching practice.
(iv) Maxims and Principles of teaching.

10(1778)

UNIT-II

    (i)   Presentation technique; Personal preparation and Technical preparation.
    (ii) Meaning and types of Teaching Aids.
    (iii) Audio Visual Aids.
    (iv) Modern concept of teaching Aids.

UNIT-III

    (i)   Lesson Plan; Meaning, Importance and Principles.
    (ii) Library; Meaning, Importance and Constructions of Library for Yoga Education.
    (iii) Qualities of Good Yog Teacher.
    (iv) Demonstration in Yoga, its types and Importance.

UNIT-IV

(i)   Meaning of Class Management and its Importance, Steps of Class Management.
(ii) Tournaments and Competitions in Yoga and its Importance.
(iii) Eligibility rules for Inter-University Yoga Competition.
(iv) Organization and administration of Yoga Competition.

Referances:
Irtegov, D. (2004). Operating system fundamentals. Firewall Media.
Marilyn, M.& Roberta, B.(n.d.).Computers in your future. 2nd edition, India: Prentice Hall.
Milke, M.(2007). Absolute beginner's guide to computer basics. Pearson Education Asia.
Sinha, P. K. & Sinha, P. (n.d.).Computer fundamentals. 4th edition, BPB Publication.

PRACTICAL – (105): (i) Demonstration of Asana

Credits=5

(PART-1)   **Maximum Marks: 50**

Course Objectives:-

To provide practical knowledge about various yogic practices.

Learning Outcomes:

Students will Gain information about different types of asanas, their techniques, precautions and Benefits of yogic exercise on Human Body.

LIST OF YOGIC PRACTICES

ASANAS

1. Vipratakarani
2. Nauka Asana
3. Satubandhasan
4. Simplematsyasan
5. Chakrasan
6. Bhujang Asana
7. Ardh-Shalbh Asana
8. Vajrasan
9. Suptavajrasan
10. Yog Mudra
11. Padmasan
12. Vakra Asana
13. Janushirasan
14. Tadasan
15. Kattichakrasan

PRACTICAL – (106): (ii) Demonstration of Pranayama and Shudhi Kriyas

LIST OF YOGIC PRACTICES

PRANAYAMA	KRIYA
1. Anulome-vilome	1. Jal Neti
2. Shitali	2. Rubber Neti
3. Sitkari	3. Vaman (Kunjal)
4. Bhastrika	4. Kapalbhati

Note: Any ten Asanas, any two <u>Pranayam and any two</u> <u>Kriya</u> from the above.

PAPER-(201): Naturopathy

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To provide with the knowledge of concept of Naturopathy and its relationship with yoga.
2. To acquaint students with the knowledge of Hydrotherapy as one of the therapeutic modalities.
3. To acquaint students with the knowledge of Mudtherapy as one of the therapeutic modalities.
4. To provide with the knowledge of Upvaas and Aakash Tatva.

Learning Outcomes:

After completion of the course contents of this paper, the student will be able to:

1. Gain knowledge about the concept of Naturopathy and its relationship with yoga.
2. Understand about Hydrotherapy and its applications in treatment of different ailments as one of the therapeutic modalities.
3. Understand about Mudtherapy and its applications in treatment of different ailments as one of the therapeutic modalities.
4. Gain knowledge of Upvaas , its variations and importance in maintaining health of an individual along with Aakash Tatva therapy to treat different physical conditions.

UNIT -1
  (i)   Concept of Naturopathy.
  (ii) Meaning, Definition and History of Naturopathy.
  (iii) Principles of Naturopathy.
  (iv) Relationship between Naturopathy and Yog.

UNIT -II

    (i) Meaning, Definition and   Importance of Jal Tatva.
    (ii)   Different techniques of Hydrotherapy.
    (iii)   Uses of Hydrotherapy in different illness.
    (iv)   Different Waterbar (Pattee) in Hydrotherapy.

UNIT -III

    (i)   Meaning, Definition and Importance of Prithvi Tatva.
    (ii) Different techniques of Mudtherapy.
    (iii) Uses of Mudtherapy in different illness.
    (iv) Principles of Mudtherapy.

UNIT –IV

    (i) Meaning, Definition and Importance of Aakash Tatva.
    (ii) Meaning, Definition and Importance of Upvaas.
    (iii) Different types and Precautions while Upvaas.
    (iv) Uses of Aakash Tatva Therapy in different illness.

Referances:

Sharma, Hira Lal (2018) Naturopathy & Yoga, the readers paradise New Delhi.
Jindal Rakesh, Naturopathy basic concept and principles (Aroyage Sev Parkashan, Modi Nagar M.K)
Jindal Rakesh, Prakarit Ayur Vigyan, Arogya Seva Parkashan, Modi Nagar, M.K

PAPER-(202): ANATOMY AND PHYSIOLOGY FOR YOGIC PRACTICES

Time: 3 Hour   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1.   To acquaint the studens with the knowledge of Endocrine glands, Asanas and their effects on Human body.
2.   To provide information about Pranayama, Shatkarma, Bandh & Mudras.
3.   To provide with the information of differences in Yogic and Non Yogic Exercises.

Learning Outcomes:

After completion of the course contents of this paper, the student will be able to:

1. Gain knowledge of Endocrine glands, Asanas, its types and their effects on Human body.
2. Understand about Pranayama, Shatkarma, Bandh & Mudras along with their mechanisms.
3. Gain information of differences in Yogic and Non Yogic Exercises.

UNIT -1

(i)   The Endocrine Glands: Structure and Functions of Endocrine glands: Pituitary, Thyroid, Parathyroid, Adrenal.
(ii)   Meaning and Definition of Asana, Classification of Asanas Body Position accordingly and its various types.
(iii)   Effect of Asana on Human Body.

UNIT -II

(i) Meaning, Definition and types of Pranayama.
(ii) Mechanism of Pranayama.
(iii)   Difference between Pranayama and Deep Breathing.

UNIT -III

(i) Meaning, Definition and Types of Shatkarma.
(ii) Effects of Shatkarmas on Human Body.
(iii) Meaning and Types of Bandhs and Mudra.

UNIT –IV

(i) Effects of Mudras on Human Body.
(ii) Benefit of Yogic Activities in Sports.
(iii) Differences between Yogic and Non-Yogic Exercises.

References:
Gupta, A. P. (2010). Anatomy and physiology. Agra: SumitPrakashan.
Gupta, M. and Gupta, M. C. (1980). Body and anatomical science. Delhi: Swaran Printing Press.
Guyton, A.C. (1996). Textbook of Medical Physiology, 9th edition. Philadelphia: W.B.Saunders.
Karpovich, P. V. (n.d.). Philosophy of muscular activity. London: W.B. Saunders Co.
Lamb, G. S. (1982). Essentials of exercise physiology. Delhi: Surjeet Publication.
Moorthy, A. M. (2014). Anatomy physiology and health education.Karaikudi: Madalayam Publications.
Morehouse, L. E. & Miller, J. (1967). Physiology of exercise. St. Louis: The C.V. Mosby Co.
Pearce, E. C. (1962). Anatomy and physiology for nurses. London: Faber & Faber Ltd.
Sharma, R. D. (1979). Health and physical education, Gupta Prakashan.
Singh, S. (1979). Anatomy of physiology and health education. Ropar: Jeet Publications

PAPER-(203): Hathyog

Time: 3 Hours   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To provide with the Knowledge of Hatha Yog, Sapta Sadhan, Nadies and Nadha Anusandhan.
2. To provide information about asanas, its types, techniques and Benefits.
3. To provide with the knowledge of Pranayama , its techniques, Precautions and benefits.
4. To provide with the information of shatkarma, and Kundalani

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain Knowledge of Hatha Yog, Sapta Sadhan, Nadies and Nadha Anusandhan.
2. Learn about asanas, its types, techniques and Benefits.
3. Gain knowledge of Pranayama , its techniques, Precautions and benefits.
4. Gain information of shatkarma, and Kundalani.

UNIT -1

(i)   Meaning, Definition and Objectives of Hatha Yog.
(ii) Sapta Sadhan.
(iii) Different Nadies.
(iv) Nadha Anusandhan.

UNIT -II

(i)   Meaning, Definition and Objectives of Asans.
(ii) Classification of Asans, Principles of Asans and Benefits of Asans.
(iii) Meaning, Technique, Benefits of five Asans i.e. Uttankurma, Dhanurasan, Paschimottan, Matsayandra asan and Kukuta asan.

10(1786)

UNIT -III

    (i)   Meaning, Definition and Classification of Pranayam.
    (ii) Principles and Importance of Pranayam.
    (iii) Technique, Precautions and benefits of Pranayam.
    (iv) Meaning and Definition of Mudra and Different Bandh.

UNIT –IV

(i) Meaning, Definition of Shatkaram.
(ii) Types of Shatkaram.
(iii) Objectives of results of Shatkaram.
(iv) Kundalani.

References:

Swami Satyananda (1998) hathyog pradipika, munger publications Bihar

Pancham Singh, the hathyog pradipika, Dev Publisher

Hathyog Pradipika, by swami swatma ram, Kaivalya Dham, Lonavla Pune.

PAPER-(204): YOGA AND HEALTH

Time: 3 Hour   **Maximum Marks: 100 (External: 80 + Internal: 20)**

Credit:4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.
2. Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.

Course Objectives:-

1. To provide with the Knowledge of Health and its guidance.
2. To provide information about Asanas, Pranayama, Shatkarama & their Health benefits.
3. To provide with the knowledge of various Psychological conditions and their treatment through yogic practices.
4. To provide with the information of Drugs and diseases with their effects on human body and their treatment through Yogic practices.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Have Knowledge of Health and its guidance.
2. Understand about Asanas, Pranayama, Shatkarama & their Health benefits.
3. Gain the knowledge of various Psychological conditions and their treatment through yogic practices.
4. Gain the information of Drugs and diseases with their effects on human body and their treatment through Yogic practices.

UNIT -1

 (i) Meaning, Definition and Concept of Health.
 (ii) Elements of Health.
(iii) Health Services and guidance instruction in personal hygiene.
(iv) Daily routine for good health.

UNIT –II
 (i) Asana and Health.
 (ii) Pranayama and Health.
(iii) Shatkarma and Health.

UNIT -III

   (i)   Frustration: meaning, causes, its effects and treatment through Yogic practices.
   (ii)   Anxiety: meaning, causes, its effects and treatment through Yogic practices.
   (iii)   Conflict: meaning, causes, its effects and treatment through Yogic practices along with the
   (iv)   Concept of normality in Yoga and Modern Psychology.

UNIT –IV

   (i)   Yogic diet and Health.
   (ii)   Knowledge of drugs and their effects on body.
   (iii)   Diseases such as Obesity, diabetes, Arthritis, Cervical, Stress, Depression and their treatment through Yoga.

References:

Gore C.S (2011) Yoga & health sports publication New Delhi
Srivastava A.K. (2010) health and yoga sports publication New Delhi
Singh Balbir Malik Satish (2018) health education and environmental studies sports publication, New Delhi
Verma K.K. Swastya Shiksha Parkash Borthers Ludiana
Kumar Amresh (2008) Paranayam & Health, Khel Shitya Kendra, New Delhi

PRACTICAL –(205) : (i) Demonstration of Asana, Pranayama and Sudhikriya
Credits=2.5

(PART-1)   **Maximum Marks: 100**

Course Objectives:-

To provide practical knowledge about various yogic practices.

Learning Outcomes:

Students will Gain information about different types of asanas, pranayamas, Kriyas, their techniques, precautions and Benefits of yogic exercise on Human Body.

LIST OF YOGIC PRACTICES

ASANAS	PRANAYAMA	KRIYA
1. Sarvang Asana	1. Nadi Shodhan	1. Tratak
2. Shirshasan	2. Surya Bhedan	2. Dhand Dhauti
3. Halasan	3. Ujjai	3. Vastra Dhauti
4. Pawanmuktasan	4. Bhramari	4. Nauli
5. Matsyasana		
6. Karanpeedasana		
7. Vihangasan		
8. Dhanurasan		
9. Sarpasana		
10. Mayur Asana		
11. Bakasana		
12. Ardhmatsyandrasan		
13. Trikon Asana		
14. Vrikshasana		
15. Pad-hast Asana		
16. Surya Namaskar		

Note: Ten Asanas, Two Pranayam and Two Kriyas will be performed in final examination with practical note book.

PRACTICAL –(206) : (ii) Teaching Practices of Asana, Pranayama and Shatkarma.

Credits=2.5

Maximum Marks: 100

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.

Kurukshetra University, Kurukshetra
CBCS Examination Scheme of M. A. Yoga
(Applicable only for UTD from Session 2019-2020)
Semester-1ˢᵗ

Total Credits= 21   **Total Marks = 500**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
M.A YOGA -101	Fundamentals of Yoga	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -102	Anatomical and Physiological Aspects of Yoga - I	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -103	Pantanjali Yog Sutra	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -104	Research Methodology in Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -105	**Practical -I** i) Demonstrations of Basic Asana ii) Basic Pranayam and Shudhi Kriya	CCC	--	5	5	--	5	5	--	--	100	100
Total			16	5	21	16	5	21	80	320	100	500

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**

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Kurukshetra University, Kurukshetra
CBCS Examination Scheme of M. A. Yoga
(Applicable only for UTD from Session 2019-2020)
Semester-2nd

Total Credits= 23   Total Marks = 550

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
M.A YOGA -201	Fundamentals of Hatha Yoga	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -202	Anatomical and Physiological Aspects of Yoga – II	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -203	Health Aspects of Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -204	Applied Statistics in Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA -205	**Practical - I** i) Demonstrations of Asana, Pranayam and Shudhi Kriya ii) Applied Statistic	CCC	--	5	5	--	5	5	--	--	100	100
M.A YOGA -206	**Yoga Parichaya/ Mooc (Massive Open Online Courses)**	OEC	02	--	02	02	--	02	10	40	--	50
	Total		18	5	23	18	5	23	90	360	100	550

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**   **O.E.C = Open Elective Course**

Kurukshetra University, Kurukshetra
CBCS Examination Scheme of M. A. Yoga
(Applicable only for UTD from Session 2019-2020)
Semester-3rd

Total Credits= 23   **Total Marks = 550**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
M.A YOGA - 301	Fundamentals of Naturopathy	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 302	Basic Yoga Texts Principle Upanishads & Bhagwat Geeta	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 303	Applications of Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 304	Applied Psychology in Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 305	(i) Demonstrations of Asana Pranayam and Shudhi Kriya. (ii) Applied Psychology	CCC	--	5	5	--	5	5	--	--	100	100
M.A YOGA - 306	**Yoga and Health/ Mooc (Massive Open Online Courses)**	OEC	02	--	02	02	--	02	10	40	--	50
Total			**18**	**5**	**23**	**18**	**5**	**23**	**90**	**360**	**100**	**550**

C.C.C = Compulsory Core Course   **C.F.C = Compulsory Foundation Course**   **O.E.C = Open Elective Course**

Kurukshetra University, Kurukshetra
CBCS Examination Scheme of M. A. Yoga
(Applicable only for UTD from Session 2020-2021)
Semester-4th

Total Credits= 21　　　　　　　　　　　　**Total Marks = 500**

Paper Code	Subjects	Type of Course	Contact Hours Per Week			Credit			Examination Scheme			Total
			Theory	Practical	Total	Theory	Practical	Total	Internal Assessment	Theory	Practical	
M.A YOGA - 401	Yoga Therapy	CCC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 402	Options: i) Food & Nutrition ii) Dissertation	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 403	Kinesiological Aspect of yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 404	Teaching Methods of Yoga	CFC	04	--	04	04	--	04	20	80	--	100
M.A YOGA - 405	Practical (i) Demonstrations of Assan Pranayam (ii) Teaching Practices Lesson Plan	CCC	--	5	5	--	5	5	--	--	100	100
Total			**16**	**5**	**21**	**16**	**5**	**21**	**80**	**320**	**100**	**500**

C.C.C = Compulsory Core Course　　　　　　**C.F.C = Compulsory Foundation Course**

M.A Yoga–Syllabus
Modification/Revision in M.A Yoga Syllabus of Semester C.B.C.S. System w.e.f. 2019-20

The duration of the course leading to the degree of Master of Yoga(M.A Yoga) shall be of four semesters. In the first year, there shall be two semester consisting of eleven courses (5 Courses in Ist Semester + 6 Courses in IInd Semester) in which 9 Theory, including one Open Elective Course & 2 Practicals. In the second/final year there will be two semesters consisting of eleven courses (9 theory courses including one Open Elective course & two Practicals).

Theory papers will be of 100 marks each (80 marks for external evaluation and 20 marks for internal assessment). Dissertation will be of 100 marks (80 marks for Evaluation + 20 marks for internal assessment). Practical will be of 100 marks mentioned according to the Scheme. External and Internal examiners will evaluate dissertation and practical jointly.

Internal Assessment will be based on the guidelines released by University.

In each theory paper, the candidate will be required to attempt five questions, including one compulsory question comprising of 10 short notes, in three hours.

All theory papers in all the four semesters are of four credits and Open Elective Course will have 2 Credits, Consisting of 50 marks (40 for Theory + 10 for internal assessment). Open Elective course will comprise of 2 Units out of which candidates are required to attempt 3 questions in total i.e. 2 Long questions having 16 marks each from each unit (1st & 2nd Unit) and 1 question comprising of 4 short questions having 2 marks for each question covering both the units.

M. A. YOGA – 1ST SEMESTER

PAPER – 101: FUNDAMENTALS OF YOGA

Time : 3 Hours   **Total Marks : 100 (Theory Marks: 80 + Internal Assessment :20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:-

1. To acquaint the students with concept of yoga in ancient and modern time, its application and misconception.
2. To provide knowledge about various schools of yoga
3. To provide information about various famous yogis and their contribution in development of yoga.
4. To provide information to students about various yoga institutes functioning in India.

Learning Outcomes:

After completion of the course contents of this paper, the student will be able to:

1. Understand the concept of yoga in ancient and modern time, its application in modern society.
2. Able to gain knowledge about various schools of yoga like Hatha Yog, Bhakti Yog etc.
3. Able to gain information about various famous yogis such Meharishi Patajali, Guru Ghorak Nath, Swami Vivekanand etc. and their contribution in development of yoga.
4. Able to gain information to students about various yoga institutes functioning in India and their contribution towards professional growth of Yoga.

Unit-I INTRODUCTION AND EVOLUTION OF YOGA

1. Meaning & Definitions of Yoga according to various schools of thoughts.
2. Historical Background and Development of Yoga.
3. Importance of Yoga in different fields in modern era.
4. Applications and Misconceptions about Yoga in Modern Society.

Unit-II SCHOOLS OF YOGA

1. Hatha Yoga – Aims and Objectives of Hatha Yoga
2. Bhakti Yoga – Types of Bhakti, Navdhabhakti
3. Meaning and Steps of Gyan Yog.
4. Meaning and Types of Mantra Yog.

Unit-III FAMOUS YOGIES

1. Biography of Maharishi Patanjali and his contribution in yoga
2. Biography of Hatha Yogi – Guru Gorakshanath and his contribution in yoga
3. Biography of Swami Vivekananda and his contribution in yoga
4. Biography of Maharishi Aurbindo and his contribution in yoga

Unit-IV INTRODUCTION OF YOGA INSTITUTES IN INDIA

1. Dev Sanskriti Haridwar and its contribution in yoga
2. Gurukul Kangri University, Haridwar and its contribution in yoga
3. Kaivalyadham Lonavla, Pune and its contribution in yoga
4. Bihar Yoga Bharti Yoga Institute Munger, Bihar and its contribution in yoga.

References Books:-

Sharma, J.P. D (2007) manav jivan & yog friends publication, New Delhi
Parmanik T.N. D(2017) Yogkla, sports publication New Delhi
Bhargav, G.M. D (2019) Yoga Education, Sports Publication, New Delhi
Pritam Amrita (2007) Yoga Prichya and parampara, Khel Sahitya Kendra, New Delhi
Yogender D. (2010) Yoga shiksha khel Shitya Kendra, New Delhi
Shukla Atul, D. (2007) Yoga sadna, Khel Shitya Kendra, New Delhi
Parmanik, T.N. D(2018) yoga education sports publication, New Delhi

PAPER – 102: Anatomical and Physiological Aspects of Yoga - I

Time : 3 Hours   **Total Marks : 100 (Theory Marks: 80 + Internal Assessment :20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1ˢᵗ, IIⁿᵈ, IIIʳᵈ & IVᵗʰ), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:-

1. To acquaint the students with basic knowledge Human Anatomy, Physiology and effects of yogic practices on body.
2. To provide knowledge about muscles its contraction and effects of yogic practices on it.
3. To acquaint the students with different processes of digestive system.
4. To provide knowledge about structure of respiratory system and its physiology.

Learning Outcomes:

After completion of the course contents of this paper, the student will be able to:

1. Understand about basic contents of Human Antinomy boniframework and its effects of yogic practices on Physiology of skeletal system.
2. Gain information and understanding about muscle property its mechanism on contraction and effects of yogic practices on it.
3. Understand digestive track, digestion and absorption of food and effects of yogic practices on digestive system.
4. Understand respiratory system and functions and its effects of yogic practices.

Unit-I   GENERAL HUMAN ANATOMY AND PHYSIOLOGY

1. Meaning & Importance of Anatomy & Physiology.
2. Structure of Cell, Function of Cell and Tissue.
3. Skeletal System – Name and structure of all bones and joints of human body.
4. Effect of Yogic Practices on Skeletal System.

Unit-II MUSCULAR SYSTEM

1. Types and structure of muscle. Properties of Muscle.
2. Elementary knowledge of muscle contraction and muscle tone
3. Mechanism of Muscles Fatigue
4. Effect of Yogic Practices on Muscular System.

Unit-III DIGESTIVE SYSTEM

1. Structure of digestive tract and organs of digestive tract
2. Role of each digestive organ in digestion of food.
3. Physiology of food digestion and absorption.
4. Effect of Yogic Practices on Digestive System.

Unit-IV RESPIRATORY SYSTEM

1. Structure and functions of respiratory organs.
2. Physiology of external and internal respiration.
3. Elementary knowledge of various respiratory volumes & capacities.
4. Effect of yogic practices on respiratory system.

References Books:-

Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: Poompugar Pathipagam.
Beotra Alka, (2000) Drug Education Handbook on Drug Abuse in Sport: Sport Authority of India Delhi.
Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs.
David, L Costill. (2004). Physiology of Sport and Exercise. Human Kinetics.
Fox, E.L., and Mathews, D.K. (1981). The Physiological Basis of Physical Education and Athletics. Philadelphia: Sanders College Publishing.
Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sanders co. Richard, W.
Bowers. (1989). Sport Physiology. WMC: Brown Publishers.
Sandhya Tiwaji. (1999). Exercise Physiology. Sport Publishers.
Shaver, L. (1981). Essentials of Exercise Physiology. New Delhi: Subject Publications. Vincent, T.
Murche. (2007). Elementary Physiology. Hyderabad: Sport Publication. William, D. Mc Aradle.
(1996). Exercise Physiology, Energy, Nutrition and Human Performance. Philadelphia: Lippincott Williams and Wilkins Company.

PAPER – 103 PATANJALI YOG SUTRA

Time : 3 Hours   **Total Marks : 100 (Theory Marks: 80 + Internal Assessment :20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1ˢᵗ, IIⁿᵈ, IIIʳᵈ & IVᵗʰ), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:-

1. To provide information about PATANJALI YOG SUTRA as a science in enhancing excellence in life.
2. To provide information about Samadhipada.
3. To provide information about SADHAN AND VIBHUTI PADA like Asthang Yog, Bahirang Sadhana, Antrang Sadhana etc.
4. To provide information about KAIVALYA PADA such as Karma and its variations and its of siddhi etc.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain information about Patanjali Yog Sutra, and its relevance in model age.
2. Understand concept of chit vritti and chitta Boomi and concept of sabeej & Nirbeej
3. Gain information about Panchklesha, Bahirang Sadhna, and Samyama
4. Understand about various siddhies, karamas and Kaivalya.

Unit – I   INTRODUCTION OF PATANJALI YOGA SUTRAS

1. Historical Background of Patanjali Yoga Sutra.
2. Importance of Patanjali Yoga Sutras in Modern Age.
3. Patanjali Yoga as a Science.
4. Physical Mental and Social Excellence in Yoga Sutra.

Unit – II   SAMADHI PADA

1. Meaning and Definition of Yoga Concept of Chitta, Chit Vritti and Chitta Bhumi
2. Abhyas Varagya, Yog Antraya, Ishwar Swaroop and Vivek Khyati.
3. Chitta Vikshep and Chitt Prasadhan.
4. Samadhi- Sampragyat Samadhi and Ritambhara Prayga. Concept of Sabeej and Nirbeej.

Unit – III   SADHAN AND VIBHUTI PADA

1. Kriya Yoga and Panch Klesha : Avidhya, Asmita, Raag, Devasha and Abhinivesha
2. Ashtang Yoga (Bahirang Sadhana) – Yama, Niyam, Asana, Pranayam and Pratyahar
3. Ashtang Yoga (Antrang Sadhana) – Dharana, Dhyana and Samadhi
4. Samyama, Yoga Vibhootis and Ashtsiddhis

Unit – IV   KAIVALYA PADA

1. Types of Sidhis.
2. Concept of Dharmamegh Samadhi
3. Brief introduction of Karma, Types of Karma and Karmaphal Siddhanta
4. Concept of Kaivalya

References Books:-

George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.
Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004), The Yoga Adventure for Children. Netherlands: A Hunter House book.
Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.
Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal
Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.
Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.
Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.
Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.
Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.
Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.
Swami Sivananda, (1971), The Science of Pranayama. Chennai: A Divine Life Society Publication.
Thirumalai Kumar. S and Indira. S (2011) Yoga in Your Life, Chennai: The Parkar Publication.
Tiwari O.P. (1998), Asanas-Why and How. Lonavala: Kaivalyadham.

PAPER – 104 - Research Methodology in Yoga

Time : 3 Hours　　　　　**Maximum Marks: 100**　**(Theory: 80 + Internal Assessment – 20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprise of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:-

1. Acquaint the students will basic concept of research, need and characteristics of research in Physical Education & sports.
2. Acquaint the students with type of research, research problem and its selection and formulation with delimitation.
3. Make students aware about concept of sampling, methods of sampling and hypothesis and its testing.
4. Acquaint the students with the concept of review of related literature, types and its sources & variables.
5. Make the students understand the concept of ethical issues regarding copy right and tools of research.

Learning Outcomes:-

The students will be able to:-

1. Understand the basic concept of research and its need and characteristics in Physical Education and Sports.
2. Know about type of research, research problem it selection and formulation with delimitation.
3. Understand the concept of sampling, methods of sampling and hypothesis testing.
4. Know about review of related literature, its types sources &writing and variables.
5. To make students understand the concept of ethical issues in Physical Education & Sports and various tools of research.

Unit – I: Introduction

1. Meaning and Definition of Research. Need of Research in Yoga
2. Types of Research: Analytical, Descriptive, Experimental, Qualitative and Meta Analysis.
3. Research Problem: Meaning of Research Problem, location of research problem, criteria for   Selection of Research Problem.
4. Delimitation and limitations of research problem

UNIT II – Concept of Sampling and Hypothesis

1. Meaning and Definition of Sample and Population.
2. Types of sampling methods: Probability Sampling Methods and Non – Probability   Sampling Methods.
3. Meaning and definition of Hypothesis, Importance Hypothesis in research,
4. Types of Hypothesis, Type 1 and Type 2 errors in Hypothesis testing.

UNIT-III   Review of related literature

1. Meaning and need for survey of related literature, Literature Sources – Primary and Secondary   sources, Steps in Literature Search. Method for writing of Literature review.
2. Variables: Meaning and Definition of Variables, types of variables: Dependent, Independent, Control, Extraneous, Moderator and Predictor.
3. Research Proposal: Meaning and Significance of Research Proposal, Steps of preparing Research   proposal/synopsis,
4. Format of a synopsis

Unit – IV Research Report

1. Research Report: Details of Chapterization of Thesis/ Dissertation,
2. Method of writing abstract, method of writing full paper for presenting in a conference and to publish in journals.
3. Technicalities of writing: Footnote and Bibliography.
4. Ethical Issues in Research: Areas of Dishonesty in research.

References Books:-

Best J. W (1971) Research in Education, New Jersey; Prentice Hall, Inc
Clarke David. H & Clarke H, Harrison (1984) Research processes in Physical Education, New Jersey; Prentice Hall Inc.Craig Williams and Chris Wragg (2006) Data Analysis and Research for Sport and Exercise Science, Londonl Routledge Press
Jerry R Thomas & Jack K Nelson (2000) Research Methods in Physical Activities; Illonosis; Human Kinetics; Kamlesh, M. L. (1999) Reserach Methodology in Physical Education and Sports, New Delhi
Moses, A. K. (1995) Thesis Writing Format, Chennai; Poompugar Pathippagam

PAPER – 105 PRACTICAL SYLLABUS (PART-1)

Credits=5

Maximum Marks: 50

Course Objectives:-

To provide practical knowledge about various yogic practices.

Learning Outcomes:

1. **Students will Gain information about Surya Namaskara and different types of Asanas such as meditative asanas, relaxative asanas, standing, siting and pronelying asanas with stretching practices and apply them in various condition to lead a happy life.**
   1. PRAYER, SANKALPMANTRA
   2. SURYA NAMASKARA-12 ROUNDS
   3. PAWANMUKTASANA SERIES-I
   4. SUKSHAMA VYAYAMA
   5. MEDITATIVE ASANAS
   6. Padmasan, Siddhasan, Vajarasana
2. **RELAXATIVE ASANAS:**
   Shavasan, Makarasan
3. **SUPINE LYING ASANAS:**
   Naukasan, Setubandhasan, Pavanmuktasan, Vipareetkaraniasan, Ardhhalasana, Simplematsyasana
4. **PRONE LYING ASANAS:**
   Bhujangasan, Ardhshalabhasan, Niralambasan
5. **SITTING ASANAS:**
   1. Janushirasan, Vakrasan, Mandukasan, Yog Mudra Shashankasan
   2. Ardhaushtrasana, Uttan Mandukasan, Parvatasana
6. **STANDING ASANAS:**
   Tadasan, Natarajasan, Garudasan, Katichakrasan

7. **STREATCHING PRACTICE**

PAPER – 105 PRACTICAL SYLLABUS (PART-B)

Maximum Marks: 50

Course Objectives:

The students will be provided Knowledge of some statistical techniques with Excel and SPSS to calculate mean, median, standard deviation, t-test, ANOVA, Co-relation & Graphical representation.

Learning Outcomes:

Students will able to gain understanding and knowledge about some statistical techniques with Excel and SPSS to calculate mean, median, standard deviation, t-test, ANOVA, Correlation & Graphical representation and can apply them in their research work.

Following statistical techniques with Excel & SPSS

i)   Calculation of Mean, Median & Standard Deviation   (Marks = 10)

ii)   t - test, ANOVA & Correlation   (Marks = 10)

iii) Plotting different types of graphs   (Marks = 10)

M. A. YOGA – 2ⁿᵈ   SEMESTER

PAPER – 201 FUNDAMENTALS OF HATHA YOGA

Time: 3 Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

Course Objectives:-

1. To provide information about basic concept of Hath yoga, Asanas and Shatkarmas.
2. To provide information about Kumbhaka, Bandhas, Chakras, Nadis & Samadhies.
3. To provide information about Gheranda Samhita in detail.
4. To provide information about Pratyahara, Pranayamas, Dyan, Smadhi.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain information about basic concept of Hath yoga, Asanas and Shatkarmas their types, techniques, precautions and benefits.
2. Understand about Kumbhaka, Bandhas, Chakras, Nadis & Samadhies their types, techniques, precautions and benefits.
3. Understand about Gheranda Samhita and its various components.
4. Understand about Pratyahara, Pranayamas, Dyan, Smadhi its types, techniques, precautions and benefits.

Unit – I   INTRODUCTION OF HATHAPRADIPIKA

1. Definitions of Hatha Yoga – Time and Place, Dress Code & Environment for Hatha Yoga practice
2. Concept of Mitahara, Pathya and Apathya
3. Introduction of Asanas, Mudra, Bandh & Concept of Nadis
4. Asana and Shatkarmas – Meaning, Definitions, Principles, Types, Technique, Precautions and Benefits.

Unit – II KUMBHAKA, MUDRAS, BANDHAS, NADANUSANDHANA

1. Kumbhaka – Meaning, Definition, Types of Kumbhaka, Technique, Precautions & Benefits
2. Mudras and Bandhas – Meaning, Definition, Technique, Precautions and Benefits
3. Chakras, Kundalini and Nadis
4. Nadanusandhana and Various types of Samadhis.

Unit – III   INTRODUCTION OF GHERANDA SAMHITA

1. Introduction and History of Gheranda Samhita.
2. Concept of Ghatasth Yoga. Saptasadhana:- Shatkarma, Asanas, Pranyama, Pratyahara, Mudra, Dhyana, Smadhi
3. Shatkarma – Meaning Types (Dhauti, Basti, Neti, Trataka, Nauli and Kapalabhati), Technique,
4. Precautions and Benefits.
5. Asanas and Mudras – Meaning, Definition, Types, Technique, Precautions and Benefits.

Unit – IV   PRATYAHARA AND PRANAYAMAS

1. Pratyahara – Meaning, Types, Technique, Precautions and Benefits
2. Pranayamas – Meaning and Definition, Types, Technique, Precautions and Benefits.
3. Dhayana – Meaning, Types, Technique, Precautions and Benefits.
4. Samadhi – Meaning, Types, Technique, Precautions and Benefits.

References Books:-

"*George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.*

Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004), The Yoga Adventure for Children. Netherlands: A Hunter House book.

Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.

Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal

Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.

Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.

Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.

Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.

Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.

Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.

Swami Sivananda, (1971), The Science of Pranayama. Chennai: A Divine Life Society Publication.

Thirumalai Kumar. S and Indira. S (2011) Yoga in Your Life, Chennai: The Parkar Publication.

Tiwari O.P. (1998), Asanas-Why and How. Lonavala: Kaivalyadham.

PAPER – 202 ANATOMICAL AND PHYSIOLOGICAL ASPECTS OF YOGA - II

Time : 3 Hours   **Total Marks : 100 (Theory Marks: 80 + Internal Assessment :20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:-

1. To acquaint the students with the knowledge of Cardio Vascular, System, its anatomy and Physiology.
2. To acquaint the students with the knowledge of Nervous, System, its anatomy and Physiology and functioning various sense origins.
3. To acquaint the students with the knowledge of exeretory, System, its anatomy and Physiology.
4. To provide information about various Endocrine Glands, their hormones.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understand the anatomy and Physiology of heart, and effects of yogic practices on structure and functioning of heart.
2. Gain knowledge about Nervous, System, functioning and effects of yogic practices on nose, ears & eyes.
3. Understand the anatomy and physiology of Kidneys & skin as organs of excretion.
4. Gain information about endocrine glands their location, secretion and their functions in human body with effect of yogic practices on hormones secretion.

Unit-I Cardio-Vascular System:

1. Structure & Functions of Heart.
2. Blood and its composition, functions of blood.
3. Types of Blood circulations: Systemic and Pulmonary
4. Effect of Yogic Practice on Cardio-Vascular System.

Unit-II Nervous System:

1. Introduction of Nervous System Organs.
2. Types of Nervous Systems: Central, Peripheral & Autonomic nervous system.
3. Effect of Yogic Practice on Nervous System.
4. Structure & functions of nose, ears and eyes. Effect of Yoga on nose, ears and eyes

Unit-III Excretory System

1. Organs of excretory system.
2. Structure of Kidney and Skin
3. Structure of nephron and physiology of the formation of urine.
4. Effect of Yogic Practices on Kidney and Skin

Unit-IV Endocrine System:
1. Meaning of Endocrine glands, Name and location of endocrine glands.
2. Hormones secretions from pituitary, thyroid, parathyroid, pancreas and adrenal gland
3. and their functions in body.
4. Meaning of Hormone and enzyme and their differentiation.
5. Effect of yogic practices on Endocrine glands and their secretions.

References Books:-

Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: Poompugar Pathipagam.
Beotra Alka, (2000) Drug Education Handbook on Drug Abuse in Sport: Sport Authority of India Delhi.
Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs.
David, L Costill. (2004). Physiology of Sport and Exercise. Human Kinetics.
Fox, E.L., and Mathews, D.K. (1981). The Physiological Basis of Physical Education and Athletics.
        Philadelphia: Sanders College Publishing.
Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sanders co. Richard, W.
Bowers. (1989). Sport Physiology. WMC: Brown Publishers.

PAPER – 203 HEALTH ASPECTS OF YOGA

Time : 3 Hours   **Total Marks : 100 (Theory Marks: 80 + Internal Assessment :20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:

1. To acquaint the students with concept of health and yoga.
2. To provide information about role of yoga in health care.
3. To provide information about yoga and its role in enhancing mental health.
4. To provide information about basic concept of yogic diet.

Learning Outcomes:

After completion of the course contents of this paper, the student will be able to:

1. Gain knowledge of health its components and concept of health and diseases in ayurveda.
2. Gain information about role of yoga and its practices in health care.
3. Understand various yogic practices and their role in enhancing mental health while preventing mental disorders.
4. Understand concept of various diets such as yogic diet, moderation of diet, vegetarian and non-vegetarian diet.

Unit-I   Introduction of Health & Yoga

1. Meaning, Definition according to WHO & Importance of Health.
2. Dimensions of Health Physical, Mental, Social and Spiritual.
3. Concept of Health & Diseases in Indian Systems of Ayurveda.
4. Health Services and Guidance Instruction in Personal Hygiene.

Unit-II   Role of Yoga in Health Care

1. Role of Yoga in Preventing Health Care.
2. Asana & Health, Pranayam & Health.
3. Shatkarmas & Health, Mudra/Bandh & Health.
4. Concept of Trigunas, Panch-mahabhutas, Panch- pran & Role in Health and Healing.

Unit-III   Yoga & Mental Health

1. Meaning of Styana, Samshaya, Pramada, Avirati, Bhranti Darsana, Alabdha – Bhumikatva, Anavasthitatva, Dukha and Daurmanasy.
2. Meaning of Mental Health and Positive Mental Health.
3. Causes and Consequences of Conflict and Frustration.
4. Healing through Yoga : Mental Disorders, Depressive Disorders, Anxiety Disorders and Serious Mental Disorders.

Unit-IV Yoga & Diet

1. Diet: Before and after yogic practices.
2. Concept and contents of Balance Diet, Yogic Diet and Moderation of Diet.
3. Concept of Vegetarian Diet, Useful Effect of Vegetarian Diet.
4. Harmful Effects of Non-Vegetarian Diet.

References Books:-

Gore C.S (2011) Yoga & health sports publication New Delhi

Srivastava A.K. (2010) health and yoga sports publication New Delhi

Singh Balbir Malik Satish (2018) health education and environmental studies sports publication, New Delhi

Verma K.K. Swastya Shiksha Parkash Borthers Ludiana

Kumar Amresh (2008) Paranayam & Health, Khel Shitya Kendra, New Delhi

PAPER – 204 – APPLIED STATISTICS IN YOGA

Time : 3 Hours   **Total Marks : 100 (Theory Marks: 80 + Internal Assessment :20)**

Credits=4

Note:- Paper setter will set nine questions in all out of which students will be required to attempt five questions.

1. **Two long answer type questions will be set from each of four units (1st, IInd, IIIrd & IVth), out of which the students will be required to attempt one question from each unit. Long answer type question will carry 15 marks each.**
2. **Question No. 9 will be compulsory and will carry 20 marks. It will comprises of 10 short answer type questions of 2 marks each selected from the entire syllabus.**

Course Objectives:

This course will enable students to understand:

1. Basic concept of statistics, data, methods of organizing data, explain & illustrate the concepts & application of measures of central tendency & its computation and merits & demerits of mean, median, mode.
2. Explain variability, range, quartile deviation, percentile & quartile with computation, percentile, rank & its computation.
3. Illustrate the meaning, computation & significance of probability curve, Meaning & type of skewness & kurtosis, Calculation of probability, meaning, types and computation of correction.
4. Illustrate the graphical representation of data & testing of hypothesis.

Learning Outcomes:

After undergoing the course contents of this paper, the students will be able to understand:-

1. Understand the basic concept of statistics, data, methods of organizing data, explain & illustrate the concepts & application of measures of central tendency & its computation and merits & demerits of mean, median, mode.
2. Explain variability, range, quartile deviation, percentile & quartile with computation, percentile, rank & its computation.
3. Understand the meaning, computation & significance of probability curve, Meaning & type of skewness & kurtosis, Calculation of probability, meaning, types, and computation of correction.

4. Identify and illustrate the significance of graphical representation of data & hypothesis testing through various graphical representation techniques.

Unit – I: Introduction to Statistics and Measures of Central Tendency

1. Meaning of Statistics. Need and importance of statistics in Yoga
2. Meaning of Data, Methods of organizing Data through Frequency Distribution.
3. Meaning of the Measures of Central Tendency, Computation Mean, Median and Mode.
4. Merits and limitations of Mean, Median and Mode

Unit-II: Introduction of Variability

1. Meaning of measures of variability: Range, Quartile Deviation, Average Deviation and Standard Deviation.
2. Computation of Range, Quartile Deviation, Average Deviation and Standard Deviation.
3. Meaning of term Percentile and Quartiles Deviation. Computation of Percentile and Quartiles Deviation
4. Meaning of term Percentile Rank and Computation of Percentile Rank.

Unit – III: Introduction to Normal Probability Curve and Correlation

1. Meaning of Normal Probability Curve and Properties of Normal Curve.
2. Meaning and types of Skewness and kurtosis. Sigma Scores and T – Scores.
3. Meaning and Types of Linear Correlation.
4. Computation of Correlation Coefficient with Product Movement and Rank Difference Method.

Unit – IV: Graphical representation of data and testing of Hypothesis

1. Meaning and advantage of Graphical Representation of Data.
2. Types of Bar Diagrams, Method of preparing Histogram, Frequency Polygon, Cumulative-Frequency Graph, Bar-Diagram and Pie Diagram.
3. Meaning of two – tailed and one tailed test of significance,
4. Computing significance of difference between two means with t – Test (independent samples) and One way ANOVA Test.

REFERENCES:

Clarke.HH.The Application of Measurement in Health and Physical Education,1992. Clarke,David H.and Clake H.Hares N. Research Process in Health Education Physical Education and Recreation . Englewood Cliffs, New Jersey, Prentice Hall, Inc.1986. Shaw. Dhananjoy. Fundamental statistics in Physical Education & Sports sciences, sports publication,2007.

Margaret J. Safrit : Introduction to Measurement in Physical Education and Exercise Science, Time Mirror/ Mosy, College Publishing St. Louis. Toronte Bosion (2Nd. Edition-1998.
Morey E. Garrett : Statistics in Psychology and Educated, David Meka Company Inc.
Devinder K. Kansal : Test and Measurement in Sports and Physical Education, D.V.S.Publications, Kalkaji, New Delhi –110019.

PAPER – 205 PRACTICAL SYLLABUS

Credits=5

Demonstrations of Asana, Pranayam and Shudhi Kriya

Maximum Marks: 70

Course Objectives:-

To provide practical knowledge about various yogic practices.

Learning Outcomes:-

Students will Gain information about Surya Namaskara and different types of Asanas such as meditative asanas, relaxative asanas, standing, sitting and prone lying asanas with stretching practices and apply them in various condition to lead a happy life.

1. **SURYA NAMASKARA - 12 ROUNDS**

2. **SUKSHAMA VYAYAMA**

3. **MEDITATIVE ASANAS:** Padmasan, Siddhasan, Vajarasana

4. **RELAXATIVE ASANAS:** Shavasan, Makarasan

5. **SUPINE LYING ASANAS:** Sarvangasan, Halasan, Chakrasan, Uttanpadanasan

6. **PRONE LYING ASANAS:** Bhujangasan, Ardhshalabhasan, Niralambasan

7. **SITTING ASANAS:** Paschimottanasan, Matsyanderasan, Shashankasan, Ushtrasana, Suptavajarasan

8. **STANDING ASANAS:** Tadasan, Vrikshasan, Konasan, Padhastasan

9. **PRANAYAM:** Nadi Shodhan Pranayam, Seetkari Pranayam, Bhastrika Pranayam, Bhramari

10. **BANDH:** Jalandhar Bandh, Udyan Bandh, Mool Bandh

11. **MUDRA:** Gyan Mudra Pranayamic Mudra, Vipritkarni Mudra

12. **SHATKARM:**

a) NETI   :   Two types (Jal Neti and Rubber Neti)

b) DHAUTI   :   Two Types (Kunjal Kriya and Agnisar Kriya)

c) KAPALBHATI   :   Vaatkarma, Sheetkarma

d) TRATAK

13.   MEDITATION – Om recitation

14.   RELAXATION TECHNIQUES – Shavasana, Yog Nidra,

15.   PRACTICAL NOTE BOOK

(ii) APPLIED STATISTICS:

Maximum Marks: 30

Course Objectives:-

The students will be provided Knowledge of some statistical techniques with Excel and SPSS to calculate mean, median, standard deviation, t-test, ANOVA, Co-relation & Graphical representation.

Learning Outcomes:-

Students will able to gain understanding and knowledge about some statistical techniques with Excel and SPSS to calculate mean, median, standard deviation, t-test, ANOVA, Correlation & Graphical representation and can apply them in their research work.

Following statistical techniques with Excel & SPSS

i)   Calculation of Mean, Median & Standard Deviation

(Marks = 10)

ii)   t - test, ANOVA & Correlation

(Marks = 10)

iii) Plotting different types of graphs

(Marks = 10)

Open Elective

PAPER-206:   YOGA PRICHAYA

Time: Two Hours   **Total Marks: 50 (Theory Marks: 40 + Internal Assessment: 10)**

Note: **Paper setter is required to set 2 questions from each Unit – I and II. Unit - III consists of 4 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I and II carrying 16 marks for each question. Unit - III is compulsory for all consisting 2 marks of each short answer.**

Course Objectives:-

Students will be educated with the knowledge of Yoga along with its elements and activities.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understand basic concept of yoga, Astanga Yoga and its elements and relevancy of yoga in modern life.
2. Gain knowledge about asanas , pranayamas, Shudikriyas, Bandhas, Mudras and meditation with its processes.

Unit – I: Introduction of yoga and its elements.

1. Meaning, Definition and historical background of Yoga
2. The Astanga Yoga:Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi
3. Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Gyan Yoga and Bhakti Yoga.
4. Need and Importance of Yoga in modern life.
5. Misconceptions about Yoga.

Unit - II Yogic activities: Asanas, Pranayamas & Shudhikriyas.

1. Meaning and types of Asana: Cultural,Relaxative & Meditative.
2. Meaning and types of Pranayama: Suryabhedan,Ujjai, Sheetali, Sheetkari, Bhramari & Bhastrika.
3. Meaning and types of Shudhikriyas: Neti, Dhoti, Basti, Neoli, Tratak & Kapalbhati.
4. Meaning and types of Bandhas: Jalandhar Mool & Udiyan.
5. Meditation and its processes.

References:

George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.

Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004),

The Yoga Adventure for Children. Netherlands: A Hunter House book.

Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.

Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal

Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.

Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.

Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.

Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.

Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.

Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.

Swami Sivananda, (1971), The Science of Pranayama. Chennai: A Divine Life Society Publication.

Thirumalai Kumar. S and Indira. S (2011) Yoga in Your Life, Chennai: The Parkar Publication.

Tiwari O.P. (1998), Asanas-Why and How. Lonavala: Kaivalyadham.

M. A. YOGA – 3rd SEMESTER

PAPER – 301: Fundamentals of Naturopathy

Time: 3 Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.

Course Objectives:

To acquaint the students with fundamentals of Naturopathy and its various forms.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain information about fundamental principles of Naturopathy, Various forms of Health and relationship between Allopathy and Naturopathy.
2. Understand about Hydro-therapy, its benefits as rehabilitative therapy.
3. Gain information about Mud-therapy, its therapeutic use, soil and its uses in Naturopathy.
4. Understand fasting, starvation, hunger and appetite, diet according to Naturopathy and effects of fasting on Human Body.

Unit-I INTRODUCTION TO NATUROPATHY

1. Meaning & Definitions, Fundamental Principles of Naturopathy.
2. Swasthya Vritam: Dinacharya, Ratricharya, Ritucharya, Vegadharana.
3. Physical, Mental, Spiritual Health.
4. Naturopathy and Allopathy.

Unit-II HYDROTHERAPY

1. Hydrotherapy: Meaning, Definition and its Benefits.
2. General Principles of Hydrotherapy.
3. Concept of Ushapan and its benefits.
4. Classification of Temperature, Effects of Different Water Temperature on the body.

Unit-III MUDTHERAPY

1. Mudtherapy: Meaning and its uses.
2. Classification of Mud for Therapeutic use and its effects.
3. Mud Bath, Different Bandages of Mud, their uses and application.
4. Soil: Meaning, Types, Characteristics and their uses in Naturopathy.

Unit-IV FASTING AND DIETETICS

1. Fasting: Meaning and Classification.
2. Difference between Fasting and Starvation, Hunger and Appetite.
3. Diet According to Naturopathy and its types.
4. Fasting: Precautions before, during and after, Effect of fasting on human Body.

References Books:-

History & Philosophy of Naturophaty – Dr. S. J. Singh
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
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.

PAPER – 302: Basic Yoga Text Principles,Upanishads and Bhagwadgita

Time: 3 Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.

Course Objectives:

 To provide the knowledge about Upanishad, Bhagwadgita and types of yoga in Bhagwadgita.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understand the concept of Yoga, Nature, Prana, Panchpranas, Tapasya and Guru bhakti and target of meditation.
2. Gain information about messages of Upanishads such as Indriya and Antahkarana, states of consciousness in relation to syllable in Omkara.
3. Gain information about Bhagwadgita and its relevance in modern time with Dharma Ka Swaroop.
4. Understand about , Sankha and Gyan yoga, Karma and bhakt yoga and characteristics of a Yogi in Bhagwadgita.

Unit-I   INTRODUCTION OF UPANISHADS

1. Katha Upanishad: Definition of Yoga; Nature of soul; Importance of Self Realization.
2. Prashna Upanishad: Concept of Prana and rayi (creation); Panchapranas; The five main questions.
3. Mundaka Upanikshad: Two approaches to Brahma Vidya-the Para and Apara:
4. The greatness of Brahmavidya, The worthlessness of Selfish-Karma; Tapas and Gurubhakti.
5. The origin of creation, Brahman the target of meditation.

Unit-II MASSAGES OF UPANISHADS

1. Ishavasyopanishad: Concept of Karmanishta; Concept of Vidya and Avidya; Knowledg of Brahman; Atma Bhava.
2. Kena Upanishad: indwelling Power; Indriya and antahkarana; Self and the Mind;.
3. Kena Upanishad: Intutive relalization of the truth, Truth transcendental; Moral of Yaksha Upakhyana;
4. Mandukya: Four States of Consciousness and its relation to syllables in Omkara.

Unit-III BHAGWAT GITA

1. Introduction to BhagwadGita.
2. History of BhagwadGita.
3. Purpose and Importance of Yoga in Modern Time.
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

Unit-IV TYPES OF YOGA IN BHAGWADGITA

1. Sankhya and Gyan Yoga (Chapter-2: Shloka 12-72) and (Chapter-13: Shloka 07-34).
2. Karma Yoga (Chapter-3: Shloka 09-35) and (Chapter-4: Shloka 17-42).
3. Bhakti Yoga (Chapter-12: Shloka 01-20).
4. Characteristics of a Yogi (Chapter-2: Shloka 55-72).

References Books:-

Message of Upanishad, Bharatiya Vidya Bhawan, (1993)
Prasad, Ramanuj, (2003), "Know the Upanishads", V & S Publication, New Delhi,
ISBN-9381384754.
Gambhirananda, Swami, (1957), Eight Upanishads with the commentary of Shankaracharya- Vol. 1 and Vol. 2", Advaita Ashrama, University of Virginia.
Radhakrishnan, Sarvepalli, (1974), "The Principal Upanishads", Allen & Unwin Publications,
ISBN-8172231245.
Ghosh Aurobindo, (1995), "Essays on Gita", Shri Aurobindo Ashrama Press, Pondicherry.
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.
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)**

Credits=4

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.

Course Objectives:-

1. To provide the knowledge of concept of Yoga, Yoga education with Guru-shishya parampara.
2. To acquaint students with values and contribution of yoga in development of values in Education.
3. To provide knowledge about Astang yoga and personality development through yogic practices.
4. To acquaint the students with stress management through Astang yoga and Bhagwadgita.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain information about yoga and yoga education in development of Human society.
2. Gain knowledge about concept of values, Value oriented education and role of yoga teacher in value oriented education.
3. Understand about Astang yoga and development of personality with emphasis on Panchkosh.
4. Understand different techniques of stress management in astanga yoga of patanjali and bhagwadgita.

Unit-I YOGA IN EDUCATION

1. Meaning, Definitions, Aim and Objectives of Yoga Education.
2. Relationship between Yoga and Education.
3. Factors of Yoga Education and its significance.
4. Guru-Shishya Prampra in Yoga Education.
5. Role of Yoga in Development of Human Society.

Unit-II   VALUE EDUCATION

1. Meaning, Definitions and Types of Values.
2. Value Oriented Education and Modes of Living.
3. Contribution of Yoga towards development of values.
4. Role of Yoga Teacher in Value Oriented Education.
5. Salient Features of Ideal Yoga Teachers.

Unit-III PERSONALTY DEVELOPMENT

1. Astang Yoga and Personality Development.
2. Personality Development with Specific Emphasis on Panchkosh.
3. Different Yoga Modules to improve memories.
4. Intelligence: Meaning and Concept of Intelligence According to Yoga.
5. Yoga Practice for I.Q. development.

Unit-IV YOGA FOR STESS MANAGEMENT

1. Stress: Introduction, Concept & Solution through Mandukya Krika (Relaxation and Stimulation) as core for stress management.
2. Techniques of Stress Management in Astang Yoga of Patanjali and Bhagwat Gita.
3. Specific Practices for Stress Management (Breath Awareness, Shavasan, Yognidra).
4. Pranayam and Meditation for Stress Management.
5. 4Impact of Yogic Life Style on Stress Management.

References Books:-
Arun Kumar Singh, Education Psychology (2015) Bharti Bhawan Publishers & Distributors.
Baron, R.A (2007). Psychology (Fifth edition) New Delhi: Pearson Prentice-Hall of India.
Baron, A. Rober, (2002) "Psychology", Pearson Education Vth Ed.
Yog Prichya and Prampra – Dr. Praveen Kumar & Dr. Amrita Pritam.
Ahuja, R (2000) Value oriented education in India. In Modi, R. (Ed.), Human values and social change, Jaipur: Rawat Publications.

PAPER – 304: APPLIED PSYCHOLOGY IN YOGA

Time: 3 Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.

Course Objectives:-

To impart the knowledge about psychology, learning and motivation, personality and its various theories and guiding and counseling significance.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understand basic concept of psychology, and its contribution in teaching learning process of yoga education.
2. Gain knowledge about learning its laws and theories, various theories of motivation.
3. Understand the concept of personality and its theories.
4. Gain information about guidance and counseling their principles in yoga education and qualities of a counselor.

Unit-I INTRODUCTION OF PSYCHOLOGY

1. Psychology: Meaning, Definition and Scope of Psychology in Yoga.
2. Nature and Branches of Psychology.
3. Relevance and Contribution of Psychology in Teaching & Learning Process of Yoga Education.
4. Methods of Psychology: General Introduction, Survey and Experiment Method.

Unit-II LEARNING AND MOTIVATION

1. Learning: Meaning, Definition, Laws of Learning and Learning Curves.
2. Theories of Learning: Thorndike's Trial and Error, Pavlov's Learning by conditioning.
3. Motivation: Meaning, Definition, Concept and Dynamics of Motivation in Yoga.
4. Theories of Motivation: Abraham Maslow's Self Actualization Theory, Sigmond Freud's Instinct Theory.

Unit-III PERSONALITY

1. Personality: Meaning, Definition and Structure of Personality.
2. Theories of Personality: Sigmond Freud's Psycho-Analytical Theory.
3. Type Theories of Personality: Kretschmer's, Sheldons and Jung's Classification.
4. Trait Theory of Personality: Allport and Eyesenk.

Unit-IV GUIDANCE AND COUNSELLING

1. Guidance: Meaning, Definition and Significance of guidance.
2. Principles of Guidance in Yoga Education.
3. Counseling: Meaning, Definition and Significance of Counseling and Different types of Counseling.
4. Concept of Counseling Process and Qualities of a Counselor.

References Books:-

Dr. Arun Kumar Singh, Education Psychology (2015) Bharti Bhawan Publishers & Distributors.
Dridge & Hung: Psychological Foundations of Education. Harper and Row Publishers.
Kamlesh, M. L. Educatin Sports Psychology, New Delhi, Friends Pub., 2006.
Jaswant kaur Vir – Psychology of Teaching and Learning (Twenty First Century Publication Pardeep Kumar Sahu Patiala. (2008).
Baron, R. A. (2007). Psychology (Fifth edition) New Delhi: Pearson Prentic-Hall of India.
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 Mcgraw Hill Book Co. New Delhi.

PAPER – 305 PRACTICAL SYLLABUSES

Credits=5

(i) Demonstrations of Asana, Pranayam and Shudhi Kriya
Maximum Marks: 70

Course Objectives:-

To Provide practical experiences of different Yogic practices like asanas, pranayams, Bandhs, Mudras and their effect on Human Body

Learning Outcomes:-

The students will gain practical experience of different Yogic practices and will apply them on all age groups and sexes for a better Lifestyle.

1. **PRAYER:** Gayatri Mantra, Mahamritunjya 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**

(ii) APPLIED PSYCHOLOGY:
Maximum Marks: 30

Course Objectives: To Provide practical experiences of Methodology of filling questionnaires and their uses in research.

Learning Outcomes:- The students will gain practical experiences of Methodology of filling questionnaires and their uses in research.

i)   Self Concept Questionnaire 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   (Marks = 10)

   Mrs. Shubhra Mangal.

Open Elective

PAPER - 306 YOGA AND HEALTH

Time: Two Hours   **Total Marks: 50 (Theory Marks: 40 + Internal Assessment: 10)**

Note: Paper setter is required to set 2 questions from each Unit – I and II. Unit - III consists of 4 questions of short answers distributed from all over the syllabus. The candidates are required to attempt one question from each Unit – I and II carrying 16 marks for each question. Unit - III is compulsory for all consisting 2 marks of each short answer.

Course Objectives:-

To provide knowledge about basic concept of health asanas, pranayamas, shudhikriyas & treatment of different health problems with yogic practices.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain information about Health, Yogic diet and different types of asanas and pranayamas.
2. Gain information about Shudikriyas and treatment of various ailments and psychological problems through yogic practices.

Unit – I INTRODUCTION OF HEALTH & YOGIC PRACTICES.

1. Meaning, Definition and Concept of Health
2. Yogic diet and health.
3. Cultural asanas and health: Paschimottan ,Hal ,Bujang, Shalabh, Vipritkarni, Sarvang, Trikon, Shirsh, Ushtra, Suptavajra.
4. Relaxative asanas and health: Savasna & Makrasna.
5. Meditative asanas and health: Padam, Vajra, Sihasna, Singhasna.
6. Pranayama and health: Suryabhedan,Ujjai, Sheetali, Sheetkari, Bhramari & Bhastrika.

Unit – II HEALTH PROBLEMS & TREATMENT THROUGH YOGA.

1. Shudhikriyas and health : Neti, Dhoti, Basti, Neoli, Tratak & Kapalbhati.
2. Stress management through Yogic practieses
3. Hypertension: Meaning, causes and yogic treatment.
4. Diabetes: Meaning,types, causes and yogic treatment
5. Cervical Spondylosis: Meaning, causes and yogic treatment.
6. Obesity: Meaning, causes and yogic treatment

References Books:-

George Feuerstein, (1975). Text Book of Yoga. London: Motilal Bansaridass Publishers (P) Ltd.

Gore, (1990), Anatomy and Physiology of Yogac Practices. Lonavata: Kanchan Prkashan. Helen Purperhart (2004), The Yoga Adventure for Children. Netherlands: A Hunter House book.

Iyengar, B.K.S. (2000), Light on Yoga. New Delhi: Harper Collins Publishers.

Karbelkar N.V.(1993) Patanjal Yogasutra Bhashya (Marathi Edition) Amravati: Hanuman Vyayam Prasarak Mandal

Kenghe. C.T. (1976). Yoga as Depth-Psychology and para-Psychology (Vol-I): Historical Background, Varanasi: Bharata Manishai.

Kuvalyananada Swami & S.L. Vinekar, (1963), Yogic Therapy – Basic Principles and Methods. New Delhi: Govt. of India, Central Health Education and Bureau.

Moorthy A.M. & Alagesan. S. (2004) Yoga Therapy. Coimbatore: Teachers Publication House.

Swami Kuvalayanda, (1998), Asanas. Lonavala: Kaivalyadhama.

Swami Satyananada Sarasvati. (1989), Asana Pranayama Mudra Bandha. Munger: Bihar School of Yoga.

Swami Satyananda Saraswathi. (1984), Kundalini and Tantra, Bihar: Yoga Publications Trust.

PAPER – 401: YOGA THERAPY

Time: 3 Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.

Course Objectives:

To acquaint students with the knowledge of Yoga therapy, concept of diseases, Yoga therapy for lifestyle disorders and psychological problems.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Gain knowledge about Yoga therapy, its concept, principles and limitations to treat various diseases.
2. Gain knowledge about concept of various diseases, its classifications and their causes along with Postural deformities and its treatment.
3. Understand yoga therapy and lifestyle disorders such as Hypertension, obesity and blood glucose, Gastric Intestinal Problems and Cardio respiratory disorders along with their treatment through yoga therapy.
4. Gain information about Yoga therapy for psychological disorders such as stress, anxiety, depression, Insomnia, Adjustment problems and attention deficit along with their treatment through yoga therapy.

Unit-I YOGA THERAPY: AN INTRODUCTION

1. Meaning, Definition and Importance of Yoga Therapy in modern age.
2. Concept and Scope of Yoga Therapy.
3. Principles of Yoga Therapy.
4. Limitations of Using Yoga Therapy.

Unit-II CONCEPT OF DISEASES

1. Diseases, Meaning and their causes.
2. Classifications of Diseases.
3. Postural Deformities: Meaning and their Causes.
4. Treatment of Different types of Postural Deformities through Yoga Therapy (KYPHOSIS, LORDOSIS SCIOLIOSIS, KNOCK-KNEE, FLAT-FOOT).

Unit-III YOGA THERAPY FOR LIFE STYLE DISORDERS

1. Hypertension, Obesity and Blood Glucose disorders: Causes, Symptoms and Treatment through Yogic Therapy.
2. Gastric Intestinal Problem: Indigestion, Constipation, Acidity, Causes, Symptoms and
3. Treatment through Yogic Therapy.
4. Cardio respiratory disorders: Atherosclerosis and Bronchi Asthma: Causes Symptoms and their Treatment through Yoga Therapy.

Unit-IV YOGA THERAPY FOR PSYCHOLOGICAL PROBLEMS

1. Stress, Anxiety and Depression: Meaning, Causes, Symptoms and their Treatment through Yoga.
2. Insomnia: Meaning, Causes, Symptoms and Treatment through Yoga.
3. Adjustment Problems: Meaning, Causes, Symptoms and Treatment through Yoga.
4. Attention – Deficit, Hyperactivity Disorder: Meaning, Causes, Symptoms, Treatment through Yoga.

References Books:-

Moorthy, A.M. (2005), "Yoga Therapy", Teacher Publising House, Coimbatore ISBN-9788180160240.
Swami, Shivananda Saraswati, (1957) "Yoga Therapy, Umachal Yoga Ashram, Guwahati".
Verma, Janki Prasad, (1962), "Rogo Ki Achuke Chikitsa" Leader Press, Allahabad.
Yogeshwar, "Simple Yoga Therapy', Yoga Center, Madras. Tiwari, O.P., (1984), "Asanas-Why and How", Kaivalayadhama, Lonavala.
Roga & Yoga- Swami Shivanand.

PAPER – 402: FOOD & NUTRITION

Time: 3 Hours　　　　　　　　　　**Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.*

Course Objective:-

To provide the students with the basic knowledge about food & nutrients, Balanced diet and meal planning for different age groups and sexes.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Adopt knowledge about food and nutrition along with their classifications , functions and their importance.
2. Gain information about various nutrients such as proteins, fats, carbohydrates, vitamins, minerals and water with thorough knowledge of their classification, sources, functions and their requirements.
3. Adopt thorough knowledge of Balanced diet with its importance and factors affecting it, Concept of yogic diet and advantages & disadvantages of vegetarian and non-vegetarian diet, Malnutrition with its causes and methods to overcome it.
4. Adopt knowledge of Meal planning with its principles and factors affecting it, Food intake timing and different types of meals.

Unit-I   FOOD & NUTRITION

1. Meaning of Food, Nutrition and their importance.
2. Functions of Food and Nutrition.
3. Classifications of Nutrients.
4. Basic Principles of Nutrition.

Unit-II NUTRIENTS

1. Proteins: Meaning, Classification, Sources, Functions and their requirements.
2. Fats and Carbohydrates: Meaning, Classification, Sources, Functions and their requirements.
3. Vitamins: Classification, Sources, Functions and their requirements.
4. Minerals: Classification, Sources, Functions and their requirements.
5. Water: Meaning, Sources and Functions.

Unit-III BALANCED DIET

1. Meaning and Importance of Balanced Diet.
2. Factors Affecting Balanced Diet.
3. Concept of Yogic Diet.
4. Advantages/Disadvantages of Vegetarian and Non-Vegetarian Diets.
5. Malnutrition: Meaning, Causes and Methods for overcoming Malnutrition.

Unit-IV MEAL PLANNING

1. Concept and Principles of Meal Planning.
2. Factors Affecting Meal Planning.
3. Meal Planning for Healthy Living.
4. Meal Planning for Adolescents Male and Female.
5. Food Intake: Timing, Concept of Dugdahar, Falahar, Alpahar and Apakahar in Yoga.

References Books:-
Bessesen, D. H. (2008). Update on obesity. J ClinEndocrinolMetab.93(6), 2027-2034.
Butryn, M.L., Phelan, S., &Hill, J. O.(2007). Consistent self-monitoring of weight: a key component of successful weight loss maintenance.Obesity(Silver Spring). 15(12), 3091-3096.
Chu, S.Y. & Kim, L. J. (2007). Maternal obesity and risk of stillbirth: a metaanalysis. Am J ObstetGynecol, 197(3), 223-228.
DeMaria, E. J. (2007). Bariatric surgery for morbid obesity. N Engl J Med,356(21), 2176-2183.
Dixon, J.B., O'Brien, P.E., Playfair, J. (n.d.). Adjustable gastric banding and conventional therapy for type 2 diabetes: a randomized controlled trial. JAMA. 299(3), 316-323.

PAPER – 403: KINESIOLOGICAL ASPECT OF YOGA

Time: 3 Hours   **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.

Course Objectives:-

1. To acquaint students about meaning of kinesiology, axsis, plane, medical terminology of body positions and different body movements.
2. To develop understanding about functional classification musles, their origin, insertion & functions of important muscles of the body.
3. To enable the students to have understanding about joints of upper extremity and structural & functional aspects of upper extremity joints(shoulder & elbow joint).
4. To acquaint the students to have knowledge about joints of lower extremity & structural and functional aspects of lower extremity joints (knee & hip joint).

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Understanding and knowledge of kinesiology, axsis, plane, medical terminology of body positions and different body movements.
2. Clarity regarding functional classification muscles, their origin, insertion & functions of important muscles of the body.
3. Understanding and knowledge of joints of upper extremity and structural & functional aspects of upper extremity joints(shoulder & elbow joint).
4. Knowledge of joints of lower extremity & structural and functional aspects of lower extremity joints (knee & hip joint).

Unit-I INTRODUCTION OF KINESIOLOGY AND BODY MOVEMENTS

1. Kinesiology: Meaning, significance and scope in Yoga.
2. Medical Terminology of Body Position.
3. Axis and planes: meaning and Types.
4. Terminologies of different Body movements.
5. Skeletal Muscle: Gross Structure, meaning of muscle origin and Insertion.

Unit-II MUSCLES OF VARIOUS REGIONS

1. Functional classification Skeletasl Muscles.
2. Origin, Insertion and Actions of Muscles in different asanas: Latissimus Dorsi, Trapezius
3. Rhomboid Major, Rhomboid Minor, Rectus Abdominal, Gluteus Maximus,
4. Gluteus Medius, Gluteus Minimus and Sternocleidomastoid muscle.

Unit-III JOINTS OF UPPER EXTREMITY

1. Shoulder Joint – Structure, Ligaments, Muscle Reinforcement and Movements.
2. Elbow Joint – Structure, Ligaments, Muscle Reinforcement and Movements. Origin, Insertion and Actions of Muscles in different asanas: Deltoid, Biceps, Triceps and Pactroralis Major.

Unit-IV JOINTS OF LOWER EXTREMITY

1. Hip Joint – Structure, Ligaments, Muscle reinforcement and Movements.
2. Knee Joint - Structure, Ligaments, Muscle reinforcement and Movements.
3. Origin, Insertion and Action of Muscles in different asanas: Hamstrings group of Muscles, Quadriceps group of Muscles, Sartorious Muscle, Gastrocnemius Muscle.

References Books:-

Gowitzke, B.A and Milner, M (1988). Scientific Basis of Human Movement (3rd. ed.) Baltimore: Williams and Wilkins.

Groves, R and Camaine, D. (1983). Concepts in Kinesiology. (2nd.ed) Philadelphia: Saunders College Publishing.

Hay, J. & Reid, J (1982). The Anatomical and Mechanical Basis of Human Motion. Englewood Cliffs: Prentice – Hall

Luttegens, Kathryn, Deutsch, Helga, Hamilton, Nancy. Kinesiology- Scientific Basis of Human Motion. 8th. Ed., Brown & Bench mark.

Rasch, P. (1989) Kinesiology and Applied Anatomy. Philadelphia: Lea & Febiger.

Thompson, C. (1985). Manual of Structural Kinesiology. (10th. ed.) St. Louis: Times Mirror/ Mosby College Publishing.

PAPER- (404): TEACHING METHODS OF YOGA

Time: 3 Hours **Total Marks: 100 (Theory Marks: 80 + Internal Assessment: 20)**

Credits=4

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.

Course Objectives:-

To provide knowledge about teaching methods, formations, teaching aids, lesson planning and class management for effective presentation of subject matter.

Learning Outcomes:-

After completion of the course contents of this paper, the student will be able to:

1. Adopt knowledge about teaching methods, its importance, modern concept, different types, principles and factors affecting it.
2. Gain information about command, formation and teaching aids along with their types and importance.
3. Adopt knowledge about lesson planning, its objectives, principles, types, importance and factors affecting it.
4. Gain knowledge about Class management along with its importance and factors affecting it, Organization and administration of yoga competition and rules of Inter-collegiate/University Level Yoga Competition.

UNIT –I TEACHING METHODS

1. Meaning, Definition and Importance of Teaching Methods in Yoga.
2. Modern Concept of Teaching Methods Types of Teaching Methods in Yoga.
3. Factors Affecting Teaching Methods.
4. Principles of teaching.

UNIT-II COMMAND, FORMATION AND TEACHING AIDS
1. Command: Their types and uses in Yoga.
2. Teaching Aids: Meaning and Importance.
3. Types of Teaching Aids
4. Modern concept of teaching Aids.
5. Class Formation: Meaning, Types and their importance.

UNIT-III LESSON PLANNING

1. Meaning and Importance of Lesson Plan.
2. Objectives and Steps of Making Lesson Plan.
3. Types of Lesson Plan.
4. Factors Affecting Lesson Plan.
5. Basic Principles of Making Lesson Plan

UNIT-IV CLASS MANAGEMENT

1. Meaning and Importance of Class Management.
2. Factors Affecting Class Management.
3. Steps of Class Management.
4. Organization and administration of Yoga Competition.
5. Rules of Inter-collegiate/University Level Yoga Competition.

References Books:-

Bhatia and Bhatia Doaba House, (1959) The Principles and Methods of Teaching New Delhi.
Prof. Ramesh Chandra (2004), Technology in the preparation of Teachers", Usha Books, Delhi.
Kochar S.K, (2010) "Methods and Techniques of Teaching ,Sterling Publishers, New Delhi
Walia JS, (2003) "Principles and Methods of Education" Plant Publishers Jalandhar City-.