SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)
Semester - I

Course No.	Course Title	Total Marks			
		Internal Assessment	Theory	Practical	
101	PRINTING PROCESS -I	25	75		100
102	COMMUNICATIVE ENGLISH	25	75		100
103	PHYSICS - I	25	75		100
104	CHEMISTERY	25	75		100
105	MATHEMATICS - I	25	75		100
106	FUNDAMENTALS OF COMPUTER	25	75		100
	LAB				
111	PRINTING PROCESS-I LAB	25		50	75
112	PHYSICS-I LAB	25		50	75
113	CHEMISTERY LAB	25		50	75
114	FUNDAMENTALS OF COMPUTER LAB	25		50	75
	TOTAL				900

101

PRINTING PROCESS-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT -I

History of printing: Brief history of printing in the Western Countries and in India from the time of Gutenberg's invention of movable type. A brief survey of the evolution of printing processes and methods from a craft to the present day sophisticated technology.

UNIT -II

Letter Press 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.

UNIT –III

Printing Processes: Introduction to printing processes, basic principles, characteristics and identification. Suitability & limitations of various processes of printing.

UNIT -IV

Running Defects of different printing process: Common printing faults, 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 By Babett Magee
4. Screen Printing By John Stephens

102
Communicative English

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT -I

Language
Main features of British, American and Indian English
Introduction to Formal and Informal English

UNIT -II

Vocabulary
Word meanings and their usage, using a dictionary
One word substitutes
Synonyms& Antonyms
Common errors in spellings and sentences

UNIT -III

Grammar
Active Voice and Passive Voice, Tag Questions
Subject-Verb agreement
Use of Articles and Prepositions
Idioms& phrases

UNIT -IV

Composition
Resume Writing
Letter writing (Formal and Informal Letters)
Paragraph Writing
Dialogue Writing
Essentials of different types of conversation (telephonic, e-mail, public speech, group discussion)

REFERENCES:
1. Oxford Practice Grammar, John Eastwood, Oxford University Press
2. Strengthen Your English, Bhaskaran and Horsburgh, Oxford University Press
3. Basic Communication Skills for Technology,and rea 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.

103
PHYSICS-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

PHYSICAL OPTICS

Interference: Division of wave front-Fresnel's biprism, Division of amplitude–Newton's rings, Michelson interferometer, applications.

Diffraction: Difference between Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a slit. Plane transmission diffraction grating, its dispersive and resolving powers.

Polarization: Polarised and unpolarized light, double refraction; Nicol prism, quarter and half wave plates, Polarimetry; Biquartz and Laurent's half-shade polarimeters, Simple concepts of photoelasticity.

UNIT-II

LASER: Spontaneous and stimulated emissions, Laser action, characteristics of laser beam-concepts of coherence, He-Ne and semiconductor lasers (simple ideas), applications.

FIBRE OPTICS: Propagation of light in fibres, numerical aperture, single mode and multi mode fibres, applications.

UNIT-III

WAVE AND OSCILLATIONS: Simple concepts of Harmonic Oscillator, resonance, quality factor. E.M. wave theory-review of basic ideas, Maxwell's equations, simple plane wave equations, simple concepts of wave guides and co-axial cables, Poynting vector. **DIELECTRICS:** Molecular theory, polarization, displacement, susceptibility, dielectric coefficient, permitivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field. Behavior of dielectrics in a.c. field-simple concepts, dielectric losses.

UNIT-IV

SPECIAL THEORY OF RELATIVITY: Michelson-Moreley experiment, Lorentz transformations, variation of mass with velocity, mass energy equivalence.

NUCLEAR PHYSICS: Neutron Cross-section, Nuclear fission, Moderators, Nuclear reactors, Reactor criticality, Nuclear fusion. Interaction of radiation with matter-basic concepts, radiation detectors-ionisation chamber, G.M. Counter, Scintillation and solid state detectors, cloud chamber and bubble chamber.

TEXT BOOKS:

1. Physics of the Atom - Wehr, Richards & Adair (Narosa)
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics – A.S. Vasudeva (S. Chand)

REFERENCE BOOKS:

1. Electricity and Magnetism – F.W. Sears (Narosa)

2. Physics Vol-I & II – Resnick & Halliday (Wiley Eastern)
3. A Text Book of Optics – Brij Lal & Subramanyam

104

CHEMISTRY

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit-1

Thermodynamics - Second law, concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change, Chemical Potential, Gibb's Helmholtz equation, Clausius - Clapeyron equation, Related numerical problems with above topics. Phase-Rule - Terminology, Derivation of Gibb's Phase Rule Equation, One Component System (H_2O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

Unit-2

Water & its treatment : Part I – Sources of water, impurities in water, hardness of water and its determination, units of hardness, alkalinity of water and its determination, Related numerical problems, scale and sludge formation (composition properties and methods of prevention). Water and its treatment : Part II – Treatment of water for domestic use, coagulation, sedimentation, filtration and dis-infection, water softening, Ion-exchange process, mixed bed demineralisation, Desalination (reverse osmosis) (electrodialysis).

Unit-3

Corrosion and its prevention - Galvanic & concentration cell, Dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, pitting corrosion, water-line corrosion, differential aeration corrosion, stress corrosion, factors affecting corrosion, Preventive measures (proper design, Cathodic protection, protective coatings).
Lubrication and Lubricants-Friction, mechanism of lubrication, classification and properties of lubricants, Additives for lubricants, synthetic lubricants, Greases – Preparation & properties (consistency, drop point) and uses.

Unit-4

Polymers and Polymerization-Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermo-plastics (PVC,PVA), thermosets (PF,UF), and elastomers (SBR,GR-N), Silicones, Introduction to polymeric compsites. Analytical methods;its needs and different methodes;Spectroscopy; its defination and scope;salient features of spectrophotometer,brief introduction of titrimetric methodes,Elementry discussion on flame photometry

TEXT BOOKS:

1. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai & Co.).
2. Chemistry in Engineering & Tech., Vol.I & II, Rajaram, Kuriacose (TMH).

REFERENCE BOOKS:

1. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
2. Physical Chemistry, P.W. Atkin (ELBS, Oxford Press).
3. Physical Chemistry, W.J. Moore (Orient-Longman).

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.

105
MATHEMATICS-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

Applications of Differentiation : Taylor's & Maclaurin's series, Expansion by use of known series, Expansion by forming a differential equation, Asymptotes, Curvature, Radius of Curvature for Cartesian, Parametric & polar curves, Centre of curvature & chord of curvature, Tracing of Cartesian & polar curves (standard curves).

UNIT – II

Partial Differentiation & its Applications : Functions of two or more variables Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, change of variables.

Homogeneous functions, Euler's theorem, Jacobian, Taylor's & Maclaurin's series for functions of two variables (without proof), Errors and approximations, Maxima-minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign.

UNIT – III

Multiple Integrals and their Applications : Double integral, change of order of integration Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variables0, Beta and gamma functions and relationship between them.

UNIT – IV

Vector Calculus : Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations, Del applied twice to point functions, Del applied to product of point functions.

Integration of vectors, line integral, surface integral, volume integral, Green's, Stoke's and Gauss divergence theorems (without proof), and their simple applications.

TEXT BOOKS:

1. Advanced Engineering Mathematics : F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.

REFERENCE BOOKS:

1. Engineering Mathematics Part-I : S.S. Sastry.
2. Differential and Integral Calculus : Piskunov.
3. Advanced Engineering Mathematics : R.K. Jain and S.R.K. Iyengar
4. Advanced Engg. Mathematics : Michael D. Greenberg

106

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.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT – I

Personal computers – Labeling standards – software applications, utilities, operating systems. Linking hardware and software, device interfaces, BIOS, device drivers.

UNIT – II

Motherboard components–nomenclature, tech., Microprocessor– basics, Memory – RAM, ROM, DRAM, EDO, SDRAM (only usage and speca basis) BIOS. BIOS compatibility, Expansion slots, parallel serial port power supply SMPS – specialization, Bus- AT bus, PCI, ISA bus.

UNIT – III

Mass storage technology – data organization – cache operation, FDD, HDD, SCSI driver their storage capacity drives, Compact Disc.

Display devices – CRT displays – display adapter CGA, VGA SVGA- Resolutions (application oriented discussion)

Input /Output devices Keyboard, mouse, scanners, printers, dot matrix, ink jet, laser, CCD Camera, Grabber Card.

UNIT – IV

Introduction to DTP, trends in printing technology, usage of computers in printing. DTP printing technology Introduction to DTP software's, Use of Text tool Adobe, Photoshop Corel Draw.

Story editing, formatting.
Working with graphics: using different graphic tools importing graphics working with colour, table editing. Desk Top Publishing Hardware, Macintosh, Cost estimation of DTP. Electronic Image, BMP, TIFF, GIF file formats. Image compression

Recommended Books :

1. Hardware Bible : Winn IL Roch Techmedia.
2. Desk Top Typography : Qukarkx Press
3. Page Maker 6.0 : BPB Publication.

111

PRINTING PROCESS - I LAB

Time : 3 hours **Max. Marks : 75**
(25+50)

LIST OF EXPERIMENTS

1. Identification of different tools & equipments used in letterpress.
2. Schematic diagram of different Printing Processes.
3. Printing of line & half tone block in single & multi color.
4. Schematic diagram of different letter press Printing Machines.
5. Study of Running & printing faults on letter press machine.

6. Screen stretching techniques.

7. Stencil preparation - Direct, Indirect, Direct/Indirect, Capillary stencil preparation.
8. Multi color printing of visiting cards, greeting cards, letter heads, certificates, invitations, folders, cover pages, photographs.

112

PHYSICS-I LAB

Time : 3 hours **Max. Marks : 75**
(25+50)

LIST OF EXPERIMENTS

The experiments in Ist semester will be based mainly upon optics, electrostatics, wave and oscillations which are the parts of the theory syllabus of Ist semester.

1. To find the wavelength of sodium light by Newton's rings experiment.
2. To find the wavelength of sodium light by Fresnel's biprism experiment.
3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To verify Newtons formula and hence to find the focal lenth of convex lens
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the specific rotation of sugar solution by using a polarimeter.
8. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.
9. To find the frequency of A.C. mains by using sonometer.
10. To find low resistance by carrey foster Bridge
11. To find the resistance of a galvenometer by Post office Box
12. To Find Value of high Resistance by substitution method
13. To Find the value of high resistance by leakage method
14. To Convert a galveno meter in to an Ammeter of given range.

RECOMMENDED BOOKS:

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

113
CHEMISTRY LAB

Time : 3 hours **Max. Marks : 75**
(25+50)

LIST OF EXPERIMENTS

1. Determination of Ca^{++} and Mg^{++} hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting & eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
6. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.
8. To find out saponification No. of an oil.
9. Estimation of calcium in lime stone and dolomite.
10. 10. Determination of concentration of $KMnO_4$ solution spectrophotometerically.
11. Determination of strength of HCl solution by titrating it against NaOH solution conductometerically.
12. To determine amount of sodium and potassium in a, given water sample by flame photometer.
13. Estimation of total iron in an iron alloy.

SUGGESTED BOOKS :

1. A Text Book on Experimental and Calculation – Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
2. Essential of Experimental Engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company.
3. Theory & Practice Applied Chemistry – O.P. Virmani, A.K. Narula (New Age)

114

FUNDAMENTALS OF COMPUTER LAB

Time : 3 hours **Max. Marks : 75**
(25+50)

LIST OF EXPERIMENTS

1. Introduction to Computer Terminologes.
2. Use of different Hardware devices.
3. Word-Processing Softwares.
4. DTP and its features.
5. Softwares used in Printing.
6. Page set-up with different sizes and margins.
7. Preparation of Text rich documents.
8. Different kinds of Scanners, their working and uses.
9. Image and Text merging.
10. Modifications and Editing of Illustrations and Text.
11. Using various tools of Printing Softwares.
12. Working of Printers.

SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)
II Semester

Course No.	Course Title	Internal Assessment	Exam. marks		Total Marks
			Theory	Practical	
201	PRINTING PROCESS -II	25	75		100
202	SCIENCE OF COMMUNICATION	25	75		100
203	GRAPHICS	25	75		100
204	PHYSICS - II	25	75		100
205	MATHEMATICS -II	25	75		100
206	ENGINEERING DRAWING	25	75		100
	LAB				
211	PRINTING PROCESS-II LAB	25		50	75
212	SCIENCE OF COMMUNICATION- LAB	25		50	75
213	GRAPHICS LAB	25		50	75
214	PHYSICS-II LAB	25		50	75
	TOTAL				900

201
PRINTING PROCESS-II

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**

UNIT -I

Printing Scope: Brief Introduction of Printing Industry in India-Scope and total printing capacity. Participation at international level
Basic operations in printing: Pre press, press and post press operations.

Printing Processes: Applications of letterpress, flexography, lithography and offset, gravure, screen printing etc. General principles of printing Surface preparation for these processes. Modes of taking impressions..

UNIT –II

Screen Printing: History of Screen Printing, Stencils - Their kinds and methods of preparation.. Screen ink- its kinds and uses for different substrates and drying methods. Special capabilities of screen printing

UNIT -III

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. Image transfer - The squeegee, Squeegee considerations, squeegee preparation, hardness categories of squeegee blades, Variety of blade, its shape and application.

UNIT -IV

Screen Printing Substrates & Machines: Their kinds and working principles and methods. Method of halftone preparation for screen printing. Drying Equipments- Drying racks, wicket dryers, Jet dryers, Infrared dryers, Ultraviolet dryers. Flocking process.
Introduction, Paper and Paper board, Wood, Textiles, Plastics, Metals, Ceramics and glass. Specialized Areas - Printed circuit boards of screen printing.

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

202
SCIENCE OF COMMUNICATION

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT –I

Definition, Nature and Scope of Communication.

Function of Communication,

Elements and Process of Communication.

UNIT –II

Essentials in Language and communication of good communication,

Barriers in Language and communication.

UNIT –III

Forms of Communication: Verbal and non verbal, intra personal, interpersonal, group public and mass communication

UNIT –IV

Introduction to Print Media: News papers- Magazines

Introduction to Electronic media: Radio -Television

Introduction to new media: Interment and mobile telephony

Convergence of Information, Communication and Telecom technologies.

203

GRAPHICS

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT –I

Introduction to "Graphic Design" : What is design, Graphic design, printer's design.

Fundamentals of design : line, tone , value, weight, texture, shape, size, space, etc. Principles of design- balances, proportion, rhythm, unity, contrast, simplicity, fitness.

UNIT –II

Colour theory: dimension of colour, colour schemes, colour symbolism, emotional effects of colour.

Division of design: natural, conventional, decorative, geometrical and abstract.

UNIT –III

Type: Methods of type arrangement, classification of typeface of font designing.

Printing planning: rough layout, comprehensive, artwork, type of originals, sizing, mashing and cropping.

UNIT –IV

Design management: Definitions in advertising art, modern art abstract art, applied art, advertising, publicity, public relations, sale promotion, sales manager
Design with D.T.P.: Various software's used for designing.

Recommended Books :-

1. The Designer's Handbook by Alistair Campbell
2. Design & Technology by Van No strand
3. Handbook of Advertising Art Production by schelmmer.
4. Art & Production by Sarkar.
5. Advertising, Art & Production by J. Nath.
6. A.C. Book (C.D.) so hick, Fundamental of copy and layout , Crair Book.

204
PHYSICS-II

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

CRYSTAL STRUCTURE: Space Lattice, unit cell and translation vectors, Miller indices, simple crystal structure, Bonding in solids, Experimental X-ray diffraction method, Laue method, powder Method, Point defects in solids, Elementary idea of quarks and gluons.

UNIT-II

QUANTUM PHYSICS: Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant, Group velocity and phase velocity, Schrodinger wave equations - time dependant and time independent Schrodinger equations, Elementary ideas of quantum statistics.

FREE ELECTION THEORY: Elements of classical free electron theory and its limitations, Drude's Theory of Conduction, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

UNIT-III

BAND THEORY OF SOLIDS: Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature. Hall effect and its Applications.

UNIT-IV

PHOTOCONDUCTIVITY AND PHOTOVOLTAICS: Photoconductivity in insulating crystals, variation with illumination, effect of traps, applications of photoconductivity, photovoltaic cells and their characteristics.

MAGNETIC PROPERTIES OF SOLIDS: Atomic magnetic moments, orbital diamagnetism, Classical theory of paramagnetism, ferro magnetism - molecular fields and domains.

SUPER CONDUCTIVITY: Introduction (experimental survey), Meissner effect, London equation.

TEXT BOOKS:

1. Introduction to Solid State Physics (VII Ed.) - Charles Kittel (John Wiley).
2. Quantum Mechanics – Powell and Crasemann (Oxford & IBH)
3. Fundamentals of Solid State Physics – B.S.Saxena, R.C.Gupta and P.N.Saxena (Pragati Prakashan).

REFERENCE BOOKS:

1. Sold State Physics – Pillai (New Age).
2. A text book of Engg. Physics – Avadhanulu and Kshirsagar (S.Chand)
3. Quantum Mechanics – Ghatak & Loknathan.

205
MATHEMATICS-II

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

Matrices & its Applications : Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and in dependence of vactors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley - Hamilton theorem and its applications.

UNIT-II

Ordinary Differential Equations & its Applications : Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legender's linear equations, simultaneous linear equations with constant co-efficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

UNIT-III

Laplace Transforms and its Applications : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivaties, transforms of integrals, multiplication by t^n, division by t. Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

UNIT-IV

Partial Differential Equations and Its Applications : Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

TEXT BOOKS:

1. Advanced Engg. Mathematics F Kreyszig
2. Higher Engg. Mathematics B.S. Grewal

REFERENCE BOOKS :

1. Differential Equations – H.T.H. Piaggio.
2. Elements of Partial Differential Equations – I.N. Sneddon.
3. Advanced Engineering Mathematics – R.K. Jain, S.R.K.Iyengar.
4. Advanced Engg. Mathematics – Michael D. Greenberg.

206

ENGINEERING DRAWING

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit I.

Various types of projections, First and Third angle systems of orthographic projections. Projection of Points in different quadrants.
Projections of Straight Lines, Projections of Planes . True shape of section. Development of surfaces of various solids.

Unit II.

Isometric projections - introduction, isometric scale, Isometric views of plane figures, prisms, pyramids and cylinders.

Unit III.

Orthographic drawings of Bolts and Nuts, Bolted Joints, Screw threads, Screwed Joints.Parts of Machines

Unit IV.

Free Hand Sketching- Orthographic Views from Isometric, Views of Simple Machine Components such as Brackets, Bearing Blocks, Guiding Blocks and Simple Couplings.
Note: Some simple exercises may be attempted with AUTOCAD.

Text Book

1. Engineering Drawing Plane and Solid Geometry: N.D. Bhatt and V.M.Panchal, Forty-Fourth Edition 2002, Charotar Publishing House.

Reference Books

1. Engineering Graphics and Drafting: P.S. Gill, Millennium Edition, S.K. Kataria and Sons.
1. A Text Book of Engineering Drawing: S.B. Mathur, Second Revised and Enlarged Edition 2000, Vikas Publishing House.
Engineering Graphics using AUTOCAD 2000: T. Jeyapoovan, First Edition 2002, Vikas Publishing House.

211
PRINTING PROCESS-II LAB

Max. Marks: 75

LIST OF EXPERIMENTS

(25+50)

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.
7. Study of cylinder and flexor plate making.
8 Study of plate making offset.

212
SCIENCE OF COMMUNICATION LAB

Max. Marks: 75

LIST OF EXPERIMENTS

(25+50)

1.Public speeches
2.Power point presentations
3. Group discussions
4. Interviews
5 .Designing poster
6. Designing pamphlets

213

GRAPHICS LAB

Max. Marks: 75

LIST OF EXPERIMENTS

(25+50)

1. Stationary and small sales literature.
2. Folders -
3. Sticker
4. Label designing
5. Introduction to computers, various software's used for designing purpose – Demonstration (Manipulation of same design)
6. Logo designing
7. Printing inks: Demonstration system.
8. Color wheel

9 Application of colour wheel

10. Designing of visiting card. Letterhead, Envelop, Bill form, Receipt, Invitation card, Posters, Title page of a Book, Magazine Cover page.

214
PHYSICS-II LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

The experiments in Second semester will be based upon electricity, Magnetism, Modern Physics and Solid State Physics, which are the parts of theory syllabus.

1. To study He Ne laser
2. Tofind the frequency of ultrasonic waves by piezo eletric methods
3. To find the value of e/m for electrons by Helical method.
4. To find the ionisation potential of Argon/Mercury using a thyratron tube.
5. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
6. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
7. To find the value of Planck's constant by using a photo electric cell.
8. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
9. To find the value of Hall Co-efficient of semi-conductor.
10. To study the V-I characteristics of a p-n diode.
11. To find the band gap of intrinsic semi-conductor using four probe method.
12. To calculate the hysteresis loss by tracing a B-H curve.
13. To verify richerdson thermionic equation
14. To find the flashing and quenching potential of Argon and to find the cap. of unknown capacitor
15. To find the temp coeff. of resistance by using Pt resistance therometer by post office box

RECOMMENDED BOOKS :

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L. Gupta & V. Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol. I & II – Chauhan & Singh (Pragati Prakashan).

SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)
III Semester

Course No.	Course Title	Internal Assessment	Exam. Schedule		Total Marks
			Theory	Practical	
301	TYPOGRAPHY & TYPESETTING	25	75		100
302	COMPUTER GRAPHICS	25	75		100
303	THEORY OF PRINTING MACHINE	25	75		100
304	DIGITAL ELECTRONICS	25	75		100
305	REPRODUCTION TECHNOLOGY	25	75		100
306	SHEET FED OFFSET TECHNOLOGY I	25	75		100
	Lab				
311	TYPOGRAPHY & TYPESETTING LAB	25		50	75
312	COMPUTER GRAPHICS LAB	25		50	75
313	REPRODUCTION TECHNOLOGY LAB	25		50	75
314	SHEET FED OFFSET	25		50	75

	TECHNOLOGY- I LAB				
	TOTAL				**900**

301

TYPOGRAPHY & TYPESETTING

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit - I

. Definition, concept and scope
. Printing type, definition, it's two-dimensional and three-dimensional concept.
Dimensions of printing types.
Printers Measurement and Systems: Point System, other units of measurements and application.
. Physical structures of printing types, their characteristics.
Design features and design 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.
. Identification of printing types, principles of size and design identification.
. Suitability of different types for different processes and publications.
. Calculations relating to type sizes and dimensions of printing pages.

Unit – III

. A brief account of the work and role of the type-setting department with in a printing press. The transformation from hand-setting to phototype-setting.
. House Style, Good and bad copy; methods of casting off; methods of copy mark-up and copy preparation procedures 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, Sheetwork, Half-sheet work, Work and tumble & Work and twist. The regular schemes up to 32 pages (upright and landscape).
Planning of composition department, Floor planand arrangement of equipment.

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. Sarkar

302
COMPUTER GRAPHICS

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-1

Basic Concept:

Introduction, The origin of computer graphics, Working of interactive - graphics display, New display devices, General purpose graphics software, The user-interface, Display of solid objects, Line drawing displays - Display devices and controllers, Display devices,

UNIT-II

The CRT-

Electron guns, Deflection system, Phosphors, Beam penetration CRT, Shadow mask CRT. Inherent-memory, devices - Direct view storage tube, Plasma panel, Laser-scan display, The storage-tube display, The refresh line - drawing display. Two dimensional transformations, Transformation principles, CAD, Animation, Simulation. Techniques for achieving realism

UNIT-III

Basics of Digital image processing: Introduction. Digital image representation, basic steps of image processing, elements of image processing system - image acquisition, storage, processing, communication, display.

UNIT-IV

Fundamental concepts of digital image processing - introduction, objectives, visual perception - structure of human eye, image formation in the eye, brightness adaptation and discrimination.

Recommended Books:

Computer graphics principles & practice 2nd edition - **Van Dam, Foley, Fiener Hughes**.
Principle of Interactive Computer Graphics 2nd edition - **William N. Newman, Robert S.Sproull**.
Computer graphics - **Hearn & Backer**.
Procedural elements for computer graphics - **David F. Rogers**.Digital imaging techniques (Block I)
Digital Imaging techniques (Block II)
Digital image processing - **Gonzalez, Woods, Chanda**,
Digital image processing and analysis –**Majumdar**
Digital image processing and computing- **Schalkoff**

303

THEORY OF PRINTING MACHINES

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.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-1

Fluctuating loads and stress concentration, reduction of stress concentration effect. Fluctuating stress, endurance limit, noten sensitivity.

Cams and Followers:

Types of cams and followers, analysis of motion, determination of cam profiles, followers for cams with specified contours

UNIT-II

Kinematics linkages and levers:

Classification of linkage systems, study of typical kinematics systems used in machines.

UNIT-III

Gears:

Spur and helical gears, Terminology, types, selection criteria, tooth form, strength of teeth, minimum number of teeth, formative number of teeth, applications. Worm and bevel gears: Terminology, strength, applications. Rack and Pinion, Ratchet and Pawl arrangements, gear trains, applications. Metrology of cams, gear, screw thread, their measurement methods. Synthesis of mechanisms, Geneva mechanism, intermittent mechanism.

UNIT-IV

Power Transmission Devices.. **Machine drawings:**

Drawing of complete drive for printing machine. Specification for fits, tolerances and materials. Miscellaneous drawings of spur, helical and bevel gears etc.

Introduction to Computer Aided Design.

Recommended Books :

(1) Thomas Bearn, The theory of Machine CBS Publisher and Distributors Delhi.

(2) Anthony Esposito and J. Rober Thrower Machine Design II edition

(3) Joseph E. Shigley, John Vickev Theory of Machine & Mechanisms McGraw Hill International Boom company.

(4) Khurmi, Gupta; Theory of Machine S. Chand Publisher New Delhi.

304

DIGITAL ELECTRONICS

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

Introduction to digital electronics in the field of printing.

Logic Gates and Boolean Algebra:

Boolean constant and variable, OR, AND, NOT, NAND, and NOR gates, truth tables, Boolean expressions, Boolean algebra. De Morgan's theorems.Realisation of Boolean expressions using universal gates.

Combinational Logic Circuits:

Simplification of Boolean expression and realization using logic gates, sum of products and product of sums, Karnaugh map & variable, minimization of Boolean expressions using Karnaugh map, don't care conditions, variable entered mapping, minimization using variable entered maps.

UNIT-II

Numbering Systems & Binary Arithmetic:

Introduction. Symbolic number systems, Positional number system, Integer Binary numbers - Binary digital computers, Binary number system, Conversions between decimal and binary numbers, Hexadecimal numbers, Conversion between Hexadecimal, Binary & Decimal numbers. Fractional binary numbers - Converting binary fractions to decimal,Converting Hexadecimal

fractions to decimal, Converting decimal fractions to Binary and Hexadecimal. Number System Notation.Binary Addition and

Subtraction - Signed binary numbers,Complementary numbers, Two's complement mathematics. Binary multiplication &

division. Binary codes - Character codes, Numeric codes, other binary codes, Error correction & detection codes.

UNIT-III

Arithmatic & Data Processing Circuits:

EXOR and EXNOR gates, half adder, full adder, full subtractor, adder-subtractor, look ahead and carry.Multiplexers, demultiplexers, decoders, BCD to decimal decoder, seven segment decoder, encoders, decimal to BCD encoder,

parity generators and checkers.

Flip-Flops & Sequential Logic Circuits:

NAND gate latch, NOR gate latch, SR flip-flop, D flip-flop, JK flip-flop and T flip-flop, clocked flipflops, edge-triggered flip-flops,

flip-flop conversions.Comparision between combinational and sequential logic circuits, shift registers, SISO,SIPO, PISO and PIPO shift registers,

ring counter, Jhonson counter.

UNIT-IV

Counters, D/A and A/D Converters:

Ripple counters, up counter, down counter, up-down counter, synchronous counters, mod number, mod-3, mod-5 and mod-10 counters, shift counters.

Variable-Resistor network, binary ladder, D/A converter. D/A accuracy and resolution, A/D converters- simultaneous conversion,

counter method, continuous conversion, successive approximation method, single slope and dual slope A/D converters. Digital Camera and Digital Scanner.

Recommended Books :

1. Digital Electronics – Malvino.

2. Digital Electronics – Gothman.

3. Digital Principles and Applications - Donald P Leach, Albert Paul Malvino.

4. Digital Systems-Principles and Applications - Ronald J.Tocci.

5. Digital Fundamentals - Floyd.

6. An Engineering approach to digital design - Fletcher.

305
Reproduction Technology

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT – I

1. Basic principles of reproduction photography: line photography; Basic density range of line original Basic line exposure for computerized camera with on-line or off-line densitometer, equipments and accessories.

2. Difficult line originals – Line originals with color; line originals with fine lines screen; line originals with fluorescence effect.

3. Contact photography – Spreads and chokes, Line separation from black and white art work, Evaluation of line negative.

UNIT – II

4. Halftone photography – Introduction to the concepts, Theories of dot formation, Selection of screen ruling, Introduction to different halftone screens glass screen (brief study), contact screens – Grey and magenta Contact screen manufacture, Density gradient of contact screens, Negative, Positive, standard or universal contact screen. Pre-screened emulsion.

5. Half tone exposure: Special features of half tone exposure. Factors affecting the halftone exposure. Basic halftone exposure setting on ordinary and computerized camera with off-line and on-line densitometer.

Unit-III

6. Contrast control: Contrast with glass screen: S.D. variation, multiple stop system (brief study) Contrast control with contact screens Determining B.D.R. and main exposure of the contact screen, Highlight compensation, Use of CC filters with magenta contact screen determining CC filters and exposure calculations.

7. Auxiliary or supplementary exposures: Contrast control with supplementary exposures. Flash exposure-Deciding the basic flash exposure, for contact screens Exposure calculations. No screen exposure-calculations.

8. Line and halftone combination, Evaluation of halftone negative.

Unit-IV

9. Color Reproduction: Definition and concepts Introduction to Corpuscular and Wave nature of light. The visual spectrum Additive Synthesis and subtractive synthesis Additive and subtractive combination for graphic for reproduction and practical interpretation of color-theories.
10. Mechanism of vision and theory of color-vision, colorimetric Properties, Color and appearance measurement. Introduction to Colorimeter and Spectrometer.

Recommended Books:

Line photography- Karl Davis Robinson

Halftone Photography – Erwin Jaffe

Small Offset Preparation & Process- Les Crawhurst

Printing Technology- Adams, Faux, Rieber.

Reproduction Systems- V.S. Raman

Digital Photography- Anthony Hamber, Phill Green.

306

SHEET FED OFFSET TECHNOLOGY-I

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit – I

Basic principles in planographic printing:

History of offset process - Principle, advantages, limitations .Types and their uses. Press configurations. Various Required and auxiliary elements.

Unit - II

Infeed unit –
pile table, pile height, air blast nozzles, forwarding pickup sucker, rear pickup suckers, seperator brushes & fingers. Types of feed board sheet control devices-conveyor assemblies, conveyor tape, hold down rods. Sheet separation system-friction, pneumatic. Forwarding system-successing sheet feeder, stream feeder. Front lay, Side lay - push type lays, pull type lays. Side lay settings. Sheet detectors - mechanical types, electromechanical types, photo electric types. No sheet detectors- early or fast detectors. Double sheet detectors.

Unit - III

Inking system:

Introduction. Theory of ink-film flow. Dwell timer, ink duct. Ink feed roller. Oscillating roller. Drive rollers. Intermediate & plate inking rollers. Drum type inking system. Multi roller type inking system. Roller setting-Setting form roller to oscillator, setting form roller to plate, setting the duct roller. Roller covering. Roller maintenance-roller removal,replacement, roller storage, roller hardness. Ink agita

Unit - IV

Dampening system:

Introduction. Fountain roller. Dampening feed roller. Scavenger roller. Dampening solution composition, Iso propanol alcohol - substitute of alcohol. pH of dampening solution. Conductivity of dampening system. Damper setting. Brush system for metering. Air knife system for metering. Conventional dampening system - metering dampening on conventional dampening system. Continuous flow dampening system- plate feed-epic litho dampener plate feed continuous flow damp. systems. Dahlgren inker feed dampening system. Roller covers - molleton fabric cover, stockinette cover, paper damper cover, synthetic damper cover. Damper cleaning machine.

Recommended Books :-

Manual For Lithographic Press Operation - **A. S. Porter**
Modern Lithography Introduction to Printing Technology - **Hugh M Speirs**.
Sheetfed Press Operation-**GATF**.
Offset Technology – **C.S.Mishra**.
Lithographers Manual Lithographic Technology - **Erwin A Dennis, Olusegun Odesina**.

311

TYPOGRAPHY & TYPESETTING LAB.

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Block Lettering & Numbering (Normal Types).
2. Italics Types (75 Degree Angle) Lettering & Numbering.
3. Four-line Principle (Drawing).
4. Physical (Features) parts of the type (Structural Diagram).
5. Fundamental strokes.
6. Finishing strokes & their identification.
7. Introduction to various fonts & their drawing characteristics.
8. Newspaper/Magazine clippings of different point sizes.
   (Paste them on Practical Note-book & draw the same).
9. Draw different cases, faces, series & families etc.
10. Draw types with different X - heights, contrasts, serifs, Beak & Terminals.
11. Study of Type case, Composing stick and various materials and equipments used in composing room.
12. Composing exercises.

312

COMPUTER GRAPHICS LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Introduction to computer graphics, scope and limitations.
2. Coreldraw, different facilities available, working in coreldraw environment.
3. Introduction to illustrator-simple lines, stylish lines, drawing and filling of images, gradation tools, blenders pattern with a difference, filling rectangular and non rectangular shapes of pallets and colour, system matrices, justifying text and application of path finders.
4. Introduction to photoshop-how you can differentiate it from illustrator, different types of the formats, their compatability to different software, introduction of tool box, uses of different filters, masking and working on images, creating a presentation using software.
5. Quark express : Pagemake up, formating and editing in the software.
6. Flash : Introduction of 2-D animations, study of tool box, menu bar, how you can use them in your industry, how you can create different effects like moving on selected path, masking of images etc.

313

Reproduction Technology- LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Setting of camera.
2. Line negative and positive preparation
3. Halftone negative and positive prepartion
4. Bromide positive preparations.
5. Exposing difficult line originals, Use of filters
6. Finding B.D.R. and main exposure time of contact screen .
7. S.D. calculations and S.D. setting and contrast control wioth glass screen
8. Study of densitometer .

314

SHEET FED OFFSET TECHNOLOGY – I LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Study of various controls and operations.
2. Study of the various mechanisms.
3. Study of the lubrication system.
4. Setting the feeder, feed board, lays and delivery.
5. Setting the water and ink rollers and fixing the plate.
6. Single colour printing.
7. Identification of printing faults in the given samples-reasons and remedical actions.
8. Mixing of process inks to the shade for a given colour patch-effect of paper and ink film thickness.

SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)
IV Semester

Course No.	Course Title	Internal Assessment	Exam. Schedule		Total Marks
			Theory	Practical.	
401	FUNDAMENTAL OF PACKAGING	25	75		100
402	PRINTER SCIENCE	25	75		100
403	SHEET FED OFFSET TECHNOLOGY II	25	75		100
404	MANUFACTURING PROCESS	25	75		100
405	ELECTRICAL SYSTEMS IN PRINTING MACHINES	25	75		100
406	SOCIAL SCIENCE	25	75		100
	Lab				
411	FUNDAMENTAL OF PACKAGING	25		50	75
412	SHEET FED OFFSET TECHNOLOGY II LAB	25		50	75
413	MANUFACTURING PROCESS	25		50	75
414	ELECTRICAL SYSTEMS IN PRINTING MACHINES LAB	25		50	75
440	INDUSTRIAL VISITS/ EXHIBITION	Students to submit reports, to be evaluated by Chairperson or a teacher nominated by him.			50

	TOTAL				**950**

401
FUNDAMENTAL 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.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit - I

Basics of Packaging:

Introduction, Function of a package, Factors influencing design of a package, Computer Aided Package Design, Packaging Cycle, Product Package Relationship, Product life curve, Elements of Package Design. Classification of Packaging - Flexible package type, Rigid package types. Hazards on package - Mechanical, Climatic, Biological and other hazards. Markings on package - Handling marks, routing marks, information marks. Tests on Package- Mechanical test - Drop test, Vibration test, Compression test, Inclined impact test, Rolling test, Climatic tests - Rain test, Sand and dust test, Salt spray test, Fungus resistance test. Shelf life, Cushioning Materials - Functions, properties. Classifications - space fillers, resilient cushioning materials, non resilient cushioning materials.

Unit - II

Packaging Media:

Effect of moisture on wood, preservation of wood, advantages. Boards-types, paper-types. Glass properties, advantages, types, basic approaches to designing a bottle, thermal shock test, pressure test, impact test, density test. Plastics-BOPP, HDPE, LDPE, LLDPE, PVC, PP, PET, Polyolefins, Celluosics, Polymides, advantages, functions & applications. Tests on plastics, Metals - functions, uses. Aluminium foils - Manufacturing of foil, properties, applications, methods of laminating foil to film or paper.

Unit - III

Carton Production & Innovative Packaging Techniques/Processes:
:

Carton styles. Folding cartons - Production steps, types. Corrugated containers - classifications, components in a corrugated board, flutes, stages in preparation in corrugated boards. Plastic corrugated boards - features & advantages.

Gas packaging - MAP & CAP, Vacuum packaging, shrink packaging, stretch wrapping, blister packaging, skin packaging, strip packaging, Aerosol packaging container, working principle. Injection Blow Moulding, Extrusion blow Moulding, Extrusion. Injection Molding, Compression molding, Thermo forming. Vacuum forming, Pressure forming, Matched mould forming.

Unit -I V

Future Trends:

Futuristic trends in packaging. Advancements in food packaging. Environmental implications of packaging - recycling, Legal aspects in packaging. Designing-Cans, metal tubes, Plastic tubes. Closures-Screw caps, Snap-on caps, Plug closures, Lids, Threaded closures, Crowns. Adhesive tapes - Fabric tapes, Paper tapes, Film tapes, Foil tapes, Foam tapes, Two faced tapes. Labels - Basic elements of correct labeling, Purpose, Types. Ancillary Materials : Sealing tapes Strapping and strapling lables and labeling, Adhesives and packaging.

Recommended Books:

Packaging design and performance - **Frank Paine**
Advances in plastic packaging technology - **John Briston**.
Packaging design an introduction - **Laszlo Roth**.
Packaging Technology - Volume I - IIP
Packaging Technology - Volume II - IIP
Packaging Technology - Volume III – IIP

402

PRINTER SCIENCE

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.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit -I

Colloids :

Characteristics, Proportion, application in Printing Industry.

Theory of Electrodeposition, Printing equipments, factors affecting nature of Electrodeposit, chromium Plating, Anodising of metal.

Introduction to Organic compounds, Carbon compound, Aromatic compound Diazo compound, Organic Solvents with specific name used in printing Science mainly.

Unit -II

Introduction of Photo chemistry

Humidity - Relative humidity, measurement, control by air conditioning.

Surface charactricts in printing - Surface tension, contact angles, capillary action, interfacial tension, measurement of contact angle, Hydropholric and hydrophillic, surface water and ink interaction.

pH : pH colormetric method of determining pH; method of determining pH, pH of paper, ink, pH application in Printing.

Unit -III

Photometry –

Introduction, solid angle, definitions of luminuous flux, luminuous intensity, illumination power, intensity of illumination of a surface, brightness or luminance of a surface, laws of illumination - inverse square law and lambert's cosine law, types of photometers, photovolteic photometer.

Unit -IV

Optical Instruments –

Photographic cameras, Depth of Focus, Telephoto Lens, Visual Angle, Angular Magnification, Magnifying Glass, Simple Microscope, Reflection, Transmission, Opacity, Denisty, Introduction to Densitometer and its types.

. **Effect of light :** defferent plate and film coatings, adhesives & Ink -films, Light fasteness and print charactristics.

. Introduction and brief study of process cameras,contact printer and safe light and process chemicals.

RECOMMENDED BOOKS :

1. Optics by Brij Lal and Subrahmaniam
2. Optics by Ajay Ghatak
3. Engineering Chemistry by Jain and Jain

403
SHEET FED OFFSET TECHNOLOGY-II

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Time : 3 hours **Max. Marks: 100**
(25+75)

Unit - I

Delivery unit-
spring gripper, pin type gripper, sprung pad gripper - compression spring, tension spring. Plate insertion system - tumbler gripper, rotary gripper. Sheet transfer section - chain transfer, single drum transfer, three drum transfer.skeleton wheels. Transfer drum. Sheet de curler. Sheet guiding device blow downs. Air cushion transfer drum. Slow down mechanisms. Anti set-off spray equipments. Extended deep pile delivery. Continuous delivery. Metered powder supply. Electrostatic system.

Unit - II

Printing unit:

Introduction. Cylinder gears - spur gear, helical gear, bevel gear. Cylinder design. Plate cylinder - cylinder driving, cylinder body, cylinder gap, plate clamping, plate punching, bearer contact cylinder, bearer gap cylinder. Plate mounting. Determining packing requirements, Packing material, problems due to improper packing. Blanket cylinder - Introduction, functions, manufacture, selecting grade of blanket performance requirement. Types of blanket. Blanket squaring. Blanket punching. Mounting the blanket. Recovering from blanket smash. Use of slightly damaged blanket. Care of blanket, blanket cleaning device. Impression cylinder.

Unit - III

Process of printing operation:

Pre make ready, make ready, inspection of press sheets, control of press function during press run - maintaining the inking system, maintaining the dampening system, the feeder, the delivery. Colour sequence in two colour and multicolour operations. Printability & runnability. Wet-on-wet printing. Wet-on-dry printing. Direct imaging presses. Quality control during the press run - Densitometry, colour control bars, press room lighting and standard viewing conditions, plate scanner. Printing unit problems. Proof press - requirements & advantages, progressive proof.

Unit - IV

Requirements and Needs Of Machine Room Conditions:

Machine room temperature ,Relative humidity, Sources of light ,ventilation, Space, and other requirements

Recommended Books :-

Manual For Lithographic Press Operation - **A. S. Porter**
Modern Lithography Introduction to Printing Technology - **Hugh M Speirs**.
Sheetfed Press Operation-**GATF**.
Offset Technology – **C.S.Mishra**.
Lithographers Manual Lithographic Technology - **Erwin A Dennis, Olusegun Odesina**.

MANUFACTURING 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit-I

Introduction: Introduction to Manufacturing Processes and their Classification. Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, First Aid.

Engineering Materials: General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron.

Unit-II

Foundry: Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern Allowances, Risers, Runners, Gates, Moulding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies.

Unit-III

Cold Working (Sheet Metal Work): Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining Advantages and Limitations.

Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing. Plant Layout, Objectives of Layout, Types of Plant Layout and their Advantages.

Unit-IV

Introduction to Machine Tools: Specifications and Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear. Mechanics of Chips Formations, Type of Chips , Use of Coolants in machining.

Welding: Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding; Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing.

Text Books :

1. Workshop Technology Vol. I &II - Hazra & Chaudhary, Asian Book Comp., New Delhi.
2. Process and Materials of Manufacture-Lindberg, R.A. Prentice Hall of India, New Delhi.

3. Principles of Manufacturing Materials and Processes- Campbell, J.S.- McGraw- Hill.

Reference Books:

1. Manufacturing Science-Amitabha Ghosh & Ashok Kumar Malik, - East-West Press.
2. Manufacturing Process and Systems - Ostwald, Munoz , John Wiley.
3. Workshop Technology, Vol. 1, 2 & 3 – Chapman, WAJ, Edward Arnold.
4. **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.

405

ELECTRICAL SYSTEMS IN PRINTING MACHINES

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit-I

D.C. Generator & Motor : Construction ; types, series, shunt, compound E.M.F. equation, Building up of E.M.F. in shunt generator, Significance of residual magnetism, Generation characteristics.

Motor types, Principles of operation, Significance of back e.m.f., Torque equation, Torque-speed characteristics of series, shunt and compound motors, speed control of d.c. motors by armature resistance, Flux control and thyristor control method applications.

. **Single Phase Motors** : Types, single phase induction motor Principlas of operation of induction-motor , Repulsion motor, A.C. series motor, Application.

Measurement of power in Three phase circuit by three wattmeter method, Two Wattmeters method, Single Wattmeter method.

Unit-II

. **Three Phase Induction Motor :** Basic principle of operation, cause of rotating rotor, Slip frequency of rotor current, Relation between torque and rotor power factor, starting Torque for squirrel cage Induction motor, Starting torque for slip ring induction motor, Condition for maximum torque, Effect of rotor resistance on torque, torque-slip characteristics, Different type of starters. Applications of 3 phase induction motor, Circle diagram.

Unit-III

Electrolytic Processes : Introduciton, Electrolyted, ionisation, Definition of various terms used in electrolysis, Faradays' laws of electrolysis, Extraction of metals, Refining of metals, electrodeposition, power supply for electrolytic proceses.

Illumination : Introduction, Nature of light, Units, Luminous efficiency glare, Production of light : Light production by excitation, Ionistion, Incandescence.

Distribution and control of light : Reflection, Refraction, Diffusion, Applications of directional controlled lighting, Production of coloured light, subtractive coloured light, Production with the discharge lamps, coloured reflectors, Lighting calculations : Plane angel, solid angle, solid angle in terms of plane angle.

Unit-IV

.Electric Welding & heating : Principle, Resistance welding, Arc welding, Atuomatic hydrogen, A.C. & D.C. welding, welding transformer.

Introduction, Resistance heating, Direct resistance.

Consideration and selection of electric motor for different industrial drives.

Recommended Books :-

Elements of Electrical Engg. By B.L. Theraja, Vol. I, II

Industrial Training (PT-410)

Studentrs will undergo for 4 weeks Industrial Training after exams in summer vacation

406

Social Science

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Sociology

UNIT-I

Concept, definitions and importance of sociology
Group-Community-Institution-organisation-Society-Humanity-Biosphere and their unity and inter-dependence
Concept of socialization

Psychology

UNIT-II

Concept, definitions and importance of psychology
Relation of psychology with other social sciences
Psychology of social groups
Process of human behavior

Political Science

UNIT-III

Concept, definitions and importance of Political Science
Concepts of power and authority Concepts of: Nation, state, government

Economics

UNIT-IV

Concept, definitions and importance of Economics
Introduction to Indian Economy
Market, Principles of demand and supply
Consumer behavior

411

FUNDAMENTALS OF PACKAGING (LAB)

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Designing and preparation of various flexible packages.
2. Designing and preparation of various rigid packages.
3. Preparation of Jigged die & unit die for a package design.
4. Study and operation of various packaging machines.
5. Manufacturing of various types of corrugated boards.
6. Cutting, creasing and building up corrugated boxes.
7. Designing & preparation of various designs of paper bags.
8. Testing of raw materials like wood, paper, plastic.
9. Test conducted on Cartons, Corrugated packages, wooden packages.
10. Drop test,Vibration test,Inclined impact test, Compression test.

412

SHEET FED OFFSET TECHNOLOGY-II (LAB)

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Two colour printing.
2. Four colour printing.
3. Effect of ink and water on the print quality-use of densitometer.
4. Effect of impression pressure on print quality-use of feeder gauge.
5. Effect on colour sequence on print quality-transparency and opacity of inks.
6. Ink trapping and back trapping- effect of tack, printing speed, ink film thickness.
7. Printing a second colour on a printed sheet problems involved and overcoming them, adjustment of lays, change of packing etc.

413
MANUFATURING PROCESS (LAB)

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.

2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)

3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.

4. To study different types of fitting tools and marking tools used in fitting practice.

5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.

6. To prepare joints for welding suitable fo r butt welding and lap welding.

7. To perform pipe welding.

8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.

9. To prepare simple engineering components/ shapes by forging.

10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.

11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.

12. To prepare a job involving side and face milling on a milling machine.

414

ELECTRICAL SYSTEMS IN PRINTING MACHINES- LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. To study constructional parts of DC Machines.
2. To study magnetization characteristics of DC Generator.
3. To study speed control of DC motor by armature control method and field control method.
4. To measure three phase power by two watt meter method.
5. To study constructional parts of three phase induction motor.
6. To study torque –slip characteristics of three phase induction motor.
7. To study various types electric welding.

440

INDUSTRIAL VISISTS/EXHIBITION

Max. Marks: 50

SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)

Vth Semester

Course No.	Course Title	Internal Assessment	Exam. Schedule		Total Marks
			Theory	Practical	
501	PRINTING AND PACKAGING MATERIALS	25	75		100
502	PRE-PRESS TECHNOLOGY	25	75		100
503	WEB OFFSET TECHNOLOGY	25	75		100
504	FLEXOGRAPHY TECHNOLOGY	25	75		100
505	PRINTING IMAGE GENERATION	25	75		100
506	DESIGN & PLANNING FOR PRINT & PACKAGING	25	75		100
	LAB				
511	PRE-PRESS TECHNOLOGY	25		50	75
512	WEB OFFSET TECHNOLOGY	25		50	75
513	FLEXOGRAPHY TECHNOLOGY	25		50	75
514	PRINTING IMAGE GENERATION	25		50	75

	TOTAL				**900**

501

PRINTING & PACKAGING MATERIALS

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit - I

Metals

Type of metals and characteristics of metals used for type alloys for foundry types, hot metal composition and stereos Physical and chemical properties of aluminium, 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. Devlopers, Reducers, Intensifiers.

Unit - II

Light Sensitive Materails

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

Book binding materials Different types of rubber used in printing. Use of leather, cloth, rexine, threads, tapes, stitching wire, metal foils and covering materials used for binding and print finishing.

Unit - IV

Materials Handling

A brief Survey of materials handling and storage, Handling and storage of paper, printing surfaces, films, chemicals and other printing materials. Systems and methods of storage. Precautions in handling, storage, use and care of various printing substrates, materials and chemicals. wastage reduction. Receiving, storage and delivery of raw, semi finished and finished products.

Recommended Books :- Printing Surface Praperation by C. S. Mishra

502

PRE-PRESS 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit - I

Introduction to colour

Basic colour theory, additive and substractive colours, process colours, application of the colour theory to colour reproduction. Overview of colour reproduction from original to printing.

Choosing a Transparency for Reproduction

Exposure level, colour balance, memory colours; grainers, contrast; highlight retouched original transparency, evaluation the transparency.

Unit - II

Colour Reproduction

Essential requirements of cameras, lens, illuminations filters and half tone screen for colour reproduction work Tone and colour controls Gray scale and colour control patches the ink/paper/colour interaction Measurement and control of colour printing Using the densitometers.

Colour Separating methods

Basic principles of colour separation Direct separation method and Indirect colour separation method, procedure followed for each method Methods and procedures followed for making the black printer negative for the indirect method, for making continuous tone positives and the making of final screened negatives and positives establishing a colour reprodcution procedure.

Unit - III

Colour correction

Objectives of colour correction ; Hand correction, Purposes and procedure followed; retouching techniques; correcting colours, tones and shades given inks and paper. Dot etching, purposes and procedure, flat ethcing, staging and etching, local reduction, blending; Masking; purposes of masking types of maskings; their clarification and uses; Electronic colour seperation and correction.

Unit - IV

Colour proofing

Press proofing methods and various pre-press proofing systems; uses and limitations of prepress sheet Interpreting pre press proofs and predicting, press resutls Control devices for proofing systems.

Planning for color work

Introduction & Working of image capturing techiques of Drum, Flat Bed Scanners & Image Setters.

Recommended Books :-

1. Dr. R.W.G. Hont :- The reproduction of colour. Fountain Press, 4th edition.
2. Miles Southworth & Donna Southworth :- Colour Reproduction. Graphic Arts Publishing, 3.1 edition.
3. Gary G. Field :- Tone & Colour correction (GATF).

503

WEB 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.

(25+75)

Time : 3 hours **Max. Marks: 100**

Unit - I

Development and growth of web offset presses

Full size and mini web presses ; four basic types of web offset presses Presses specially used for newspaper and magazine production in single and multicolour Factors to be considered for selecting the press.

Components of web offset press

Infeed, tension control Pre-conditioners, drier and chill rolls, folders, sheeters and winders, Adjustment, operation and maintenance of the major components.

Inking systems and dampening systems for web offset

Conventional and non-conventional dampening systems, UV inks and setting systems Causes and correction of ink-related problems Properties and requirements of heat set inks.

Unit - II

Web Control

Roll stands and automatic pasters, Detection of web breaks and control of tension, Web Flutter, casues and correction of misregister Control of fan out, Sidelay, cut-off, web-to-web and ribbon control.

. Auxiliary equipment

Various types of in-built and optional equipment availability for web-offset and their uses; -Remote control console, Plate scanners, scanning densitometer, closed-loop system, web preconditioners, sheet cleaners, ink agitators, water coded ink oscillators, fountain solution recirculation systems, fountain solution mixers, refrigerating fountain solution, automatic blanket washers, side lay sensors, web break defectors, remoisturizers-liquid applicator system, roller applicators systems, antistatic devices, Imprinters, Perfectors, cutoff controls, straboscope, synchroscope, counters-Denex laser counter, stobb counter.

Web-paper ,Plate and blankets

Properties and requirements of paper used for web offset Printability, Care and handling of rolls. Various types used for web-offset their characteristics, merits and demerits for specific work, Cylinder pressures and Printing Make-ready.

Unit - III

Dry Offset

Dry-offset; adventages and disadvantages Comparative study of dry offset, letterset and lithographic offset processes, difference between dry offset and letterset machines and inks job suitability.

Description of the process, Method of producing image and non-image areas Importance of the correct formulation of waterless lithographic inks.

Unit - IV

. Introduction to types of drives used in web offset machines

. **Brief introduction to control pannels of the web offset machines.**

Folders

Introduction, folding principles, parts of folder, combination folder, ribbon folder, double-former folder, the me-chanics of folding process of jaw fold, chopper fold mechanism. Operation of collect cylinder, press folders, double former prefolder, flow folders, insert folders.

Recommended Books :

Web offset press operating- **David B. Crouse**Offset M/c II - **C. S. Mishra**Manual for Lithography Press Operation - **A. S. Porter**

504

FLEXOGRAPHY 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit - I

Introduction to Flexography:
Definition. flexographic printing, flexographic market, flexographic products, growth potential, Advantages of flexography, Press development. Mechanical principles of flexography - Fountain roll, Anilox roll, plate cylinder, impression cylinder.

Flexographic printing plates:
Introduction. Plates for printingRubber plates , its kinds and methodes of preperation, Photopolymer plates its kinds and methodes of preperation,care handeling and storage of flexographic plates.

Unit - II

The Printing press:
Flexo press types - Stack press, Central impression cylinder press, Inline press, Tension control in flexographic m/c, Unwind equipments - general, single-position unwind - flying-splice unwind, unwind tension systems, cooling drum a out feed unit. Rewind equipments - surface winders, center winders, rewind tension systems. Web guides. Printing stations - two roll, anilox roll, reverse angle doctor blade system, Deck control, Continuous inking, side and circumferential register control, Dryers. Mechanical components - CI drum, plate cylinders. Anilox roll - construction, cell structure, anilox roll wear, selecting the night anilox roll, chrome plating. Fountain rolls - formulating rubber for rolls, Flexo roller covering, Care of covered rolls.

Unit - III

Mounting and Proofing:
Introduction. Checking the equipment. Operation care of equipment. Understanding the mounting instructions. Mounting and proofing a complete line job - proofing the first set of plates, proofing for printability, methods of prepress makeready, wrapping mounted cylinders. Miscellaneous procedures - removing plates from the cylinder, mounting metal-backed plates, reusing sticky back, plate staggering, use of release agents. Tools for the operator. Basic requirements for process colour printing. Press room practices. Environment and safety concerns.

Flexo graphy and Barcoding:
Barcode structures. Types. Verifying/Analyzing printed barcodes. UPC and flexographic printing. UDC film masters and printing capability tests. The shipping container symbol (SCS). SCS shipping contain Barcode printing.

Unit - IV

Beyond the Horizon- Tomorrows Flexography:

Flexo graphic substrates. Narrow web presses-Narrow web press components, Future narrow web flexography. Wide web presses. Corrugated presses. Pre printed liner presses. Future of Ink distribution system. Tomorrows flexographic plates. News print for water-base flexography. Markets for today and tomorrow.

Recommended Books :

Flexography principles and practices - Foundation of flexographic technical association.

505

PRINTING IMAGE GENERATION

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit - I

Assembly of film images:

Facilities. Equipments and tools required. Materials and supplies. Photographic film-camera film, contact film, room light handling films, duplicating films. Proofing materials - diazo papers, polymer papers, brown print paper, diffusion transfer material, Stripping supplies - screen tints, pressure sensitive tapes, adhesives opaques, cleaning solutions, starch filler, register tabs button & pins. Register masks, GATF image contact masks. Basic steps in planning a film image assembly Film assembly for single color printing. Assembly for film multiple color printing. Assembly for multiple imaging of plates and film.

Unit - II

Planographic plates:

Introduction. Light sensitive coating -dicromated colloids, diazo compounds, photo polymers, diffusion and transfer methods, electrostatic. Sensitivity of coating to light. Dye-sensitized photo polymerization, dark reaction, post exposure, safe lights, reciprocity law. Action of light sources on coatings, stabilities of coatings. Plate materials - zinc, aluminum, brass, copper, steel, chromium. Action of oil and water on metal - contact angle. Ability to withstand cracking. Susceptibility to dot sharpening. The plate base - cross section of an aluminum plate, cross section of an a plastic plate. Graining of plates - mechanical graining, electrochemical graining. Anodized aluminum, plate washes. Paper plates, paper aluminum laminates, plastic plates. Light sources for plate making - spectral data for various light sources, metal halide, mercury lamps, pulsed - xenon, laser. Treatment of nonimage areas - desensitizing gum,chemistry of gum arabic, other natural & synthetic gums. General processing sequence fo a negative working plate. General processing sequence for a positive working plates. Negative working plates- additive presensitized plates, subtractive diazo PS plates, photo polymer presensitized plates, aqueous developable plates, driographic plates, multimetal plates. Producing a multimetal plate. Types- bimetalic, trimetalic. Projection-speed negative plates. Positive working lithographic plates- Presensitized plates, Electrostatic plates. Baking of positive plate Process of making deep etch plate - counter etching, exposing, developing, deep etching, cleaning the image areas, stopping out unwanted areas, copperizing the image areas on aluminum plate, applying non blinding lacquer applying deep etch developing ink, remaining the gum stencil, desensitizing, gumming up, putting the plate under asphaltum, removing and adding work. Health and safety in deep-etch plate making.

1. Driography- Outline, system, structure, processing and use, precautions.
2. Toray waterless plates – outline, structure, processing and use, advantages and disadvantages.
3. Role of photopolymer in Image formation – Raised and Recessed.
4. Diffusion processes – Reflex and Projection plates.

5. Electro photography – Introduction, process, toner transfer theory, Equipment.
6. Water soluble photosensitive resin plates – introduction, characteristics, structure, processing, image reproductivity.
7. Laser plate making – introduction, system outline, system performance, implifications.
8. Computer-to-plate :– Thermal plate, Polyester plate.
9. Surface preparation for screen

Unit - III

Image carriers for flexography:

Introduction. Thickness of flexo graphic plates. Photopolymer flexographic plates Advantages of photo polymer plates. Disadvantages of photo polymer plates. Solid photo polymer plates. Photo initiators and photo sensitizers. Washout solvents. Liquid photo polymer plates. Base material for photo polymer plates. Rubber flexo plates, photo engravings, duplicate plates. Rubber plate making process – Advantages of rubber plates, disadvantage of rubber plates. Photo polymer plate making process sheet photo polymer plate making, liquid photo polymer plate making. Letter press plates – Introduction, photo polymer letterpress plates.

Unit - IV

Gravure image carrier:

Methods of cylinder preparation – diffusion etch, direct transfer, electromechanical process, laser cutting, Well formation- lateral hard dot wells, direct contact wells, conventional gravure wells. Cylinder design – part of gravure cylinder, forms of gravure cylinder- integral shaft, mandrel. Copper plating and polishing. Reuse of cylinders. Ballard shell cylinders. Cylinder layout and film assembly. Carbon printing – Tissue lay down and development, staging and etching. Cylinder proofing – soft copy proofs, single sheet proofing system, direct digital proof, Diazo chrome proofs, overlay proofs. Chemical engraving methods- advantages, disadantages.

Digital Image Carriers:

Image generation of a Digital Offset Machine. Basics of other digital image carriers.

1. Auto plate processor.
2. Troubleshooting for plates.
3. Quality control aids for plate making.

Recommended Books:-

Heidelberg DI Press- Manual

Chemistry for Graphic Arts - **Dr. Nelson R. Eldred**.

Offset Plate Making - **Robert F. Reed**.

Printing Technology 3rd Edition. - **Adams, Fax & Rieber**.

Screen Process Printing - **John Stephens**.

Sheetfed Offset Press Operating - **Lloyd P. Dejidas**.

Flexography Premier - **Donna C. Mulvihill**.

Stripping - **Harold L. Peck**.

Gravure Process And Technology –GAA.

Selecting The Right Litho Plate - BPIF.

A. L. Gatehouse; Manual for film planning and plate making; roper – GATF Publication, 1983 edition.

Lithographers manual – GATF seventh edition.
Paul J.Hartsuch Chemistry for the Graphic Arts, GATF, 1983 edition.
Lan Faux, Modern lithography, MacDonald & Evans Publication, 1973. Edition.
W.R. Durrant Printing – A guide to systems and their uses, Heinemann Professional Publishing, 1989 edition.
D.C. Mulvihill Flexo Primer, GATF & Foundation of FTA 1985 editon.

506

DESIGN AND PLANNING FOR PRINT & 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit - I

Introduction:

Importance of a good design. Impact of a design on various target audience. Relationship between design and sale of a product. Graphic designer and his role. Elements and Principles of design.

Basic design and letter forms:

Visual ingredients of graphic design, point, line, graphic space, shape, texture, color, scale, balance and contrast. Use of computers in designing. Introduction to some designing softwares. Suitability of a design for printing technique and paper surface. Legibility and readability, Monograms and trademarks.

Unit - II

Images in design:

The relationship between type, illustration and Photography. Types of images. Selection and assessment of originals, photographs, sketches, paintings. Factors to be considered for preparation of a design.

Design management:

Relationship of a design studio with production and sales departments of a press. Control and checking of artwork at all stages, employment of free-lance artists, designers and photographers.The advertising agency, its structure and its services.

Unit - III

Design process:

Methods of preparing a design in various stages. Design for books, magazines, newspapers, catalogues, cartons and commercial stationery. Materials and tools used in preparing layouts and artwork. Copy preparation. Casting-off and marking-up.

Unit - IV

Production planning:

Selection and co-ordination of production processes. Consideration of composition methods. Limitations of binding, finishing and ancillary processes affecting design. Selection and specification of ink, paper and other materials in relation to design specifications and to the production process.

Reference Books :

Fundamentals of Copy & Layout - **A. C. Book(Ac) Sohick(Cd)**
Production for the Graphic Designer. – **Craig**.
How to brief designs & buy print. - **Muray(Ray)**.
Lithographic Press Work. - **A. S. Porter**.
Principle of CAD.- **Rooney J. & Steadman P.**
Advertisement Management. - **David A. Akar & John G. Myers**.
Elements of Cartography. - **Arthur Robinson, Randall Sale & J. K. Morrison**.
Analysis of Electronic Circuit - **Jal Baker**.
Copy Preparation. - **Leon O Chus & Pen Min Lin C. A.**

511

PRE PRESS TECHNOLOGY- LAB

Max. Marks: 75

LIST OF EXPERIMENTS
(25+50)

1. Making of Half tone negative using process camera.
2. making of own colour control patches.
3. Gray Scale (Drawing).
4. Drawings spectrophotometric curve by using spectro densitometre.
5. How to make colour separtion negative of a four coloured original by using Electronic colour seperation system.

(Scanning).

6. Working of Image Setter and obtaining output on Image Setter.
7. colour Correction by using photography masking.
8. Six Colour Wheel.
9. Planning for four Colour Newspapers designs.
10. Software for colour seperation photoshop, coreldraw, quark express.
11. Preparation of originals for separation - reflection type and transparency.
12. Demonstration of various masking methods using reflection copy, by OHP/ Slides, video etc.
13. Exposing tonal correction mask, making UCR mask/GCR mask etc.
14. Comparison of camera separation and scanned separation.
15. Cut out and mixing jobs.
16. Use of different Quality Control Aids. New developments in Electronic Imposition & DTP etc.

512

WEB OFFSET TECHNOLOGY- LAB

Max. Marks: 75

1. Premake ready operations.
(25+50)
2. Make ready operations.
3. Multicolour job printing.
4. Trouble shooting during printing.
5. Study of electronic panel.
6. Blanket and plate cylinder setting.
7. Damping roller setting.
8. Inking roller setting.
9. Study of Web-breaks.
10. Operations of Folding machine.

513

FLEXOGRAPHY TECHNOLOGY - LAB

Max. Marks: 75

LIST OF EXPERIMENTS
(25+50)

1. Introduction and familiarizing flexo machine and other related elements.
2. Preparation of rubber plates.
3. Preparation of i.liquid photo polymer plates, ii.sheet photo polymer plates.
4. Registering and plate mounting on flexo plate cylinder.
5. Make ready procedures a flexo machine.
6. Printing i.single color, ii.two color, iii.four color.
7. Studying of 6 color and 8 color flexomachines.

514

PRINTING IMAGE GENERATION - LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Comparitive study of various materials and equipments used in Image Generation Department.
2. Preparation of pre-sensitized plate,
3. Preparation of letter set plates.
4. Layout preparation:
5. Study of gripper margin and registration processes,
6. Positioning of images for plate making,
7. Masking techniques.
8. Page makeup -folders, pamplets, journals/magazines, newspaper, book work.
9. Layout preparation - Single page layout, 2 page layout, 4 page layout, 8 page layout, 16 page layout, 32 page layout, 64 page layout for work & turn, work & tumble, work & twist.
1. Drawing layout for different jobs.
2. Assembling negatives for single colour jobs and two colour jobs.
3. Assembling positives for single colour and two colour jobs.
4. Assembling positives for four colour jobs.
5. Preparing wipe-on plates.
6. Preparing albumin plates.
7. Preparing deep-etch plates.
8. Preparing pre-sensitized plates.

B. Tech. (Printing, Graphic & Packaging)
VI Semester

Course No.	Course Title	Internal Assessment	Exam. Marks		Total Marks
			Theory	Practical	
601	PRINTING SUBSTRATE	25	75		100
602	SECURITY AND STATIONARY PRINTING.	25	75		100
603	ENVIRONMENTAL STUDIES	25	75		100
604	ADVERTISING	25	75		100
605	ELECTRONIC COMPOSITION	25	75		100
606	COSTING & ESTMATING	25	75		100
	LAB				
611	PRINTING SUBSTRATE LAB	25		50	75
612	ELECTRONIC COMPOSITION	25		50	75
613	SECURITY AND STATIONARY PRINTING	25		50	75
614	SECURITY AND STATIONARY PRINTING.	25		50	75
660	INDUSTRIAL VISITS/ EXHIBITION	Students to submit reports, to be evaluated by Chairperson or a teacher nominated by him.			50
	TOTAL				950

601

PRINTING SUBSTRATE

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

Unit - I

Paper:

Introduction, Paper fibers & pulps paper performance, strengths and durability, absorbency, dimensional stability. Fiber structure- cellulose, hemi celluloses and lignin, Paper manufacture - Stage1 - pulp preparation, mechanical pulp, refiner mechanical pulp, thermo mechanical pulp, chemical processes-sulfate or Kraft process, sulfite process, combined chemical & mechanical process. Bleaching: Stage 2- stock preparation, non fibrous additives, fillers or loading. Stage 3- refining the pulp, pulp freeness, refiners, pulp cleaning. Paper manufacturing process – paper making machine. Wet-end, Head box and slice. Fiber orientation. Angular flow. MD: CD ratio. Wire section. Forming wires. Press and drier sections. Calendaring and Finishing- Hard calendaring, soft nip calendaring, super calendaring, machine glazing, paper coatings. Performance requirements for pigment - coated papers and boards.

Unit - II

Recycled paper:

Introduction. recycling process, fiber preparation- screening, centrifugal cleaning, flotation, washing, deinking plant function, continuous drum pulper, prescreening and cleaning, primary flotation, cleaning, fine screening, thickening, dispersing, brightness control, washing, thickening and storage. Deinking chemistry. Bleaches - Hydrogen peroxide, Oxygen & Ozone bleaching, reductive bleaching agents, chelating agents, sodium silicate, catalase enzyme, agglomerating chemicals, surfactants. Biodegradation of surfactants, dispersants and the principles of washing.

Unit - III

Choosing a suitable paper:

Characteristics of paper. Printing process requirement. Paper varieties for printing. Printing defects associated with paper. Reel defects. Testing methods. Measurement and calculations: Paper sizes. Influence of moisture and RH on paper and boards. Paper storage – Requirement. Methods. Variables affecting paper storage. Print quality achievable on different types of paper. Paper properties and printing problems-Introduction, printability, runnability. Surface and directional properties of paper & board-substance, caliper, bulk, compressibility, surface smoothness/roughness, air permeance, static and dynamic friction. Surface strength and

internal bond strength - picking, fluffing, splitting. Strength properties - stiffness, folding endurance, bursting strength, tear resistance. Optical properties - gloss, brightness, whiteness, yellowness and tint indices, flurescence, opacity.

Unit - IV

Introduction to Non Paper substrates

Surface preparation, plastics-properties. Metalized films - Aluminum foil, Foil laminations. Advantages, limitations. Future in Printing.

602

SECURITY AND STATIONARY PRINTING

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.

Time : 3 hours **Max. Marks: 100 (25+75)**

Unit-I

Introduction:

Trends in the Computer Forms stationery - Demands for the computer forms.

Designing of Computer forms:

Basic designs of various types of forms for input and output - Fan fold forms, Computer letters and Mailers. Computer envelopes, Snap-out-forms, Tags and labels, Computer envelope, MICR cheques etc., Typography - designing of forms with computer based machines etc.,

Paper used for the Production of forms:

Specifications, requirements, storage conditions, etc., Carbon papers - varieties, specifications and manufacturing process.

Unit-II

Manufacture of computer forms:

Different types of Web-Offset Printing Presses. Construction and configuration -on-line operations such as numbering, perforating, sprocket hold punching and Zig-Zag folding etc.,

Finishing Machines for computer forms:

Different types of collators - Roll to Roll -Roll to pack and pack to pack-Programmable outers for continuous web-MICR cheque binding system. Machines used for packing and Despatch.

Unit-III

Principles of stochastic screening:

Spot patterns. Gaininess or noise.Combining AM and FM screening.Screen angles. Spot size. Claimed benefits for FM screening. Absence of rosettes and moiré patterns.Improved rendition of detail. Smoother tonal transition. Photographic smoothness. Improved process colour simulation of spot colours. No restriction on reproducible grey levels. Tone value stability with increased inking. Smaller file size and speedier output through imagesetter. Decreased register sensitivity. Limitations associated with FM screening. Film imaging. Film contacting. Plate making. Photomechanical proofing.High levels of dot gain. Fine screen rulings versus FM screening.

Unit-IV

Practical experiences with offset litho printing:

Platemaking. Exposure and tone transfer.Using FfM and AM screening together.Vacuum contact and Newton's rings. Negative working plates. Proofing.Negative proofing. Printing. Dot gain in printing.Influence of FM screening spot size. Influence of different screening algorithms. Tone value stability when printing. Sensitivity to register shifts. Colour shifts

Recommended Books :

Forms for the 80"s. How to design and produce them - Gar Raines.

Stochastic Screening - Kelvin Tritton.

603

ENVIRONMENTAL STUDIES

Time : 3 hours **Max. Marks: 100**

(25+75)

Note: The Examiners will set eight questionsThe students are required to attempt any five questions. All questions will carry equal marks.

Unit I :

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.

604

ADVERTISING

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.

Time : 3 hours **Max. Marks: 100**

` **(25+75)**

UNIT-I

Advertising

Definition, concept,
Scope and role

UNIT-II

Various form of advertising:

A. *Print,*
B. *Radio,*
C. *Television,*
D. *Internet,*
E. *Outdoor,*
F. *Media mix.*

UNIT-III

Essential for a good advertising:

Visual
A. *Text*
B. *Punch line*
C. *Design*
D. *colors*
E. *spoken word Music*

UNIT-IV

Appeals in Advertising
A. Advertising campaigning and Planning –Introduction
B. Public Relation: Concept ,Definition, Scope and Role, Tool

Recommended Books:-
Business Ethics Concepts & Cases - **Sadhri Sorab**.
Advertising Theory & Practice - **Chunawalla, Kumar, Sethia, Subramanian, Suchak**.
The Concept of Marketing-By Philip Kotler
Advertising and Promotion-By Belch & Belch

605

ELECTRONIC COMPOSITION

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.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

Elements in copy preparation:

Preparing copy for press,Acquisition of Text- Automatic input, human input, keyboards, offline,online, optical character recognition, working principle, factors affecting performance, automaticvoice recognition, desktop scanners, pointing device, mouse, light pen, touch screen. Proofing, different proofs. Proofing stages, proof correction marks, correction of type set matter. Text transferring data - capture device,telecommunications, modems, ISDN. Typesetting commands – code syntax, menu driven systems.General rules of page make up. Composition Software - Automatic Page Make up, Text and graphics Integration, Page display.

UNIT-II

Typesetting methods:

Hot type composition, Cold Type, Photolettering, Photo composing -Introduction, Advantages, Basic principle, image setter, film transport system in autologic information APS 3850, film transport system in DS Katana image setters. Price, Laser type, Processing, environmental issues, other factors. Small, Medium and Large format image setters. Page description languages. Post Script Language – Introduction. PostScript Fundamentals-Structure of PS file, Post Script code, The user space, Encapsulated P.S., Images, Postscript colour processing, The printer driver, P.S.errors, Post script limitations, Adobe acrobat.

UNIT-III

Desk Top Publishing:

Introduction, Origin, components of DTP, applications of DTP. Benefits of DTP. Developments. Output quality, output speed, output & color input, page make up. IBM-PC and DTP. Software for DTP – word processing-heavy duty programmes, medium duty programes, light duty programmes. Graphic programs. Illustration programs, Business Graphics, CAD design programs, Type manupulation software, OCR software, Image software. Presentation graphics. Image editing commandscrop, marquee tools, cloning tool, cut & paste, image filters. Page make up software – approach, typography, document & text handling, applications. Standard program features – Adobe PageMaker, Ventura Publisher, Quark Xpress, Letraset Ready set G, Design studio, Frame maker. Desk Top colour – spot colour v/s full colour. Hardware & software for colour. Peripherals & add ons – front–end peripherals, graphics tablets, scanners for text, line art & images, video digisters, fax adaptors,

music & sound digisters. DTP as a typesetting front end – distributed desktop, DTP solution, systems from traditional suppliers. Linking PC's, Mac and other computers – disk transfer file translation, transfer by cable or modem.

UNIT-IV

Digital Fonts:

Tex, Meta font, True type fonts, Post Script Type 1, Bitmapped fonts, Adobe type manager, The real source cheap type, multiple master, Quick draw GX, Transferring fonts, Font manipulation software, Vector & Bitmap text and Graphic creation, Raster Image Processing, Digital O/P, Creation of type for digital system, Future trends and developments.

Reference Books :

Desk Top Publishing 4th edition – Kirty wilson, Davis, Ron Strutt.
Typesetting-Composition-Geoff, Barlow
Word Processor to Printed Page - Micheal Card
Digital Typography-Donald E.Knuth Introduction to Prepress - High Speirs
Introduction to Printing Technology - Hugh Speirs Composing and Typography Today - Mendiratta.B.D.Hand Book of Typography - Kailas Takle. Guide to DTD-James Cavuoto
Printing Technology - Adams Printing in a Digital World – David Bergsla

606

COSTING AND ESTIMATING

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Printing Company Organization:
Printing management, principles, functions, Organizational criteria, Skills requirements, Types of business, Printing company management structures, Management team responsibilities, Business plan, Management styles, Management decisions, Communications, Print market ing and sales - marketing, sales.

UNIT-II

Human Resource Management Concepts:
HRM for printing, employment policy, evaluation of skills requirements for printing occupations, recruitment, job evaluation, staff appraisal, motivation training, human resources factors that limit productivity, staff flexibility. Manning and training requirements, States of industry, Analysis and development of human resources strategy. Management personal skills and development, job satisfaction through involvement.

UNIT-III

Estimating:
Purpose and functions of estimating from printer point of view & customers point of view. Difference between costing & estimating. Qualifications of an estimator, working environment, estimators tools, estimating paper - selection of paper, allowance for waste, allowance for trimming, weight of loose sheets, weight of a reel of paper. Estimating Ink - Ink consumption formula, Ink allowance for spoilage. Estimating binding materials - Board requirement, estimating covering materials, estimating sewing thread, estimating stitching wire, estimating adhesives. Terms and conditions-approved by AIFMD. Estimate Form and Computer Aided Estimating.

UNIT-IV

Costing:
Job costing, its need and procedures. Elements of cost and their method of recovery. Cost sheet. Daily Docket. Work Instruction Ticket and their importance in costing.
Recommended Books :
Principles of Accounting - B. S. Raman
Fundamentals of Financial Management - Prasanna Chandra.
Cost Accounting - B. R. Bhar
Print Management - Derek Porter
Printer’s Costing & Estimating - B. D. Mendiratta
Management Aspect of Printing Industry - T. A. Saifuddin.
Estimating Methods and Cost Analysis for Printers - K. S. Venkataraman, K. S. Balaraman.

Printing Estimating Principle & Practice - Philip Kent Ruggles
Print Production Management - Gray G. Field
Principles of Applied Costing for Printing Industry - K. S. Venkataraman.

611
PRINTING SUBSTRATE LAB.

Max. Marks: 75

LIST OF EXPERIMENTS
(25+50)

1. Various samples of Paper and their study.
2. Different samples of Papers and their study.
3. Lightfastness test.
4. Machine Direction and Cross Direction of paper.
5. Effect of Humidity and Temperature on paper.
6. GSM Test.
7. Printed samples of different printing processes and their study.
8. Ink Viscosity Test.
9. Introduction to various chemicals used in printing.
10. Conusmables and miscellanous used in printing.

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612
ELECTRONIC COMPOSITION LAB.

Max. Marks: 75

LIST OF EXPERIMENTS **(25+50)**

1. Familiarising with key board.
2. M.S.Word – Justification works, column work, single column, double column, fonts & type style changing, copy & cut & paste command, wordart.
3. Page Maker – Designing of visiting cards, page makeup of pamplets, page make up of advertisements, folders, journals, book work. Picture and text manupulation, Table work setting, tabular work setting.
4. Photo Shop – Introduction, Picture editing, scanning the picture, converting image formats, resizing the images.
5. Coreldraw – working principles, designing and practicing.
6. Comparing various outputs – Dot matrix, Inkjet printer, Laser printer, Digital printer.

613
SECURITY AND STATIONARY PRINTING LAB

Max. Marks: 75

LIST OF EXPERIMENTS
(25+50)

1) Design of fan fold forms computer letter & Mailers
2) Design of computer envelops and snap-out-forms.
3) Various types of web offset printing
4) Processes use for packaging and dispatch
5) Study of collators
6) Dot loss and dot gain in film imaging
7) Plate making
8) Colour sequence for security printing

614

SECURITY AND STATIONARY PRINTING LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Study of various types of collators
2. Commercial computer forms
3. Study of different type of web-offset printing presses
4. Finishing operations
5. Methods of screening
6. Fine screen rulings versus FM screening
7. Setting of finishing machines
8. Various proofing methods

660

INDUSTRIAL VISITS/EXHIBITION

Max. Marks: 50

SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)
VII Semester

Course No.	Course Title	Exam.Marks			
		Internal Assessment	Theory	Practical	Total Marks
701	PRINT AND PACKAGE MANAGEMENT	25	75		100
702	PRINTING PLANT LAYOUT	25	75		100
703	GRAVURE TECHNOLOGY	25	75		100
704	PRINTING INK TECHNOLOGY	25	75		100
705	PRINT FINISHING	25	75		100
706	QUILTY CONTROL IN PRINTING AND PACKAGING	25	75		100
	LAB				
711	GRAVURE TECHNOLOGY	25		50	75
712	PRINTING INK TECHNOLOGY	25		50	75
713	PRINT FINISHING	25		50	75
714	QUILTY CONTROL IN PRINTING AND PACKAGING	25		50	75
770		MINOR-PROJECT			50
	TOTAL				950

701
PRINT & PACKAGE MANAGEMENT

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Business Environment – Printing Industry in India & Abroad. Impact of globalization & IT.

. Management – Nature scope and importance of Management, Functions of Management –Scientific, Management, CPM & PERT (Introduction)

UNIT-II

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Production and operations Management – Locations and Layout of plant, Maintenance management. Quality assurance, Total quality management (TQM), ISO. Marketing management – Marketing and its functions, distribution channels, salesmanship and advertising.

UNIT-III

Human resource management: Manpower planning – recruitment, selection, Training performance appraisal Wage and salary administration.

Financial Management, Nature, Scope objectives and functions of Financial Management.

UNIT-IV

Work flow and organizational structure in a printing press.

Cost Accounting: Cost concept, cost sheet, B.E.P.analysis,cost reduction and cost control.

. Depreciation - Introduction to different methodes and their comparison.

Recommended Books :-

1. T.A. Saifuddin – Management aspects of printing industry by Nirmal Sadanadn Publishers, Mumbai, Ist edition.
2. G.G. Field- Printing Production Management by Graphic Arts Publishing, 1996.
3. Balaraman – PMCA by Ramaya Features & publications, 1987.
4. Mendiratta B.D. – Estimating & Costing by Print Trade Publications, 1999-2000.
5. Ruggles – Printing Estimating Principles and Practices by Delmer Publication 1985.
   (1.) Maintenance Engineering Handbook
   (2.) Lindley R. Higging, Mc Graw Hill International Edition.
   (3.) Operator's Manually by GATF.
6. R.D. Aggarwal-Organisation and Management-Tata McGraw Hill Publishing Ltd., New Delhi

702

PRINTING PLANT LAYOUT

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Site Selection:

Strategic issues of location. The supply-distribution system, Dynamic nature of plant locationlocation strategyfactors influencing choice of location. State regulations on location. Backward areas and Industrial policy. Govt. Polocies for
decentralization, Industrial estates, comparision of locations-urban v/s rural areas advantages, sub-urban area. Economic survey of site selection. Analytical approach.

UNIT-II

Plant Layout:

Objectives of good plant layout, principles of plant layout, importance of plant layout, situations in which layout problem may arise, factors influencing plant layout, Methods of plant and factory layout-operation process chart, flow process
chart, flow diagrams, string diagrams, machine data cards, templates three dimensional models, correlation chart, travel chart, load path matrix method. Types of plant layout - product layout or live layout - process layout or functional layoutcombination layout - static layout or fixed position layout. Symptoms of bad layout. flow pattern-line flow, L type flow, circular flow, U type flow, S or inverted S combination of U and line flow pattern. Characteristics and place of application

UNIT-III

.

Factors governing flow patterns:

Combination of line flow and S type of pattern. Combination of line flow and circular type. Processing upwards. Retration type, Inclined flow. Workstation design-Storage Space requirements.

Plant layout procedure:

Accumulate basic data, Analysis and coordinate basic data, decide the equipment and machinery required, Select the material handling system, sketch plan of the plot for making factory building. Determine a general flow pattern, Design the individual workstation. Assemble the individual layout into the total layout calculate storage space required, Make flow diagrams In work stations and allocate them to areas on plot plan, Plan and locate service areas, make master layout. Check final layout, Get official approval of the final layout, install the approved layout.

UNIT-IV

Factory Building (Press Building):

Introduction, Advantages of a good factory building, Factors affecting the factory building - nature of manufacturing process-flexibility-expandability-service facilities-employee facilities-lighting-heating-ventilating-air conditioning-appearancedurable construction-security measures-noise control. Types of factory building - single story building, high bay and monitor type buildings, multi storey buildings, building of special types. Comparison

between single storey and multistory building. Types of construction of factory building Wood frame construction, Brick construction, Slow burning mill construction, Steel frame construction,Reinforced concrete construction, Precast concrete construction. Specific parts of factory buildingroof, walls,floor.

Plant layout-An analytical approach:

Heuristic and other methods of line balancing. Planer single facility location problems. Minisum examples, insights for minisum problem, minisum location problem with distance. MLP with Euclidean distance.

Recommended Books :

Facility layout and location-Richard L.Francis, John A. White. Computer Aided Production Management - Mahapatra
Production and Operations Management - Mchelmann Oakland, Lockyer
Practical Plant Layout - Herold B.Maynard
Industrial Engineering Management System- Dr. S. Dalela, Dr. Mansoor Ali
Industrial Engineering & Management - O. P. Khanna
Industrial Engineering and Production Management-M. Mahajan.
Materials handling for Printer - A. John Geis, Paul L. Addy.

703
GRAVURE 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.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

Gravure:
History of gravure, Gravure products and markets - Publication gravure - gravure packaging and converting - product gravure. Gravure Screens. Gravure cylinder preparation - Diffusion etch - Direct Transfer-Electromechanical process - Laser cutting. Electronic engraving systems today. Chemical engraving methods and equipments – cell configurations-advantages and disadvantages. Cylinder correction methods - Re-etching electro mechanical engravings, Colour balance etches, spot plating. Well formation - variables, basic types. Cylinder construction and preparation - Cylinder design, types. Balancing the cylinder. Copper plating and polishing, Reuse of cylinders.

UNIT-II

Gravure Doctor blade assembly –
Blade angles. Blade distance from Nip, Blade edge, Blade mounting. Doctor Blade wear - Fatigue, Corrosion, Abrasive, Adhesive wear, Doctor blade materials, Doctor blade Holder configurations, Blade setting procedures, Preparing blade for use, Doctor blade problems. Gravure Impression Roller - function, Roller covering, Roller pressure, Cylinder diameter, Roller design & configuration. Balance-static & Dynamic. Roller setting. New developments. Storage of impression rollers. Impression roller problems. Impression mechanismsmechanical, Hydraulic, Pneumatic.

UNIT-III

Gravure Press and Its components:

A generic printing unit.Sleeve&solid cylinder,single and two revolution ,sheet fed and web fed machines Typical press configurations.Gravure publication presses-characteristics. Packaging Gravure Presses - Folding carton Presses. Flexible Packaging presses, Label presses. Product gravure. Other gravure presses - Intaglio plate printing, offset gravure and flexogravure. Gravure with flexo units. Gravure units as other equipment. Gravure roller coating. Gravure folders - types. Gravure Ink Dryers - Need for ink dryers,Drying water based inks, Dryers functioning,Dryer limitations, supply air valves, balancing the dryer, filters & dampers, roller condition vital. Heat Sources - steam, electric and gas, combination gas/oil, thermic oil, waste heat form incinerators. Solvent Recovery Methods. Gravure cylinder preparation- basic construction, surface finishing, sleeve and integral shafting of cylinder, Electo-mechanical, electron beam & Laser engraving.

UNIT-IV

Gravure Substrates:

Paper substrates-Roto news papers, Coated papers, Gravure packaging paper substrates - properties. Label stock, Paper board. Non Paper substrates - surface preparation, plastics-properties. Metalized films - Aluminium foil, Foil laminations. Gravure advantages, limitations. Future of Gravure Printing Industry.

Recommended Books :

Gravure process and technology - GAA.

Printing Technology - Adams, Faux, Rieber.

704

PRINTING INK 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.

Time : 3 hours **Max. Marks: 100**
(25+75)

UNIT-I

Printing Inks

Introduction, solvent based inks, water based ink, ingredients in Ink- pigments- properties, types, carbon black, inorganic pigments, organic pigments, physical characteristics of organic pigments.Vehiclesvehicles for liquid inks, vehicles for paste inks, UV curing vehicles. Additives - driers, extenders, anti oxidants, waxes. Oils- vegetable drying oils, semi drying oils, non drying oils. Drying mechanisms - physical drying mechanisms, absorption drying, evaporation drying, chemical drying systems, oxidation polymerization drying, radiation drying and curing, microwave drying, infrared drying. Viscosity - Newtonian flow, units of viscosity, viscosity & temperature, factors influencing viscosity, simple low viscosity inks, complex high viscosity inks. Ink requirements for printing processes – offset, letterpress, flexography, gravure, screen printing. Optical properties of ink films, rheology and ink transfer requirements, ink distribution and transfer on the press, method for the direct measurement of ink setting on coated paper.

UNIT-II

Printing Ink manufacturing machines & equipments

Paste inks - single roll mill, twin roll mill, triple roll mill, ball mill, twin horizontal mixer, uni-roll mill, high speed stirrer milling. Liquid inks - ball mill, pearl mill, sand mill, bead mill, shot mill. Trends and developments in ink manufacturing process.

UNIT-III

Radiation curing

Introduction, radiation curing inks, ink cure considerations, chemistry of uv curing-photo initiation, propagation, termination. Cationic curing, electron beam curing

UNIT-IV

.

Security Inks

Range of security inks, special security features - fluorescence, phosphorescence, reflected by improved filters, magnetism, security printing inks for cheques-penetrating L/p inks, water fugetive inks, inks reacting with pen evadicators, red-ox reagents, inks reacting with solvents, invisible reactive inks, carbonizing inks. Security inks conformity tests and Q.C.tests-tests for chemical resistance, light fastness, rub resistance test, crumpling resistance test, grinding control, colour control, control of the rheological properties, control of drying time, control of various specific properties. Environmental considerations in security printing.

Recommended Books :-

Printing materials science & technology - Bob Thompson-PIRA
Advances in printing science & technology Vol.24 - J. Anthony Bristow
Hand book of Print & Production - Micheal Barnard, John Peacock
Introduction to Printing Technology - Hugh M.Speirs. SIGPA - 1987

705
PRINT FINISHING

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.

Time : 3 hours **Max. Marks: 100**

(25+50)

UNIT-I

Introduction:
Bindery In The New Millennium, Latest Developments in Print Finishing. Organization and Workshop Layout. Importance Of Book Binding. Growths Factors In Print Finishing. Book Binding Tools- Forwarding Tools, Finishing Tools. Binding Room Equipments- Laying Press, Standing Press, Sewing Frame, Glue Pot, Board Cutting. Book Binders Materials & Quality Control. British Standard Paper Sizes. International Paper Sizes. Ra & Sra Sizes. Advantages Of Iso Paper Sizes. Board - Kinds Of Boards. Reinforcing Materials. Securing Materials, Covering Materials, Adhesives- Factors Governing The Choice Of Adhesives, Use Of Adhesives In Print Finishing, Effect Of Wet Adhesives. Theories Of Adhesives. Principles Of Adhesives. Solvent Based Adhesives, Water Based Adhesives, Pressure Sensitive Adhesives. Types Of Adhesives. Adhesion- Physical, Specific. Miscellaneous Material.

UNIT-II

Structure Of A Book:
Physical Parts Of a Hard Bound Book. Operations Of Ideal full Cloth Binding Production- Pre- Forwarding Operations, Forwarding Operations, Finishing Operations. Jogging, Counting, Cutting, Slitting, Trimming. Folding Binders Aids, Characteristics Of Printed Sheet, Planning Imposition, Folding Schemes. Hand Folding- Folding To Paper, Folding To Print, Lump Folding, Puckering, Advantages & Limitations Of Hand Folding. Machine Folding - Knife Principles, Buckle Principle, Combination Of Knife & Buckle. Folding & Machine Direction. Advancements & Developments On Folding Machine, Folding Machine Paper Feeders, Tips For Smoother Folding. Tipping - In/ Attachment Of Plates.
Gathering - Single Sheet Gathering, Collating - Collating Marks. Insetting - Make Up Of Insetted Work. Inserting.

UNIT-III

Securing Methods:
Wire Stitching - Saddle Stiching, Side Stiching, Stabbing. Thread Sewing - Letterpress Binding, & Stationery Binding. Saddle Sewing, Side/Flat Sewing, French Sewing, Sewing On Tapes, Sewing On Cords, Sewing Two Sections On, Whip Sewing, Stub-Binding. Adhesive Binding/Perfect Binding - Advantages. Quality Control In Adhesive Binding. Lay-Flat Adhesive Binding. Mechanical Binding – Loose Leaf Binding - Traditional Styles Used. Spiral Binding. Wire ‘O’ Binding, Plastic Comb Binding. Case Binding. -Stages In Sheet Fed, Stages In Reel Fed, Case Making, Stages in casing-in. Ring Binding - Inter Screw, Ring Metal - Types, Loose Leaf Ring Binding. Ring Shapes. Burst Binding, On Demand Booklet Binding. Preflight In The Bindery. Publishers Binding. Magazine Binding & Book Binding.

End Papers:

Purposes, Kinds of end Rapers, Quality of Paper Required for Pasting End Papers. Pressing, Gluing The Spine, Smashing the Spine, trimming the Book Edges, Rounding- Advantages, Rounding M/C. Backing - Backing M/C. Lining - Advantages. Head-Tail Bands, Caps, Book Marker. Method Of Attaching Head & Tail Bands. Covering - Covering Styles. Pasting Down, Pressing, Inspection.

UNIT-IV

Finishing Processes:

Cover Decoration & Other Processes. Print Finishing Operations - Embossing & Debossing, Blind Embossing, Gold Blocking /Foil Stamping. Die Printing. Thermography, Velvet Printing, Marbling, Varnishing, Graining, Laminating, Gumming, Gluing, Punching, Perforating, Drilling. Label Puching, Appliqué. Edge Decoration - Requirement, Colouring The Edges, Marbling Edges, Edge Guilding. Round Corner Cutting.

Numbering

Folio Numbering, Double Numbering, Duplicate Numbering. Principle of Rotary Numbering. Skip Numbering, Automatic Numbering.

Kindes of Indexes. Ruling - Principle Of Pen & Disk Ruling M.C. Ruling Terms. Banding & Lacing, Poly Bagging, Mailing, Creasing, Bundling, Tacketing. Ultra Violet Curing & Infra Red Curing.

Binding & Finishing Machines:

Study Of Various Modern Machines. Modern Guillotines - Single Knife Guillotines. Three Knife Trimmers. Knife Grinding M/C. Gold Blocking/Foil Stamping M/C. Wire Stitching M/C. Straw Board Cutter. Laminating M/C - Small Laminating M/C. Pouch Laminating M/C. Tunnel Laminating M/C. Tipping M/C. Smashing M/C. Back Gluing M/C. Roller Gliding M/C. Inline Rounding M/C. Lining M/C. Modern Lining M/C. Cloth Cutting M/C. Foil Blocking M/C. Rotary Blocking M/ C. Casing In M/C. Case Making M/C. Box Waste Disposal Process. Box & Carton Manufacturing Process. Adhesive binding machine.

Recommended Books :-

Binding And Finishing - Ralph Lyman Binding And Finishing Part-1 - B.D.Mendiratta
Binding Finishing Mailing - T.J.Tedesco Introduction to Printing & Finishing - Hugh Speirs
Finishing Process in Printing - A.G.Martin.

706

QUALITY CONTROL IN PRINTING AND 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Introduction

Definition of Quality, Quality control, its meaning and purpose setting up a Quality Control Programme, and establishng necessary System and procedures, economic consideration.

UNIT-II

. Management Consideration

Quality Control as an attitude and management tool, managment's responsibility, organization and personnel functions, getting everybody involved. Total Quality Control. Quality Control procedures and methods. Different shapes of quality control.

UNIT-III

. Materials Control

Establishing clear specifications and standardization of materials to be purchased - particularly paper, ink, plates, blankets and rollers, Inspection and testing of incoming materials as part of quality control; importance of proper handling and maintaining records of performance of materials Sampling and sampling plans.

Establishing Quality control programme in different departments of Printing organization.

UNIT-IV

Quality Control Instrumentation

Paper and paper board testing instruments for testing printability, print quality and end-use requirements, Ink testing instruemtns for testing optical and working properties and end-use requirements Process control instruments, devices and aids used in the galley and dark-room, striping department, plateroom and press room for specific processes and for general purposes Press sheet control devices used for production of multicolour printing jobs Basic principles of these instruments and devices how they function and what they measure, minimum instrumentation necessary to produce a product consistent with the appropriate quality level.

6. Introduction to ISO:9000 and ISO:14000 series.

Recommended Books:

1. W.H. Banks, Inks, Plates and Print Quality, Pergamon Press
2. Quality Control for quality printing, Graphic Arts, Technical Foundations.

711
GRAVURE TECHNOLOGY LAB.

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Study of various Gravure printing machine configurations.
2. Study of various components of a Gravure printing machine.
3. Pre-make ready in Gravure Printing Process.
4. Plate preparation/ Cylinder preparation.
5. Make-ready in Gravure Printing Process.
6. Study of feeding unit of a Sheet-fed/ Web-fed Gravure printing machine.
7. Single and Multi colour printing by using Grauvre Printing Process.
8. Printing on different substrates by using Grauvre Printing Process.
9. Study of delivery unit of a Sheet-fed/ Web-fed Gravure printing machine.
10. Cylinder setting in a Gravure printing machine.
11. Check the practical problems in a Gravure printing process.

712
PRINTING INK TECHNOLOGY LAB

. **Max. Marks: 75**

(25+50)

LIST OF EXPERIMENTS

1. Various samples of INK and their study.
2. Different samples of Inks and their study.
3. Light fastness test.
4. Study of various component of ink.
5. Effect of Humidity and Temperature on INK.
6. Ink tackiness Test.
7. Printed samples of different printing processes and their study.
8. Ink Viscosity Test.
9. Introduction to various chemicals used in printing.
10. Consumables and miscellaneous used in printing.

713

PRINT FINISHING LAB.

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

I. Preparation of the following types of books.

1. Quarter bound a/c books by - French sewing method, Tape sewing method, Cord sewing method, Saddle sewing method, Side sewing method, Whip sewing method.
2. Half bound a/c books by - French sewing method, Tape sewing method, Cord sewing method, Saddle sewing method, Side sewing method, Whip sewing method.
3. Full bound a/c books by - French sewing method, Tape sewing method, Cord sewing method, Saddle sewing method, Side sewing method, Whip sewing method.

II. Preparation of Writing board.

III. Preparation of Photo Album.

IV. Preparation of Receipt books with numbers in duplicate & triplicate.

V. Preparation of Cheque books with 25 leaves.

VI. Preparation of following type of Mechanical binding - Spiral wire binding, Wire 'O' binding, Ring binding.

VII. Preparation of files of following designs - Loose leaf file - single piece, Loose leaf file - Two piece tab binder, Loose leaf guard file - Boards joined with spine strip, Court case file, Portfolio - Closed file to keep confidential loose sheets.

VIII. Preparation of these types of End papers - Single End paper, Double or Inserted End paper, Made end paper, Cloth joint end paper, Zig Zag end paper, Cloth joint Zig Zag end paper.

IX. Preparation of telephone directory with Indexes and Tabs.

X. Study of various controls, operations and mechanisms of the following machines: Folding machine, Guillotine machine, Cutter and Creaser, Varnishing machine, Laminating machine, Sewing & Stitching machine, Miscellaneous machine.

XI. Binding of case bound, publishers binding. Book-emphasis will be given on decoration.

XII. Print finishing operation to be conducted - Gold blocking, Embossing, Edge decoration, Thermography, Marbling, Velvet printing, Rubber printing, Die printing, Pouch lamination.

XIII. Repairing of old books.

XIV. Study of Pen ruling, Disk ruling, UV curing processes.

714

QUALITY CONTROL IN PRINTING AND PACKAGING LAB.

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Paper testing checking grain direction.
2. Tensile strength of paper, burst strength of paper.
3. Substance, caliper, porosity test, cob sizing value test.
4. Tearing testing of paper, brightness test of paper.
5. Operating test, gloss test, lighting color filter sensor.
6. G.S.M. testing, folding endurance.
7. Moisture contents test, ash contents test.
8. Hot air oven tester, absorbing test.
9. Pick strength, humidity control test, room temp testing.
10. Ink film thickness test.
11. Investigation of pigment properties.
12. Investigation of solvent properties.
13. Measurement of viscosity, tack measurement.
14. Test a printed sheet - proof printing and measurement of colour using spectro photometer, resistance
testing of prints.
15. Measurement of ink film thickness.

770

MINOR-PROJECT **MAX. MARKS: 50**

SCHEME OF STUDIES & EXAMINATIONS

B. Tech. (Printing, Graphic & Packaging)
VIIIth Semester

Course No.	Course Title	Internal Assessment	Exam. Schedule		Total Marks
			Theory	Practical	
801	PRINTING MACHINERY MAINTENANCE	25	75		100
802	DIGITAL PRINTING	25	75		100
803	ENTREPRENEURSHIP PROCESS	25	75		100
804	BOOK PUBLISHING	25	75		100
805	NEWSPAPER PUBLISHING				
806	A) ADVANCE PRINTING TECHNOLOGY B) ADVANCE GRAPHIC TECHNOLOGY C) ADVANCE PACKAGING TECHNOLOGY	25	75		100
	LAB				
811	PRINTING MACHINERY MAINTENANCE	25		50	75
812	DIGITAL PRINTING	25		50	75
813	BOOK PUBLISHING	25		50	75
814	NEWSPAPER PUBLISHING	25		50	75
880		MAJOR – PROJECT			50
	TOTAL				950

801

PRINTING MACHINERY MAINTENANCE

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Drive and Control Systems

Transmission systems such as AC and DC motors, belt, chain, gear, cranks, connecting rods, paul and ratchet machanisms, Hydraulic, Pneumatic, Electrical, Electronics and mechanical controls.

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 designcommissioning.

UNIT-III

Repairs and Reconditioning

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

Cylinders, Bushes and Bearings

Cylinder contruction - 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, Maintenance policies -Maintenance organization - Maintenanceof pumps and compresser - Lubricants, their types and Characteristics, Lubricating methods - Central lubrication with return oil Manual lubricating Greases, oils, Greases, oils, grades - preventive maintenance, break down maintenance.

Identification & rectification of faults. Maintaining different types of Letterpress, Offset, Gravure & Flexo Machine.

Recommended Books :-

1. Electrical Engg. By B.L. Thareja Part I & II
2. Theory of Machines By Khurmi & Gupta S.Chand Publisher New Delhi

802
DIGITAL PRINTING

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.

Time: 3 hours **MaxMarks: 100**
(25+75)

UNIT-I

Digital Documents

Introduction to Digital Printing fundamentals Pixel image, Digital image, Digitazation, Half toning colour reproduction, colour jumbs, resolution andits qualities. AC quiring Scanning of different original, Selection of technology of Programme. Transfer of Digital Photographs. Documentation Image file formats TIFF, EPS JPEG files text files and past discription languags.

UNIT-II

Digital Printing Processes

Silver faldire, Phernal, INkjet, elictrostatic processes. Rendering Typeline Art and images.
Colour management Introduction and future, Characterizing input and output device use of **CIELAB, CMS Market & Applications:**
Introduction. Defining «On demand». Defining Digital Printing. Defining variable printing. Typical lengths. Shortrun process colour printing. On demand printing & Publishing concepts. Future on-demand. Market research Where are pages created. Number of originals and run length. New technologies shift existing methods. Economics of on demand printing - Economics of long run. Advantage for the buyer. Efficiencies of Digital on demand work flow. Shortrun pricing paradox.

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. Advantages of search & Retrival. Alternative media-CD-ROM's. Manufacturing costs-Paper mailing. Alternative media-online. Commercial online services. Commercial applications - 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. Accepting
digital files - File transfer for on-demand.

UNIT-IV

Networking:

Networks for printing. Networks for publishing. Networks for Inhouse. Ideal Network. WAN (Wide Area Net works). Flexibility. Changing Markets for Print. Market projections, Projection of changes in the no.of colors. Moving towards shorter runs.

Recommended Books :

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

803

ENTREPRENEURSHIP 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Entrepreneurship:
A Perspective: Recognition of the need for entrepreneurship and self-emplyment 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-requisities 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 scuccess 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. Entreprenuership 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

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Book Publishing

Definition and concept, parts of a book, basic steps in book publishing, areas of publishing - general publishing, educational publishing, professional publishing and reference publishing Publishing house - the 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.

Prouction & 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 Techical 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 funtions in newspapers, journals, magazines and books.

UNIT-IV

Legal Aspects in book Publising

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, defence agaisnt libel, mitigation & damages.

Introduction to Booking and Circulation methods used in publishing houses.

Subsidy in the Publication of Books

Importance and need of subsidy ADVANCE PRINTING in the publication of books. Salient features of the subsidy scheme. Procedure of getting subsidy.

805

NEWS PAPER PUBLISHING

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-1

Introduction to Newspaper organization
Newspaper Hierarchy - editorial organization, souces of news; mechanical aspects of newspaper organization-composition, printing the newspaper, basic operations business aspects of newspaper organization, flowcharts of staff in newspaper organization, Circulation and Advertisement departments, distribution channels.

UNIT-II

Policy of a newspaper. Headlines. History and their significance. Functions of headlines, kickers, blurbs. Thegrammar of headlines. Unit count in headlines. Treating photographs; cropping. Captions for photographs.The aesthetics of desing. Achieving symmetry/asymmetry, balance/off-balance, use of colour, placement of various elements in design. The written word and illustration. Principles of adapting content to form. Attracting attention.

UNIT-III

Newspaper layout & designing
Difference between design and layout. The various kinds of layout. The importance of visual appeal in pagemaking.Playing up/down a story. Colour, boxing, verbal and non-verbal languages in design. Graphics/diagrams and illustrations and their importance.
Flow of stories into a newspaper officeThe various sources and copy for each page. Reporters, correspondents, agencies, syndicates,columnists, readers. Fascimiles copy & photographs.

UNIT-IV

Editorial content and news. The OP-ED page. Thegatekeeping function.
Editorial Organization Newspaper PublishingSources of news wire services, syndicates The role of copy editors, city editors, news editors, editorialcartoonist, artists, sunday editors, sports editor, business editor, journalist & reporters, Information to aprinter by editor.
Recommended Books :
News Reporting and writing - Melvin Mecher
The Journalist; Handbook - M. V. Kamath
Editing; A Handbook for Journalists - TJS George
Editing; A Handbook for Journalists - TJS George, Indian Institute of Mass communication, Delhi.
Telling Stories, Taking Risks - Klement/Mataline
Journalism in India - R. Parthasarathy
Headlines and Deadlines - Baskette, Floyd

806 (A)

ADVANCE PRINTING 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

UNIT-I

Modern Trend in Printing

1) Digital offset Colour 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,Brouchers,Buisness 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-Seetharama L.Narasimhan,Dennis W.Mcleavey,Peter J.Villington
4) Production Planning ,Control and management-K.C.Jain, L.N. Aggarwal

806(B)

ADVANCE GRAPHICS 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.

Time : 3 hours **Max. Marks: 100**

(25+75)

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

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.

Time : 3 hours **Max. Marks: 100**

(25+75)

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

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, registance 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 hazard

811
PRINTING MACHINERY MAINTENANCE LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

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

812
DIGITAL PRINTING LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

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

813

BOOK PUBLISHING LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Introduction to type of Web Presses as per the configuration & end products.
2. Study of various units & their setting.
3. Study of pre-make ready & makeready operations.
4. Printing single & multicolour jobs.
5. Introduction to Digital presses & their working.

814

NEWS PAPER LAB

Max. Marks: 75

(25+50)

LIST OF EXPERIMENTS

1. Introduction to type of Web Presses as per the configuration & end products.
2. Study of various units & their setting.
3. Study of pre-make ready & makeready operations.
4. Printing single & multicolour jobs.
5. Introduction to Digital presses & their working.

880

MAJOR-PROJECT

Max.Marks:50