B.Tech (Printing, Graphics & Packaging)

Syllabus

Duration: Four year
Eligibility: 10+2 with non-medical or medical stream

w.e.f. Academic Session: 2014-2015
Institute of Mass Communication and Media Technology

Kurukshetra University
### SCHEME OF STUDIES & EXAMINATIONS

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

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<tr>
<th>Course No.</th>
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**TOTAL**                                             |             |                        |        |           | 900   |
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**


**UNIT –II**

**Printing Processes:** Introduction to conventional printing processes- Relief, Planography, Intaglio, Screen. Basic principles, characteristics and identification. On Demand printing, Specialized printing. Suitability & limitations of various printing Processes.

**UNIT -III**

**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 of Letterpress printing machines.

**UNIT -IV**

**Running Defects of different printing process:** Common printing faults comes in various printing processes, causes and their remedies.

**Recommended Book :**

1. Letter Press Printing Part 1, 2, By C.S. Misra
2. Printing Technology By Adams, Faux, Rieber
3. Screen Printing Review By Babett Magee
4. Screen Printing By John Stephens
5. Art and Print Production By N.N. Sarkar
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:
2. Strengthen Your English, Bhaskaran and Horsburgh, Oxford University Press
4. Murphy's English Grammar with CD, Murphy, Cambridge University Press
5. English Skills for Technical Students by Orient Longman
**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 un-polarized light, double refraction; Nicol prism, quarter and half wave plates, Polarimetry; Biquartz and Laurent's half-shade polarimeters, Simple concepts of photoelasticity.

**UNIT-II**

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

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

**UNIT-III**

**WAVE AND OSCILLATIONS:** Simple concepts of Harmonic Oscillator, resonance, quality factor. E.M. wave theory-review of basic ideas, Maxwell's equations, simple plane wave equations, simple concepts of wave guides and co-axial cables, Poynting vector. **DIELECTRICS:** Molecular theory, polarization, displacement, susceptibility, dielectric coefficient, permittivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field. 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)
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 (H₂O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

**Unit-2**


**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 composites. Analytical methods; its needs and different methods;Spectroscopy; its definition and scope; salient features of spectrophotometer, brief introduction of titrimetric methods, Elementary discussion on flame photometry

**REFERENCE BOOKS:**

1. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai & Co.).
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 variables, 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.

REFERENCE BOOKS:
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

Computer function and components – Labeling standards – software applications, utilities, Applets, operating systems. Linking hardware and software, device interfaces, BIOS, device drivers. I/O ports, USB Buses, Bluetooth. Logic Gates- AND, OR, NOT, NOR, NAND, XOR.

UNIT – II

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

UNIT – III


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

Input /Output devices Keyboard, mouse, Electronic Pen, scanners, printers, dot matrix, ink jet, laser, Thermal printer, CCD Camera, Digital Camera.

UNIT – IV

Introduction to DTP, trends in printing technology, usage of computers in printing. DTP printing technology, Introduction to DTP softwares, Use of Text tool Adobe Photoshop, Corel Draw, Quark Express, DTP hardware, Cost estimation of DTP.

Working with graphics: using different graphic tools, importing graphics, working with colour, table editing. Electronic Image, BMP, TIFF, GIF, PNG, PDF, JPEG file formats. Image compression-Lossy and Lossless technique

Recommended Books :
1. Hardware Bible : Winn IL Roch Techmedia.
2. Desk Top Typography : Qukarkx Press
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.
4. Operational and mechanical features of different letter press Printing Machines.
6. Identification of different printing processes.

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 Newton's formula and hence to find the focal length of convex lens.
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the specific rotation of sugar solution by using a polarimeter.
8. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.

RECOMMENDED BOOKS:
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
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 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-Martens flash point apparatus.
7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.

SUGGESTED BOOKS :

114
FUNDAMENTALS OF COMPUTER LAB

Time : 3 hours

Max. Marks : 75

(25+50)

LIST OF EXPERIMENTS
1. Introduction to Computer Terminologies.
2. Use of different Hardware devices.
4. DTP and its features.
5. Softwares used in Printing.
6. Page set-up with different sizes and margins.
7. Different kinds of Scanners, their working and uses.
8. Image and Text merging.
9. Modifications and Editing of Illustrations and Text.
10. Working of Printers.
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<th>Theory</th>
<th>Practical</th>
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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


General principles of printing surface preparation for various printing processes.
Applications of letterpress, flexography, lithography and offset, gravure, screen printing etc.

UNIT –II


UNIT -III


UNIT -IV


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
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.
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

Color theory: dimension of color, color schemes, color symbolism, emotional effects of color. Division of design: natural, conventional, decorative, geometrical and abstract.

UNIT –III

Type: Methods of type arrangement, classification of typeface of font designing.
Printing planning: rough layout, comprehensive, artwork, type of originals, sizing, mashing and cropping.

UNIT –IV

Design management: Definitions in advertising art, modern art abstract art, applied art, advertising, publicity, public relations, sale promotion, sales manager
Design with D.T.P.: Various softwares used for designing.

Recommended Books :-
1. The Designer’s Handbook by Alistair Campbell
2. Design & Technology by Van No strand
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, Schrödinger 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)

**REFERENCE BOOKS:**
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 vectors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley - Hamilton theorem and its applications.

UNIT-II


UNIT-III

Laplace Transforms and its Applications : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, 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


REFERENCE BOOKS :
5. Advanced Engg. Mathematics F Kreyszig
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 Engineering Graphics and Drawing**
Importance of engineering graphics and drawing, introduction to drawing instruments, types of lines, dimensioning, lettering, types of projections, theory of orthographic projections, first angle and third angle projections, projection of points.

**Unit II**

**Projection of Lines and Planes**
Projection of lines parallel to one or both planes, contained by one or both planes, perpendicular to a plane, inclined to one and parallel to the other, inclined to both the planes, true length of the line and its inclinations to the reference planes, Traces of line. Introduction, types of planes, Projection of planes by change of position method only, projection of plane perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane and inclined to the other plane

**Unit III**

**Projection of Solids and Their Development**
Types of solids, polyhedra and solids of revolution, projection of solids with axis perpendicular to a plane(Solids in simple position), axis parallel to both the planes, axis parallel to one and inclined to the other
Development of surface of various simple solids such as cubes, cylinders, prisms, pyramids etc.

**Unit IV**

**Isometric Projection**
Introduction, isometric scale, Isometric views of plane figures, prisms, pyramids and cylinders. Orthographic drawings of Bolts and Nuts, Bolted Joints, Screw threads.

**Reference Books**
211
PRINTING PROCESS-II LAB

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

LIST OF EXPERIMENTS

1. Study of various types of screen materials.
2. Operating of automatic machine.
4. Screen printing on Irregular Surfaces - Bottles, Ceramics, Glass.
5. Screen printing on printed circuit boards (PCB)
6. Screen Reclamation.
7. Study of gravure cylinder and flexography plate making.
8. Study of offset plate making.

212
SCIENCE OF COMMUNICATION LAB

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

LIST OF EXPERIMENTS

1. Public speeches
2. Power point presentations
3. Group discussions
4. Interviews
5. Designing poster
6. Designing pamphlets
LIST OF EXPERIMENTS
1. Stationary and small scales literature.
2. Folders -
3. Sticker
4. Label designing
5. Introduction to computers, various softwares used for designing purpose – Demonstration ( Manipulation of same design)
6. Logo designing
7. Color wheel

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. To find the frequency of ultrasonic waves by piezo electric methods
3. To find the value of e/m for electrons by Helical method.
4. To find the ionisation potential of Argon/Mercury using a thyratron tube.
5. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
6. To find the band gap of intrinsic semi-conductor using four probe method.
7. To calculate the hysteresis loss by tracing a B-H curve.

RECOMMENDED BOOKS:
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
## SCHEME OF STUDIES & EXAMINATIONS

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

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Internal Assessment</th>
<th>Exam. Schedule</th>
<th>Total Marks</th>
<th>Time</th>
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<td>Theory</td>
<td>Practical</td>
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<tr>
<td>301</td>
<td>TYPOGRAPHY &amp; TYPESETTING</td>
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<td>THEORY OF PRINTING MACHINE</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 Hrs</td>
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<tr>
<td>304</td>
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<td>75</td>
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<td>3 Hrs</td>
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<tr>
<td>311</td>
<td>TYPOGRAPHY &amp; TYPESETTING LAB</td>
<td>25</td>
<td>50</td>
<td>75</td>
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<td>312</td>
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<td>3 Hrs</td>
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<td>3 Hrs</td>
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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 typography, concept and scope
- Printing type, definition, it's two-dimensional and three-dimensional concept.
- 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 photo type-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**


**Recommended Books :**

1. Theory & practice of composition - By A.C. Goel
4. Printing Technology - By Adams,Faux,Riber
5. Art & Production - By N.N. Sarka
FUNDAMENTALS OF PACKAGING

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

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

Unit - I

Basics of Packaging:

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, Cellulosics, Polymides, advantages, functions & applications. Tests on plastics, Metals - functions, uses. Aluminum foils - Manufacturing of foil, properties, applications, methods of laminating foil to film or paper.

Unit - III

Carton Production & Innovative Packaging Techniques/Processes:


Unit - IV

Future Trends:

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

UNIT-1
Fluctuating loads and stress concentration, reduction of stress concentration effect.
Fluctuating stress, endurance limit, notch 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 Mechanism: Kinematics links, Classification of linkage systems, Kinematics’ pairs, Machine, kinematic chain, Mechanism, Degree of freedom for plane mechanisms, types of kinematic chains, inversion of mechanism, Four-bar chain, Single and double slider crank chain, Quick return mechanisms, study of typical kinematics systems used in machines.

UNIT-III
Gears:
Types of gears, terminology, condition for correct gearing, cyclical and involutes profiles of gear teeth, pressure angle, length of path of contact, length of arc of contact, Interference, undercutting, minimum number of teeth to avoid interference, number of pairs of teeth in contact, introduction to helical, spiral, worm and worm gear and bevel gear, numerical.
Gear trains; simple, compound, reverted and epicyclic, compound or sun and planet epicyclical gear train, bevel epicyclical gear train, problems of gear trains.

UNIT-IV
Power Transmission Devices.
Types of belt drives, types of belts, material for belts, open and crossed belt drives, velocity ratio, slip, crowning of pulleys, length of belts, ratio of tensions, centrifugal tension, power transmitted by belts, problems, introduction to V belt drive, rope drive, chain drive, classification of chains.

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

Arithmetic & Data Processing Circuits:
EXOR and EXNOR gates, half adder, full adder, full subtractor, adder-subtractor, look ahead and carry. Multiplexers, demultiplexers, decoders, BCD to decimal decoder, seven segment decoder, encoders, decimal to BCD encoder, parity generators and checkers.

Flip-Flops & Sequential Logic Circuits:
NAND gate latch, NOR gate latch, SR flip-flop, D flip-flop, JK flip-flop and T flip-flop, clocked flip-flops, edge-triggered flip-flops, flip-flop conversions. Comparison between combinational and sequential logic circuits, shift registers, SISO, SIPO, PISO and PIPO shift registers, ring counter, Jhonson counter.

UNIT-IV

Counters, D/A and A/D Converters:
Ripple counters, up counter, down counter, up-down counter, synchronous counters, mod number, mod-3, mod-5 and mod-10 counters, shift counters.

Recommended Books :
1. Digital Electronics – Malvino.
5. Digital Fundamentals - Floyd.
6. An Engineering approach to digital design - Fletcher.
Reproduction Technology

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

**Time : 3 hours**

**Max. Marks: 100**

(25+75)

**UNIT – I**

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

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

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

**UNIT – II**

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

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

**Unit-III**

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

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

Line and halftone combination, Evaluation of halftone negative.

**Unit-IV**


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
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  \hspace{1cm} Max. Marks: 100
\hspace{1cm} (25+75)

Unit – I

Basic principles in planographic printing:


Unit - II

Infeed unit –

Unit - III

Inking system:


Unit - IV

Dampening system:


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.
LIST OF EXPERIMENTS

1. Block Lettering & Numbering (Normal Types).
2. Italics Types (75 Degree Angle) Lettering & Numbering.
3. Four-line Principle (Drawing).
4. Physical (Features) parts of the type (Structural Diagram).
5. Fundamental strokes.
6. Finishing strokes & their identification.
7. Introduction to various fonts & their drawing characteristics.
8. Newspaper/Magazine clippings of different point sizes.
   (Paste them on Practical Note-book & draw the same).
9. Draw different cases, faces, series & families etc.
10. Draw types with different X - heights, contrasts, serifs, Beak & Terminals.
312
FUNDAMENTALS OF PACKAGING (LAB)

Time: 3 Hours
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.

313
Reproduction Technology- LAB

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

LIST OF EXPERIMENTS

1. Setting of camera.
2. Line negative and positive preparation
3. Halftone negative and positive preparation
4. Bromide positive preparations.
5. Exposing difficult line originals, Use of filters
7. S.D. calculations and S.D. setting and contrast control with glass screen
8. Study of densitometer.
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.
7. Identification of printing faults in the given samples—reasons and remedial actions.
8. Mixing of process inks to the shade for a given colour patch—effect of paper and ink film thickness.
## SCHEME OF STUDIES & EXAMINATIONS

**B. Tech. (Printing, Graphic & Packaging)**

### IV Semester

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Internal Assessment</th>
<th>Exam. Schedule</th>
<th>Total Marks</th>
<th>Time</th>
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<td>401</td>
<td>PACKAGING TECHNOLOGY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 Hrs</td>
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<tr>
<td>402</td>
<td>PRINTER SCIENCE</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 Hrs</td>
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<td>25</td>
<td>75</td>
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<td>25</td>
<td>75</td>
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<td>3 Hrs</td>
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<td>406</td>
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<td>25</td>
<td>75</td>
<td>100</td>
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<td>3 Hrs</td>
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<td>Student has to submit a visit report on a assigned work by his/her concerned teacher &amp; the report will be evaluate by the examiner appointed by Director/Chairperson.</td>
<td>50</td>
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Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit-I


Unit-II

Fiberboard and Glass Technology: Fiberboard Cartons, Drugs, Glass Containers: Manufacture, Properties, Applications and Testing

Plastics Technology: Polymer Chemistry, Classification of Polymers, Properties, Processing of Plastics, Special Plastics and Their applications. Seals, Coatings, Laminates, Adhesives, Reinforcements

Unit-III


Unit-IV


Moulds and Tooling: Introduction to Design of Moulds and Tooling: Injection Moulds, Blow Moulds, Extrusion dies, Product Design, Designing for Packaging Application

References:
1. Packaging design and performance – Frank Paine.
2. Advances in Plastic Packaging Technology – John Bristol
3. Packaging Design an Introduction – Laszlo Roth
402

PRINTER SCIENCE

Time : 3 hours

Max. Marks: 100

(25+75)

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

Unit -I

Colloids:
Characteristics, Proportion, application in Printing Industry.
Theory of Electro deposition, Printing equipments, factors affecting nature of Electrodeposits, chromium Plating, Anodizing of metal.
Introduction to Organic compounds, Carbon compound, Aromatic compound Diazo compound, Organic Solvents with specific name used in printing Science mainly.

Unit -II

Introduction of Photo chemistry
Humidity - Relative humidity, measurement, control by air conditioning.
Surface characteristics in printing - Surface tension, contact angles, capillary action, interfacial tension, measurement of contact angle, Hydrochloric and hydrophilic surface, water and ink interaction.
\( \text{pH} \): \( \text{pH} \) colorimetric method of determining \( \text{pH} \); method of determining \( \text{pH} \), \( \text{pH} \) of paper, ink, \( \text{pH} \) application in Printing.

Unit -III

Photometry –
Introduction, solid angle, definitions of luminous flux, luminous intensity, illumination power, intensity of illumination of a surface, brightness or luminance of a surface, laws of illumination - inverse square law and Lambert’s cosine law, types of photometers, photovoltaic photometer.

Unit -IV

Optical Instruments –
Effect of light : different plate and film coatings, adhesives & Ink -films, Light fastness and print characteristics.
Introduction and brief study of process cameras, contact printer and safe light and process chemicals.

RECOMMENDED BOOKS:
1. Optics by Brij Lal and Subrahmaniam
2. Optics by Ajay Ghatak
3. Engineering Chemistry by Jain and Jain
403
SHEET FED OFFSET TECHNOLOGY-II

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

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

Unit - I

Delivery unit-

Unit - II

Printing unit:

Unit - III

Process of printing operation:

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

Time: 3 hours  Max. Marks: 100

(25+75)

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

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

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

Unit-IV

REFERENCE BOOKS:
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.


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: Introduction, Electrolyted, ionisation, Definition of various terms used in electrolysis, Faradays' laws of electrolysis, Extraction of metals, Refining of metals, electro deposition, power supply for electrolytic processes.


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


Introduction, Resistance heating, Direct resistance.

Consideration and selection of electric motor for different industrial drives.

Recommended Books:
Industrial Training (PT-410)
Students will undergo for 4 weeks Industrial Training after exams in summer vacation
Time : 3 hours Max. Marks: 100 (25+75)

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

UNIT-I

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.
Computer graphics - Hearn & Backer.
Procedural elements for computer graphics - David F. Rogers.
Digital Imaging techniques (Block I)
Digital Imaging techniques (Block II)
Digital image processing - Gonzalez, Woods, Chanda,
Digital image processing and analysis –Majumdar
Digital image processing and computing- Schalkoff
411
SHEET FED OFFSET TECHNOLOGY (LAB)-II

Time: 3 Hours  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.
7. Printing a second colour on a printed sheet problems involved and overcoming them, adjustment of lays, change of packing etc.

412
MANUFACTURING PROCESS (LAB)

Time: 3 Hours  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 for butt welding and lap welding.
7. To perform pipe welding.
8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
9. To prepare simple engineering components/ shapes by forging.
10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
413
ELECTRICAL SYSTEMS IN PRINTING MACHINES- LAB

Time: 3 Hours 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.

414
COMPUTER GRAPHICS LAB

Time: 3 Hours 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 finder’s.
4. Introduction to Photoshop-how you can differentiate it from illustrator, different types of the formats, their compatibility to different software, introduction of tool box, uses of different filters, masking and working on images, creating a presentation using software.
5. Quark express: PageMaker up, formatting and editing in the software.
6. Flash: Introduction of 2-D animations, study of tool box, menu bar, how you can use them in your industry, how you can create different effects like moving on selected path, masking of images etc
INDUSTRIAL VISITS/EXHIBITION

Max. Marks: 50

Student has to submit a visit report on a assigned work by his/her concerned teacher & the report will be evaluate by the examiner appointed by Director/Chairperson.
### SCHEME OF STUDIES & EXAMINATIONS

**B. Tech. (Printing, Graphic & Packaging)**

**Vth Semester**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Internal Assessment</th>
<th>Exam. Schedule</th>
<th>Total Marks</th>
<th>Time</th>
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<td>501</td>
<td>PRINTING AND PACKAGING MATERIALS</td>
<td>25</td>
<td>75</td>
<td>100</td>
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<td>502</td>
<td>PRE-PRESS TECHNOLOGY</td>
<td>25</td>
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<td>25</td>
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<td>75</td>
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Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

**Unit - I**

**Metals**
Type of metals and characteristics of metals used for type alloys for foundry types, hot metal composition and stereos, Physical and chemical properties of aluminum, zinc, copper, nickel, chromium, magnesium in relation to printing applications.

**Photographic Materials**
Main kinds of films and photographic papers used in graphic orgination Films positives, mainbase, stripping, thickness, right and wrong reading, negatives; paper positive materials. Developers, Reducers, Intensifiers.

**Unit - II**

**Light Sensitive Materials**
Various sensitized materials, used and relationship with processes Silver halide emulsions-classification according to speed, contrast and spectral sensitivity.

**Paper and Ink**
Fibrous and Non-fibrous materials used in paper and board manufacturing. General characteristics and requirements of printing inks formulations pigments, vehicles, varnishes, solvents, agents.

**Unit - III**

**Adhesives**
Classes and characteristics of adhesives 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**

**Recommended Books :-**
- Printing Surface Praperation by C. S. Mishr
PRE-PRESS TECHNOLOGY

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

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

Unit - I

Introduction to colour
Basic colour theory, additive and subtractive 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 reproduction 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 etching, 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 results Control devices for proofing systems.

Planning for colour work


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

Unit - I

Development and growth of web offset press
Full size and mini web press; four basic types of web offset press, Press 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; advantages 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 panels of the web offset machines.

Folders
Introduction, folding principles, parts of folder, combination folder, ribbon folder, double-former folder, the mechanics 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
FLEXOGRAPHY TECHNOLOGY

Time : 3 hours
Max. Marks: 100

(25+75)

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

Unit - I

Introduction to 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.

Image carriers for flexography:

Unit - II

The Printing press:

Unit - III

Mounting and Proofing:
**Flexography 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:**

**Recommended Books :**
Flexography principles and practices - Foundation of flexographic technical association.
Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Unit - I

Assembly of film images:


Unit - II

Planographic plates:


Unit – III

Gravure image carrier:

Digital Image Carriers:

Recommended Books:-
Offset Plate Making - Robert F. Reed.
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.
DESIGN AND PLANNING FOR PRINT & PACKAGING

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

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

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

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

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

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

Unit - III
Design process:

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).
Principle of CAD.- Rooney J. & Steadman P.
Advertisement Management. - David A. Akar & John G. Myers.
Analysis of Electronic Circuit - Jal Baker.
Copy Preparation. - Leon O Chus & Pen Min Lin C. A.
511
PRE PRESS TECHNOLOGY- LAB

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

LIST OF EXPERIMENTS

2. making of own colour control patches.
3. Gray Scale (Drawing).
4. Drawings spectrophotometric curve by using spectro densitometre.
5. How to make colour separation negative of a four coloured original by using Electronic colour separation system.
7. colour Correction by using photography masking.
8. Six Colour Wheel.
10. Software for colour separation photoshop, coreldraw, quark express.
11. Preparation of originals for separation - reflection type and transparency.
12. Exposing tonal correction mask, making UCR mask/GCR mask etc.

512
WEB OFFSET TECHNOLOGY- LAB

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

1. Premake ready operations.
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.
513
FLEXOGRAPHY TECHNOLOGY - LAB

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

LIST OF EXPERIMENTS
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

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

LIST OF EXPERIMENTS
1. Comparative study of various materials and equipments used in Image Generation Department.
2. Preparation of wipe-on plates, Albumin plates.
3. Preparing deep-etch plates, pre-sensitized plate,
5. Study of gripper margin and registration processes,
6. Positioning of images for plate making,
8. 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.
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<td>ELECTRONIC COMPOSITION</td>
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Student has to submit a visit report on a assigned work by his/her concerned teacher & the report will be evaluate by the examiner appointed by Director/Chairperson.

TOTAL                              |                     |             |             | 950         |

Note: The paper of Environment Studies will teach as Special Paper in this semester.
PRINTING SUBSTRATE

Time : 3 hours

Max. Marks: 100 (25+75)

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

Unit - I

Paper:

Unit - II

Recycled paper:

Unit - III

Choosing a suitable paper:

Unit - IV

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

Unit-I

Introduction:
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 Press, 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, MICR cheque binding system. Machines used for packing and Dispatch.

Unit-III

Principles of stochastic screening:

Unit-IV

Practical experiences with offset litho printing:

Recommended Books :
Forms for the 80”s. How to design and produce them - Gar Raines.
Stochastic Screening - Kelvin Tritton.
603
PACKAGING MACHINERY LOGISTIC AND REGULATIONS

Time : 3 hours                  Max. Marks: 100

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

Unit-I

Packaging Machinery
Study of special packages and machines for Aerosols, easy opening device, carry home packs, Strip, Shrink, Blister, Skin, Stretch packaging, Cartons, pouch, Controlled Atmosphere(CAP), Modified Atmosphere(MAP) and Aseptic packaging system

Filling of Dry and Liquid Products, Filling of carbonated , Liquids and other Packaging techniques, Labeling and Thermoforming.

Unit-II

Packaging Laws and Regulations
Standards and standardization, Quality Standards
Standards for packaging material - rigid, non-rigid, and ancillary material.
Standards for export packages-labeling and marketing regulations.
Packaging quality control criteria.
Sampling, variables and attributes, AQL
Implication of ISO-9000.
Eco packaging and regulation.
Recycling and disposal of packaging waste.
Packaging Laws and regulations- legal requirements
Weights and measure/ Packaged Commodities Act and Regulations
Prevention of Food Adulteration (PFA) Act
FPO, FDA Rules and other related regulations
UN certificate code for packaging of Dangerous goods

Unit-III

Advance Package Printing
Advance Printing Processes used in special products and its packaging, Advance non impact printing technique for printing on regular as well as irregular shape packages. Composition of printing and ink transfer media, use of special papers and inks, Security applications, Holography and hologram stickers.

Unit-IV

Logistics and Physical Distribution
Physical distribution and material handling methods.
Handling and transportation.
Unit load system.
Palletisation: Skids and pallets – Principles, construction and application.
Conveyor: Loading and unloading and other mechanical handling application.

Recommended Books:
Packaging design and performance - Frank Paine
Advances in plastic packaging technology - John Briston.
Packaging design an introduction - Laszlo Roth.
Packaging Technology - Volume I,II,III - IIP
604

PRINT 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 ,role and various forms of Advertising
A. Print Advertising,
B. Internet Advertising
C. Outdoor Advertising

UNIT-II

Publishing Advertising
News paper, Magazines
Billboards
Leaflets, Hoardings, Pamphlets, Danglor

UNIT-III

Essential for Print Advertising:
1. Headline
2. Body copy (illustrations and photographs)
3. Text

UNIT-IV

Computer Application
Software’s used in Print Advertising
Printing Techniques in Print Advertising
Printing processes used for newspaper & magazines printing
Printing processes used for billboards printing

Recommended Books:-
Mass Communication Principal & Concept- Seema Hasan
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
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 equals marks.

UNIT-I

Elements in copy preparation:

UNIT-II

Typesetting methods:

UNIT-III

Desk Top Publishing:
Introduction, Origin, components of DTP, applications of DTP. History of DTP,Benefits of DTP,IBM-PC and DTP, Software for DTP, Graphic programs, Business Graphics, CAD design program, OCR software, Image software, Image editing commands crop, marquee tools, cloning tool, cut & paste, image filters. Pages make up software – approach, typography, document & text handling, applications. Standard program features – Adobe PageMaker, Ventura Publisher, Quark Xpress,Design studio, Frame maker, scanners for text, DTP as a typesetting front end – distributed desktop, 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:
Typesetting-Composition-Geoff, Barlow
Word Processor to Printed Page - Micheal Card
Digital Typography-Donald E.Knuth Introduction
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
COSTING AND ESTIMATING

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

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

UNIT-I

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 marketing 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:

UNIT-IV

Costing:

Recommended Books :
Principles of Accounting - B. S. Raman
Cost Accounting - B. R. Bhar
Print Management - Derek Porter
Printer’s Costing & Estimating - B. D. Mendiratta
Management Aspect of Printing Industry - T. A. Saifuddin.
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.

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

LIST OF EXPERIMENTS
1. Various samples of Paper and their study.
2. Different samples of Papers and their study.
3. Light fastness test.
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. Consumables and miscellaneous used in printing.

612
ELECTRONIC COMPOSITION LAB.

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

LIST OF EXPERIMENTS
1. Familiarizing with keyboard.
2. M.S.Word – Justification works, column work, single column, double column, fonts & type style changing, copy & cut & paste command, word art.
3. Page Maker – Designing of visiting cards, page makeup of pamphlets, page make up of advertisements, folders, journals, book work. Picture and text manipulation, Table work setting, tabular work setting.
4. Photo Shop – Introduction, Picture editing, scanning the picture, converting image formats, resizing the images.
LIST OF EXPERIMENTS

1. Operation and study of Aerosol, Strip, Blister, Packaging
2. Operations of the filling dry and liquid products.
3. Study of the recycling and disposal of packaging waste
4. Preparation of the regular as level as irregular shop packages
5. Study of how to print the holography and photograph strikers
6. Study the palletisation
7. Study of the loading and unloading process of the package

SECURITY AND STATIOARY PRINTING LAB

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

INDUSTRIAL VISITS/EXHIBITION

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

ENVIRONMENTAL STUDIES

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

Note: The Examiners will set eight questions. The 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
- 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.
## SCHEME OF STUDIES & EXAMINATIONS

### B. Tech. (Printing, Graphic & Packaging)

**VII Semester**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Exam. Marks</th>
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<td>701</td>
<td>PRINT AND PACKAGE MANAGEMENT</td>
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<td>702</td>
<td>PRINTING PLANT LAYOUT</td>
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<td>703</td>
<td>GRAVURE TECHNOLOGY</td>
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<td>QUALITY CONTROL IN PRINTING AND PACKAGING</td>
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<td>MINOR-PROJECT</td>
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<td>Student has to submit a project report on a assigned</td>
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</table>
UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Recommended Books :-

   (a.) Maintenance Engineering Handbook  
   (c.) Operator's Manually by GATF.  
UNIT-I

Site Selection:

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 layout combination 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. Retraction 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, appearance durable 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 building roof, walls, floor.

**Plant layout-An analytical approach:**


**Recommended Books:**

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.
703
GRAVURE TECHNOLOGY

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

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

UNIT-I
Gravure:

UNIT-II
Gravure Doctor blade assembly –

UNIT-III
Gravure Press and Its components:

UNIT-IV
Gravure Substrates:

Recommended Books :
Gravure process and technology - GAA.
Printing Technology - Adams, Faux, Rieber.
UNIT-I

Printing Inks

UNIT-II

Printing Ink manufacturing machines & equipments

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

UNIT-I

Introduction:

UNIT-II

Structure Of A Book:

UNIT-III

Securing Methods:
End Papers:


UNIT-IV

Finishing Processes:

Numbering

Binding & Finishing Machines:

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
QUALITY CONTROL IN PRINTING AND PACKAGING

Time : 3 hours  Max. Marks: 100

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

UNIT-I

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

UNIT-II

Management Consideration
Quality Control as an attitude and management tool, management'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 instruments 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, plate room and press room for specific processes and for general purposes. Press sheet control devices used for production of multicolor 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.


Recommended Books:
1. W.H. Banks, Inks, Plates and Print Quality, Pergamon Press
**711**

**GRAVURE TECHNOLOGY LAB.**

**Time:** 3 Hours  \hspace{3cm} **Max. Marks:** 75  
\hspace{2cm} (25+50)

**LIST OF EXPERIMENTS**

1. Study of various Gravure printing machine configurations.
2. Study of various components of a Gravure printing machine.
11. Check the practical problems in a Gravure printing process.

**712**

**PRINTING INK TECHNOLOGY LAB**

**Time:** 3 Hours  \hspace{3cm} **Max. Marks:** 75  
\hspace{2cm} (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

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

LIST OF EXPERIMENTS

I. Preparation of the following types of books.
   4. Preparation of Writing board.
   5. Preparation of Photo Album.
   6. Preparation of Receipt books with numbers in duplicate & triplicate.
   7. Preparation of Cheque books with 25 leaves.
   8. Preparation of following type of Mechanical binding - Spiral wire binding, Wire ‘O’ binding, Ring binding.
   10. 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.
   11. Preparation of telephone directory with Indexes and Tabs.
   12. 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.
714
QUALITY CONTROL IN PRINTING AND PACKAGING LAB.

Time: 3 Hours
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.
14. Test a printed sheet - proof printing and measurement of colour using spectro photometer, resistance testing of prints.

770
MINOR-PROJECT
MAX. MARKS: 50

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

**B. Tech. (Printing, Graphic & Packaging)**

**VIIIth Semester**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
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<td>ENTREPRENEURSHIP PROCESS</td>
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Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

UNIT-I

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

UNIT-II

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

UNIT-III

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

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

UNIT-IV

Maintenance procedures
Need and importance of maintenance - Definition, types of maintenance, Maintenance policies - Maintenance organization, Modern trends- Application of computers in maintenance. Identification & rectification of common faults in a printing machine

Lubricants, their types and Characteristics, types of lubricating systems - Mist, Wet sump and dry sump systems, Greases, oils, Greases oils grades.

Recommended Books :-
1. Electrical Engg. By B.L. Thareja Part I & II
2. A text book of Mechatronics by R K Rajput, S.Chand Publisher New Delhi
3. A course in workshop technology” Vol-II by B.S. Raghuwanshi, Dhanpat Rai & Co
4. Internal Combustion Engines by V. Ganesan, Mcgraw- Hill Education
802
DIGITAL PRINTING

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

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

UNIT-I

Digital Documents

UNIT-II

Digital Printing Processes

UNIT-III

Database Marketing’s Role:

UNIT-IV

Networking:

Recommended Books:
Digital Printing -
On Demand Printing - Howard M. Fenten, Frank J. Romano
Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

UNIT-I

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

UNIT-II

Quick Start Method:

UNIT-III

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

UNIT-IV

Instructional Models:
Govt. support to new enterprise, incentives, sources of finance. Entrepreneurship Development Centre, Role of Govt. and promotional agencies in entrepreneurship development, Entrepreneurship development programmes, Role of various institutions in developing entrepreneurship in India.

Recommended Books:
BOOK PUBLISHING

804

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

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

UNIT-I

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

Production & Estimating in Book Publishing

UNIT-III

Marketing and Distribution in Book Publishing

Editorial Organization in Publishing
The editorial functions in newspapers, journals, magazines and books.

UNIT-IV

Legal Aspects in book Publishing
Copyright, types of agreement between author and publishers, the outright sale of the copyright, profit sharing agreement, the royalty system, commission agreements The press and the law-libel, defense against libel, mitigation & damages.

Introduction to Booking and Circulation methods used in publishing houses.

Subsidy in the Publication of Books
Importance and need of subsidy ADVANCE PRINTING in the publication of books. Salient features of the subsidy scheme. Procedure of getting subsidy.
NEWS PAPER PUBLISHING

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

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

UNIT-1

Introduction to Newspaper organization
Newspaper Hierarchy - editorial organization, sources 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


UNIT-III

Newspaper layout & designing

UNIT-IV

Editorial content and news. The OP-ED page. The gate keeping function. Editorial Organization Newspaper Publishing Sources of news wire services, syndicates The role of copy editors, city editors, news editors, editorial cartoonist, artists, Sunday editors, sports editor, business editor, journalist & reporters, Information to a printer by editor. Recommended Books:
News Reporting and writing - Melvin Mecher
The Journalist; Handbook - M. V. Kamath
Editing; A Handbook for Journalists - TJS George
Telling Stories, Taking Risks - Klement/Mataline
Journalism in India - R. Parthasarathy
Headlines and Deadlines - Baskette, Floyd
806 (A)

ADVANCE PRINTING TECHNOLOGY

Time: 3 hours  Max. Marks: 100

(25+75)

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

UNIT-I

Modern Trend in Printing

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

UNIT-II

Pre-Press Techniques

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

UNIT-III

Print job planning and Stock control

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

UNIT-IV

Print Industry in India and Abroad

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

References Books:

1) Operator manual –GATF
2) Colour scanning and imaging systems-Gary field,GATF
3) Production Planning and inventory control-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

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

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

Unit-I


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

Unit-III


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, Grid, 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:
7. PDF : Printing & Workflow, Frank J. Romano, GATF Publication
806(C)
Advanced Packaging Technology

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

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

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

(b) For packaged goods- Unit package : compatibility studies, shelflife studies-with reference to flexible, rigid packs, different types of seals, closure etc. Bulk packages-Evaluation of transport worthiness of filled packages-physical and climatic hazards.
811
PRINTING MACHINERY MAINTENANCE-LAB

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

LIST OF EXPERIMENTS

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

812

DIGITAL PRINTING-LAB

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

LIST OF EXPERIMENTS

1) Colour Reproduction
2) File format TIFF,EPS,JPEG converting
3) Study of various output printing equipments
4) Page layout
5) Page formation
6) Digital work flow
7) Work flow for on demand printing
813
BOOK PUBLISHING-LAB
Time: 3 Hours Max. Marks: 75
(25+50)
LIST OF EXPERIMENTS

1. Introduction to type of Printing Presses for book publishing 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. Digital presses for Book Publishing

814
NEWS PAPER-LAB

Time: 3 Hours 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 Web presses & their working.

880
MAJOR-PROJECT Max. Marks: 50

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