



**B.Sc.(Printing & Packaging Technology)**

**Scheme of Examination**

**and**

**Syllabus**

**from 3<sup>rd</sup> to 6<sup>th</sup> Semester**

**Duration:** Three Year

**Eligibility:** 10+2 in any stream

w.e.f. Academic Session 2020-21



**Institute of Mass Communication and Media Technology**

**Kurukshetra University, Kurukshetra**

B.Sc. (Printing & Packaging Technology)  
**Scheme of Examination**  
w.e.f. Academic Session 2020-21

Semester		Th	P/FW	IA	T	Time
<b>3rd Semester</b>						
<b>BPPT-301</b>	Image Reproduction Technology	50	30	20	100	3 Hours
<b>BPPT-302</b>	Paper and Ink Technology	50	30	20	100	3 Hours
<b>BPPT-303</b>	Flexography	50	30	20	100	3 Hours
<b>BPPT-304</b>	Food Packaging	50	30	20	100	3 Hours
<b>BPPT-305</b>	BPPT-305 (A) Applied Physics	50	30	20	100	3 Hours
<b>Elective Paper</b>	BPPT-305(B) Advertising	50	30	20	100	3 Hours
<b>4<sup>th</sup> Semester</b>						
<b>BPPT-401</b>	Pre-Press Technology	50	30	20	100	3 Hours
<b>BPPT-402</b>	Computer Graphics	50	30	20	100	3 Hours
<b>BPPT-403</b>	Gravure Technology	50	30	20	100	3 Hours
<b>BPPT-404</b>	Web Offset Technology	50	30	20	100	3 Hours
<b>BPPT-405</b>	BPPT-405 (A) Applied Chemistry	50	30	20	100	3 Hours
<b>Elective Paper</b>	BPPT-405 (B) Sales and Marketing	80	-	20	100	3 Hours
<b>5<sup>th</sup> Semester</b>						
<b>BPPT-501</b>	Binding and Finishing Technology	50	30	20	100	3 Hours
<b>BPPT-502</b>	Printer's Science	80	-	20	100	3 Hours
<b>BPPT-503</b>	Book and Newspaper Publishing	50	30	20	100	3 Hours
<b>BPPT-504</b>	Packaging Machinery Logistic and Regulations	50	30	20	100	3 Hours
<b>BPPT-505</b>	Quality Control in Printing and Packaging	50	30	20	100	3 Hours
<b>6<sup>th</sup> Semester</b>						
<b>BPPT-601</b>	Digital Printing	50	30	20	100	3 Hours
<b>BPPT-602</b>	Security Printing	50	30	20	100	3 Hours
<b>BPPT-603</b>	Costing and Estimating	80	-	20	100	3 Hours
<b>BPPT-604</b>	Management and Entrepreneurship	80	-	20	100	3 Hours
<b>BPPT-605</b>	Major Project		100		100	

**Note:**

**Abbreviation of some points:-**

**Th- Theory, P- Practical, FW- Field Work, IA- Internal Assessment, T- Total**

## BPPT-301

### IMAGE REPRODUCTION TECHNOLOGY

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### UNIT – I

**Basic principles of reproduction photography:** line photography; Basic density range of line original Basic line exposure for computerized camera with on-line or off-line densitometer, equipments and accessories. Contact photography – Spreads and chokes, Line separation from black and white art work, Evaluation of line negative.

#### UNIT – II

**Halftone photography** – Introduction to the concepts, Theories of dot formation, Selection of screen ruling, Introduction to different halftone screens, glass screen (brief study), contact screens – Grey and magenta Contact screen manufacture, Density gradient of contact screens, Negative, Positive, standard or universal contact screen. Pre-screened emulsion. Half tone exposure: Special features of half tone exposure. Factors affecting the halftone exposure. Basic halftone exposure setting on ordinary and computerized camera with off-line and on-line densitometer.

#### UNIT-III

**Contrast control:** Contrast with glass screen: S.D. variation, multiple stop system (brief study) Contrast control with contact screens Determining B.D.R. and main exposure of the contact screen, Highlight compensation, Use of CC filters with magenta contact screen determining CC filters and exposure calculations. Auxiliary or supplementary exposures: Contrast control with supplementary exposures. Flash exposure-Deciding the basic flash exposure, for contact screens Exposure calculations. No screen exposure-calculations. Line and halftone combination, Evaluation of halftone negative.

#### UNIT-IV

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

**Recommended Books:**

Line photography- Karl Davis Robinson

Halftone Photography – Erwin Jaffe

Small Offset Preparation & Process- Les Crawhurst

Printing Technology- Adams, Faux, Rieber.

Reproduction Systems- V.S. Raman

Digital Photography- Anthony Hamber, Phill Green.

## IMAGE REPRODUCTION TECHNOLOGY- LAB

### 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
6. Finding B.D.R. and main exposure time of contact screen .
7. S.D. calculations and S.D. setting and contrast control with glass screen
8. Study of densitometer.

## BPPT-302

### PAPER AND INK TECHNOLOGY

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### UNIT - I

**Paper:** Introduction, Paper fibers and non-fibers materials, Paper manufacture - Pulp preparation - mechanical pulp, Chemical processes, semi chemical process. Bleaching, Screening and Cleaning, Stock preparation, Paper making machine - Wire section, Press section and Drier sections, Calendaring and, super calendaring.

#### UNIT - II

**Recycled paper**-Introduction, Recycling process, De-inking chemistry-Pulping, Ultrasonic treatment, Flotation deinking, wash deinking, Printing defects associated with paper. Reel defects. Paper Testing, Influence of moisture and RH on paper, Paper storage and handling, Paper properties- physical, strength, optical, and printing- printability, runnability.

#### UNIT - III

**Printing Inks** - Introduction, Ingredients in Ink- pigments, vehicles, additives, Drying mechanisms- physical drying, absorption drying, evaporation drying, chemical drying systems, radiation drying and curing, microwave drying, infrared drying, Ink requirements for printing processes,

#### UNIT-IV

**Security printing Ink**- Ink manufacturing machines, Security Inks, Types of security inks, Special security features - fluorescence, phosphorescence, Basic properties of ink, Trends and developments in ink manufacturing process, 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

## **PAPER AND INK TECHNOLOGY LAB**

### **LIST OF EXPERIMENTS**

1. Different samples of Papers and their study.
2. Effect of Humidity and Temperature on paper.
3. GSM Test.
4. Printed samples of different printing processes and their study.
5. Different samples of paperboard and their study.
6. Study of various component of ink.
7. Ink tackiness Test.
8. Printed samples of different printing processes and their study.
9. Ink Viscosity Test.
10. Different samples of Inks and their study

**FLEXOGRAPHY TECHNOLOGY**

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

**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:**

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

**UNIT - II**

**The Printing press:**

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

**UNIT - III**

**Mounting and Proofing:**

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

**Flexography and Bar-coding:**

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:**

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

### **Recommended Books :**

Flexography principles and practices - Foundation of flexographic technical association

Hand book of Print & Production - Micheal Barnard, John Peacock

Introduction to Printing Technology - Hugh M.Speirs. SIGPA - 1987

Printing Technology- Adams, Faux, Rieber.

## **FLEXOGRAPHY TECHNOLOGY – LAB**

### **LIST OF EXPERIMENTS**

1. Introduction and familiarizing flexographic machine and other related elements.
2. Preparation of rubber plates.
3. Preparation of Liquid photo polymer plates, Sheet photo polymer plates.
4. Registering and plate mounting on flexographic plate cylinder.
5. Make ready procedures of a flexographic machine.
6. Printing single color and multicolor
7. Studying of 6 color and 8 color flexographic machines.

**BPPT 304**  
**FOOD PACKAGING**

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

**UNIT-1**

**Introduction**

- Food packaging: Definition,
- Functions of food packaging,
- Need of food packaging
- Role of packaging in extending shelf life of foods
- Safety assessment of food packaging materials
- Different forms of packaging.
- Rigid, semi-rigid, flexible forms of packaging in food industries..
- Different packaging system for-Dehydrated foods, Frozen foods, Dairy products, Fresh fruits, Vegetables, Meat, Poultry, Sea foods.

**UNIT 2**

**Aseptic packaging of foods**

- Principles of sterilization,
- sterilization of packaging material,
- verification of sterilization processes,
- aseptic packaging systems: carton systems, can systems,
- bottle systems, sachet and pouch systems, cup systems □

**UNIT 3**

**Active and Smart packaging**

- Definition
- Smart packaging systems
- intelligent packaging systems: Quality Indicators, Time-temperature
- indicators, gas concentration indicators, RFID;
- Safety and Regulatory issues

**UNIT 4**

**Properties & selection of packaging materials**

- Tensile strength, bursting strength, tearing resistance, puncture
- resistance, impact strength, tear strength,
- Barrier properties of packaging materials,,
- prediction of shelf life of foods,

**REFERENCE BOOKS:**

Gordon L. Robertson, Food Packaging: Principles and Practice, Third Edition,2013.  
Gordon L. Robertson, Food Packaging and Shelf Life: A Practical Guide,2010.  
Ruben Hernandez, Susan E. MSelke, John Culter, John D. Culter,  
Plastics Packaging: Properties,Processing, Applications, and Regulations,2000.  
Walter Soroka, Fundamentals of Packaging Technology-Fourth Edition,

## **FOOD PACKAGING- LAB**

### **LIST OF EXPERIMENTS**

1. Identification of different types of packaging and packaging materials
2. Determination of tensile strength of given material
3. Determination of tearing strength of paper
4. Determination of bursting strength of packaging material
6. Determination of drop test of food package
7. Visit to relevant industries
- 8 Introducing the students with the latest trends in packaging consulting the web sites and magazines

**APPLIED PHYSICS**

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical:30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

**Unit-1**

**Newton's laws and their applications**

Statement and explanation of the Newton's laws of motion, Inertial frames of reference, Galilean transformations, Atwood machine, Static and dynamic friction, Motion along inclined plane with and without frictional force, Use of free body diagrams, motion in a resistive medium, terminal velocity.

**Unit -2**

**Work energy and conservation laws**

Work done by a constant and a variable force, power, kinetic energy, conservative and non-conservative forces, potential energy, law of energy conservation, momentum, impulse, collisions, elastic and inelastic collisions, conservation of momentum, ballistic pendulum, rocket motion.

**Holography**

Holography Principles of Holography, Recording of holograms, types of holograms, reconstruction of objects from holograms, applications of holography: 3D reconstruction, Interferomet

**Unit – 3**

**Motion of rigid bodies**

Angular velocity, angular momentum and acceleration, kinetic energy in rotational motion, moment of Inertia of a body; calculation of moment of inertia of a disk, annular ring, solid sphere and rectangular bar; parallel and perpendicular axis theorems, torque and dynamics of rotational motion, conservation of angular momentum with illustrations.

**Viscosity**

Laminar flow, the coefficient of viscosity, Poiseuille's method of measuring viscosity, temperature dependence of viscosity, Stokes' law.

## Unit – 4

### Surface tension

Molecular interpretation of surface tension; Surface energy; Angle of contact and Wetting ,Pressure difference across a curved surface; Interfacial tension, Drop weight method with necessary theory, factors affecting surface tension.

### Elasticity

Elasticity and plasticity, Stress and strain, elastic moduli, relationship between elastic constants, Poisson's ratio, work done in stretching a wire, bending of beams, bending moment, theory of single cantilever, couple per unit twist, torsional oscillations. Wetting, Pressure necessary theory,

### References

1. Concepts of Physics Vol (1)-HC Verma, BharathiBhavan Publishers, 2004.
2. Mechanics- Berkeley Physics Course Vol(1)- Mittal,Ifuight&Rudermann, TMH, Delhi, 1981.
3. Mechanics, K R Symon, 3'd Edition, pearson, 2016.
4. Mechanics, S Datta, Pearson, 2012.
5. Oscillations and Waves - DP Khandelwal, Himalaya Publishing House, 1976.
6. Elements of Properties of matter - DS Mathur, Shamlal Charitable Trust, Delhi, 1996.
7. Properties of Matter - Brijlal&Subramanyam, S Chand & Co, 1992.

## **APPLIED PHYSICS- LAB**

### **LIST OF EXPERIMENTS**

1. Atwood machine - with photo gate.
2. . Determination of coefficients of static, kinetic and rolling frictions.
- 3 Verification of principle of conservation of energy.
4. Fly wheel.
5. Verification of parallel and perpendicular axis theorem.
6. Searle's double bar.
7. Work done by variable force.
8. Cantilever of negligible mass to find Young's modulus.
9. Young's modulus by Stretching.

## **BPPT 305(B)**

### **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.

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### **Unit I**

##### **Introduction**

Definition, Nature & Scope of advertising, Roles of Advertising; Societal, Communication, Marketing & Economic, Functions of advertising, Based on target audience, geographic area, Media & Purpose, Corporate and Promotional Advertising, Web Advertising.

#### **Unit II**

##### **Planning to execution**

Client Brief, Account Planning, Creative Strategy and Brief, Communication Plan, Brand Management - Positioning, brand personality, brand image, brand equity. Case studies.

#### **Unit III**

##### **Visualization process**

Conceptualization and Ideation, Translation of ideas into campaigns, Visualization Designing & Layout, Copy writing - Types of headlines, body copy base lines, slogans, logos, & trademarks. Typography, Writing styles, Scripting. Story board, Advertising campaign-from conception to execution.

#### **Unit IV**

##### **Ad Agency & Media, Trends, Structure & Functions of Ad Agency**

Environment, Components -Advertiser, Advertising agency & Media. Consumer behavior, Latest trends in advertising - (India and abroad). Ad Agency - Structure of small, medium & big agencies, functions. Types of agencies - in-house, Independent, Full-service & Specialized, Legal aspects & ethical issues.

#### **REFERENCES**

Sandage, Fryburger and Rotzoll (1996) Advertising Theory and Practice. AAITBS Publishers  
Stansfield, Richard: Advertising Managers Handbook. UBBSPD Publications. Third Edition  
Advertising Handbook: A Reference Annuaikon Press TV , Radio and Outdoor Advertising.  
Different Years ATLANTIS Publications  
Mohan: Advertising Management: Concepts and Cases. Tata McGraw-Hill  
Jewler, E (1998): Creative Strategy in Advertising. Thomson Learning



## **Advertising- Lab**

### **LIST OF EXPERIMENTS**

1. Prepare a design for newspaper advertisement
2. Banner and Pamphlet design
3. Logo and Trademark design
4. Book and magazine cover page design
5. Structural outline of ad agency

## **BPPT-401**

### **PRE-PRESS TECHNOLOGY**

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### **UNIT - I**

**Pre-press-** Processes in pre –press, Basic colour theory, colour scheme, Additive and Subtractive colours, Process colours, Application of the colour theory to colour reproduction, Exposure, Colour balance, Memory colours, Contrast, Film transparency.

#### **UNIT - II**

**Colour Reproduction** - Process cameras-Vertical process camera and Horizontal process camera, Parts of process camera, Image setter-Drum and Flatbed Image setter, Ctp (Computer to plate) operations, Ctp types, Colour control - Gray scale, Colour patches, Colour bar, Densitometer.

#### **UNIT - III**

**Colour Separating methods** -Direct separation method and Indirect colour separation method, Methods and procedures followed for making the black printer negative, Objectives of colour correction, Hand correction, Tools used for hand correction, Masking, Types of mask, Electronic colour separation and correction.

#### **UNIT - IV**

**Press proofing-** Proofing methods, Purpose of proofing and importance, Types of proofing press, Photographic film, Scanner, Types of scanner, Quality control in Pre-press, Overview of colour reproduction from original to printing.

#### **Recommended Books :-**

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

## **PRE-PRESS TECHNOLOGY - LAB.**

### **LIST OF EXPERIMENTS**

1. Setting of process camera
2. Study of Additive and Subtractive colours
3. Making of Half tone negative using process camera
4. Making of own colour control patches.
5. Gray Scale (Drawing).
6. Six Colour Wheel.
7. Planning for four Colour Newspapers designs.
8. Study of Densitometer

## BPPT-402

### COMPUTER GRAPHICS

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### UNIT-1

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

#### UNIT-II

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

#### UNIT-III

**Fundamental concepts of digital image processing** - introduction, objectives, visual perception - structure of human eye, image formation in the eye, brightness adaptation and discrimination. Digital image representation, basic steps of image processing, elements of image processing system - image acquisition, storage, processing, communication, display.

#### UNIT-IV

**Color model and color applications** – Properties of light, standard primaries and the chromaticity diagramme XYZ color model, CIE chromaticity diagram, RGB color model, CMY color model, color selection and application,

**Illumination model and surface rendering method**—Light sources, basic illumination models, ambient light, diffuse reflection, displaying continuous tone images, halftone pattern and dithering technique.

#### **Recommended Books:**

Computer graphics principles & practice 2nd edition - **Van Dam, Foley, Fiener Hughes.**

Principle of Interactive Computer Graphics 2nd edition - **William N. Newman, Robert S.Sproull.**

Computer graphics - **Hearn & Backer.**

Procedural elements for computer graphics - **David F. Rogers.**Digital imaging techniques (Block I)

Digital Imaging techniques (Block II)

Digital image processing - **Gonzalez, Woods, Chanda,**

Digital image processing and analysis –**Majumdar**

Digital image processing and computing- **Schalkoff**

## COMPUTER GRAPHICS LAB

### 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

## BPPT-403

### GRAVURE TECHNOLOGY

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical:30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

#### UNIT-I

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

#### UNIT-II

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

#### UNIT-III

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

#### UNIT-IV

**Gravure Substrates:** Paper substrates-Rotonews papers, Coated papers, Gravure packaging paper substrates – properties. Label stock, Paper board. Non Paper substrates – surface preparation, plastics-properties. Metalized films – Aluminum foil, Foil laminations. Gravure advantages, limitations. Future of Gravure Printing Industry.

#### **Recommended Books :**

Gravure process and technology – GAA.

Printing Technology – Adams, Faux, Rieber.

## **GRAVURE TECHNOLOGY LAB.**

### LIST OF EXPERIMENTS

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

## BPPT-404

### WEB OFFSET TECHNOLOGY

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical:30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

#### 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, causes 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 me-chanics of folding process of jaw fold, chopper fold mechanism. Operation of collect cylinder, press folders, double former prefolder, flow folders, insert folders.

### **Recommended Books :**

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

## **WEB OFFSET TECHNOLOGY- LAB**

### LIST OF EXPERIMENTS

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.
9. Study of Web-breaks.
10. Operations of Folding machine.

## BPPT-405(A)

### APPLIED CHEMISTRY

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical:30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

#### UNIT-1

**Thermodynamics** - Second law, concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change, Chemical Potential, Gibb's Helmholtz equation, Clausius - Clapeyron equation, Related numerical problems with above topics. Phase-Rule - Terminology, Derivation of Gibb's Phase Rule Equation, One Component System (H<sub>2</sub>O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

#### UNIT-2

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

#### UNIT-3

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

#### UNIT-4

**Polymers and Polymerization**-Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermo-plastics (PVC,PVA), thermosets (PF,UF), and elastomers (SBR,GR-N), Silicones, Introduction to polymeric 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 (DhanpatRai& Co.).
2. Chemistry in Engineering & Tech., Vol.I& II, Rajaram, Kuriacose (TMH).
3. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
4. Physical Chemistry, P.W. Atkin (ELBS, Oxford Press).
5. Physical Chemistry, W.J. Moore (Orient-Longman).

**CHEMISTRY LAB****LIST OF EXPERIMENTS**

1. Determination of  $\text{Ca}^{++}$  and  $\text{Mg}^{++}$  hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting & eutectic point for two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
6. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.

## **Sales and Marketing**

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

**Total Marks: 100**  
**Theory Marks: 80**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

### **Unit I**

#### **Introduction**

Introduction to Sales, Product, Price, Place, Promotion. Skills in selling hard skills, soft skills. Sales Process: Sales process overview Prospects & characteristics a good prospect Qualifying Placing presentation Objections Handling objections Closing sales

### **Unit II**

#### **Marketing**

Marketing Concept, Nature, Functions & Importance; Selling vs. Marketing; Marketing Environment: Nature, Types & Strategies to deal with Internal & External (Micro& Macro) Marketing Environment; Ethical & Social Responsibilities of Marketing.

### **Unit III**

#### **Consumer Behaviour**

Consumer Behaviour & its characteristics, Factors Influencing the Consumer Behaviour, Consumer Buying Process, Buying Motives, Consumer Markets in India, Models of Consumer Behaviour- Phenomenological models, Logical Models (short explanation with example of each), Theoretical model (Howard-Sheth Model)

### **Unit IV**

#### **Market Segmentation**

Market Segmentation Concept, Importance and basis, Target Market Selection; Market Positioning: Concept & Importance, Market Repositioning; Product Differentiation vs. Market Segmentation; Contemporary issues in Marketing

**SUGGESTED READINGS:**

- Kotler “Marketing Management”, 8th Edition
- Kotler, Armstrong, Agnihotri, Haque- Principles of Marketing- South Asian Perspective (Pearson)
- Kotler,Keller,Koshy And Jha “ Marketing Management” 13th edition Pearson Education
- Ramaswamy VS, Namakumari “Marketing Management” 4thMacmillan
- Shukla A.K. “Marketing Management” 1st edition, VaibhavLaxmiPrakashan
- Evance&Berman “ Marketing Management”2007, Cenage Learning
- Mcdenial,Lamb,Hair “ Principles Of Marketing 2008”Cenage Learning
- William M. Pride and O.C Ferrell: Marketing; Houghton - Muffling Boston
- Stanton W.J. et al: Fundamentals of Marketing, McGraw H

## BPPT-501

### Binding and Finishing Technology

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical:30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

#### UNIT-I

**Introduction** to the terms 'Binding ' and 'Finishing'. List of major operations performed in binding and finishing Pre-forwarding, Forwarding, Finishing. Tools and equipment's used for binding, binder's aids and or marks. Material used in Binding and Finishing .Paper- British standard and ISO paper sizes. Multiples and subdivisions of a given size. Advantages and Limitations of different measurement standards. Units for number of paper- ream, quire, gross. Study of different types applications of board used in binding and finishing work. Securing materials-Thread, wire, tape, cord – Selection based on application, gauge of wire, thread strength, and cost. Covering materials- Binding cloth, Mull cloth, rexine, leather – grain direction, surface, Applications, cost. Study of properties and applications of different types of adhesives such as glue, paste, hot melt, PUR (polyurethane reactive)

#### UNIT-II

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

#### UNIT-III

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

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

## UNIT-IV

### **Finishing Operations:**

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

### **Binding & Finishing Machines:**

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

### **Recommended Books :-**

Binding And Finishing - Ralph Lyman Binding And Finishing Part-1 - B.D.Mendiratta

Binding Finishing Mailing - T.J.Tedesco Introduction to Printing & Finishing - Hugh Speirs

Finishing Process in Printing - A.G.Martin.



## **BINDING AND FINISHING TECHNOLOGY LAB.**

### **LIST OF EXPERIMENTS**

1. Preparation of Quarter, Half and Full bound books using, French sewing method / Tape sewing method / Cord sewing method / Saddle sewing method / Side sewing meth
2. Preparation of Writing board.
3. Preparation of Receipt books with numbers in duplicate
4. Preparation of following type of Mechanical binding - Spiral wire binding, Wire 'O' binding, Ring binding.
5. 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.
6. Preparation of telephone directory with Indexes and Tabs.
7. 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.
8. Print finishing operation to be conducted - Gold blocking, Embossing, Edge decoration, Thermography, Marbling, Velvet printing, Rubber printing, Die printing, Pouch lamination

## BPPT-502

### PRINTER'S SCIENCE

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

**Total Marks: 100**

**Theory Marks: 80**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

#### UNIT -I

**Colloids** :Characteristics, Proportion, application in Printing Industry.

**Theory of Electro deposition**, Printing equipments, factors affecting nature of Electrodeposit, chromium Plating, Anodising of metal.

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

#### UNIT -II

**Introduction of Photo chemistry**

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

**Surface characteristics in printing** - Surface tension, contact angles, capillary action, interfacial tension, measurement of contact angle, Hydrophobic and hydrophilic, surface water and ink interaction.

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

#### UNIT -III

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

#### UNIT -IV

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

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

#### RECOMMENDED BOOKS :

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

## **BPPT-503**

### **BOOK AND NEWSPAPER PUBLISHING**

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### **UNIT-I**

Book Publishing -Introduction, Parts of a book, Basic steps in book publishing, Areas of publishing - general publishing, educational publishing, professional publishing and reference publishing, Editorial organization, the role of commissioning editor, the desk editor, Relationship of the Editor with the manuscript, Types of agreement between author and the publishers.

#### **UNIT-II**

Technical aspects of production from receipt of manuscript to completion of book, Work flow and organizational structure in a commercial printing press., Management- The production manager, The marketing manager, Financial Manager, Advertisement departments, International book trade and barriers. Subsidy in the Publication of Books, Importance and need of subsidy, Procedure of getting subsidy.

#### **UNIT-III**

Introduction to Newspaper organization - Sources of news, printing of newspaper, Elements in design, Editorial organization, 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.

#### **UNIT-IV**

Distribution channels, Types of distribution channels, Work flow and organizational structure in a newspaper printing press. The various type of layout, Functions of headlines, kickers, and blurbs, Graphics/diagrams and illustrations and their importance.

**Recommended Books :** News Reporting and writing - Melvin Mecher The Journalist; Handbook - M. V. Kamath Editing; A Handbook for Journalists - TJS George Editing; A Handbook for Journalists - TJS George, Indian Institute of Mass communication, Delhi. Telling Stories, Taking Risks - Klement/Mataline Journalism in India - R. Parthasarathy Headlines and Deadlines - Baskette, Floyd

## **BOOK AND NEWSPAPER PUBLISHING- LAB.**

### **LIST OF EXPERIMENTS**

1. Introduction to type of Web Presses as per the configuration & end products.
2. Study of various printing machine units & their setting.
3. Study of various pre-make ready operations.
4. Preparation of a multi-colour book cover page
5. Study of various make-ready operations.
6. Printing single & multicolour jobs.
7. Introduction to Digital presses & their working.

## **BPPT-504**

### **PACKAGING MACHINERY LOGISTIC AND REGULATIONS**

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical:30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### **UNIT-I**

**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.

Conveyer: Loading and unloading and other mechanical handling application.

#### **Recommended Books:**

Packaging design and performance - **Frank Paine**

Advances in plastic packaging technology - **John Briston.**

Packaging design an introduction - **Laszlo Roth.**

Packaging Technology - Volume I,II,III - IIP

## **PACKAGING MACHINERY LOGISTIC AND REGULATIONS**

### **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

## BPPT-505

### QUALITY CONTROL IN PRINTING AND PACKAGING

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

**Total Marks: 100**  
**Theory Marks: 50**  
**Practical: 30**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### 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, plateroom and press room for specific processes and for general purposes Press sheet control devices used for production of multicolour printing jobs Basic principles of these instruments and devices how they function and what they measure, minimum instrumentation necessary to produce a product consistent with the appropriate quality level.

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

#### **Recommended Books:**

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



## **QUALITY CONTROL LAB.**

### **LIST OF EXPERIMENTS**

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

## BPPT-601

### DIGITAL PRINTING

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical: 30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

#### UNIT I

**PRINCIPLES AND BASIC COMPONENTS** -Variable Data Printing; Print on Demand; Evolution – Computer to Press, Computer to Print; Non-Impact Printing Technologies - Overview, Process characteristics, economics, job suitability; Computer to Print systems – Digital Front Engine, Components, Architecture, Inline Print Finishing; ISO Standards

#### UNIT II

**ELECTROPHOTOGRAPHY, IONOGRAPHY & MAGNETOGRAPHY** - Principle of Electrophotography, Imaging Systems, Inking Unit (Developing Unit) and Toner Fixing and Cleaning, Conception of the Printing Unit, Ionography, Printing Unit, Imaging System and the Principle of Ionography, Printing Unit Concepts and Printing Systems based on Ionography; Principle of Magnetography, Imaging System for Magnetography, Examples of Applications/Printing Systems

#### UNIT III

**INK JET & NANOGRAPHIC PRINTING** - Overview of Ink Jet Technologies and Processes, Continuous Ink Jet, Drop on Demand Ink Jet Technologies, Structure of Ink Jet Arrays, Printing Systems based on Ink Jet Technology for Multicolour Printing (Selection); Nanographic printing – Principle, Inks, Press configuration; **UNIT IV THERMOGRAPHY AND ELECTROGRAPHY** 9 Overview of Thermography, Technologies, Thermal Transfer Printing Systems, Thermal Sublimation Printing Systems, Electrography, Photography, “X”-Graphy, TonerJet Printing Technology, Elcography, Direct Imaging Printing Technology, Assessment of New Types of NIP Technologies.

#### UNIT V

**Networking:** Networks for printing. Networks for publishing. Networks for Inhouse. WAN (Wide Area Networks). **APPLICATIONS** -Hybrid Printing Systems – Configuration, Integration, Applications; Printed Electronics, Photography, Coding, Display and Signages, Textiles, Security Printing – Inks, Substrates, Digital Press configurations, Major manufacturers;

#### Recommended Books :

Digital Printing -

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

**TEXT BOOKS:** 1. Harald Johnson, Mastering Digital Printing, Cengage Learning PTR; 2 edition, 2004 2. Mitchell Rosen, Noboru Ohta, Colour Desktop Printer Technology, CRC Press, 2006

**REFERENCE:** 1. Helmut Kipphan, Handbook of Print Media, Springer Verlag, 2001

## **DIGITAL PRINTING LAB**

### **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

**SECURITY PRINTING**

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

**Total Marks: 100**

**Theory Marks: 50**

**Practical: 30**

**Internal Assessment: 20**

**Time: 3 Hrs. (for theory paper)**

**Unit-I**

**Introduction:**

Security Printing its definition and requirement, currency printing, Introduction to Security Printing, Optical document security, importance of security printing of bank note papers and boards, passports and government documents. UV visible Printing, rainbow printing, micro lines, guilloches, numbering, Line-printing, stamp embossing, hot-foil-embossing, embossing / punching, fibers, hologram, solvent colour, multi colour UV-fluorescence stitching thread, holographic foil or lamination of a page, Digital Watermark.

**Unit-II**

**Inks and Brand Security Inks:**

Invisible inks, Specialist security printers inks; such as thermo chromic, UV fluorescing, water fugitive, solvent sensitive inks, combifuge, photo chromic, Fluorescent Inks, Watermarks, Testing, Deterrent measures Brand Security: First line inspection of documents using optical elements such as Holograms, optical variable graphics, diffraction structures, liquid crystal materials, optical security in laminates etc., invisible document security and Brand protection.

**Unit-III**

**Security Products:**

Credit Cards, Smart cards, club cards, credit / debit cards, Plastic ID cards, Water mark cards, RFID technology, Bar codes, Printers used for bar codes, Cheques and their value documents, MICR/OCR/Cheque printing technology Counterfeit, fraud prevention, Cheque fraud prevention, method and arrangement for processing negotiable instruments.

**Unit-IV**

**Applications**

Security design and processes for various print products: Barcodes, Holograms, cheque printing-MICR cheques and Reserve Bank of India (RBI) specifications, finishing, paper specifications-Manufacturing process of – Bank Notes – Business forms – Certificates Passports – Packaging - Card printing. Different types of machines used for producing various security products. Recent trends and developments in security printing.

**Recommended Books :**

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

TEXT BOOKS: 1. Richard D. Warner, Richard M. Adams, "Introduction to Security Printing", PIA/GATF Press, 2005 REFERENCES: 1. A.S. Bhaskar Raj, Barcode Technology and Implementation, McGraw Hill, 2007. 2. Developments in Security Labels and Tags, Rudie Lion, Pria International Ltd. 3. Martin Monestics, The Art of Paper Currency, Quarlet Books Ltd.,1983.

Stochastic Screening - Kelvin Tritton.

## SECURITY PRINTING LAB

### LIST OF EXPERIMENTS

1. Study of hot-foil-embossing, embossing , punching,
2. Study of various security inks
3. Collection of various security papers.
4. Holograms printing
5. Security features of currency and bank cheque
6. Structural design of Barcodes,

## **BPPT-603**

### **COSTING AND ESTIMATING**

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

**Total Marks: 100**  
**Theory Marks: 80**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### **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:**

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

#### **UNIT-IV**

##### **Costing:**

Job costing, its need and procedures. Elements of cost and their method of recovery. Cost sheet. Daily Docket. Work Instruction Ticket and their importance in costing.

**Recommended Books :**

Principles of Accounting - B. S. Raman

Fundamentals of Financial Management - Prasanna Chandra.

Cost Accounting - B. R. Bhar

Print Management - Derek Porter

Printer's Costing & Estimating - B. D. Mendiratta

Management Aspect of Printing Industry - T. A. Saifuddin.

Estimating Methods and Cost Analysis for Printers - K. S. Venkataraman, K. S. Balaraman.

Printing Estimating Principle & Practice - Philip Kent Ruggles

Print Production Management - Gray G. Field

Principles of Applied Costing for Printing Industry - K. S. Venkataraman.

## BPPT-604

### MANAGEMENT AND ENTREPRENEURSHIP

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

**Total Marks: 100**  
**Theory Marks: 80**  
**Internal Assessment: 20**  
**Time: 3 Hrs. (for theory paper)**

#### UNIT-I

**Printing Industry in India, Management** – Nature of Management, Functions of Management, Production and operations Management – Locations and Layout of plant, Advertising, Maintenance management, Total quality management (TQM), Marketing management – Marketing and its functions,

#### UNIT-II

**Human resource management:** Manpower planning – recruitment, selection, Training performance, appraisal Wage and salary administration, Financial Management, Nature, Scope objectives and functions of Financial Management, Work flow and organizational structure in a printing press. Depreciation - Introduction to different methods and their comparison.

#### UNIT-III

**Entrepreneurship** - Recognition of the need for entrepreneurship, Significance of entrepreneur in Economic Development, Scope and trends of small enterprises, Types of small enterprises, Selection of a potential entrepreneur, Business Planning Process: Good business plan requirement, Methods and Procedures to start and expand one's own business, life cycle of new business,

#### UNIT-III

**Forms of Ownership-** Different forms of ownership- sole proprietorship, partnership, joint stock company, Selling, Selling your venture, Responsibility of a good employer, Risk management, Govt. support to new enterprise, Entrepreneurship Development Centre, Entrepreneurship development programmes.

**Recommended Books** : Entrepreneurship Development - Colombo Plan Staff College for Technician Education. Entrepreneurship Development & Management - Jose Paul, N. AjithKumar. Entrepreneurship Development Programmes & Practices - Jasmer Singh Saini.

**Recommended Books** :- 1. T.A. Saifuddin – Management aspects of printing industry by NirmalSadanadn Publishers, Mumbai, 1st edition. 2. G.G. Field- Printing Production Management by Graphic Arts Publishing, 1996. 3. Balaraman – PMCA by Ramaya Features & publications, 1987.



**BPPT-605**

**MAJOR PROJECT**

**Note: Project/Report to be evaluated by a panel of three examiners to be appointed by the Director of the Institute and it is to be submitted to the Institute by the student 20 days prior to the theory examination of the semester in which the Project/Report is supposed to be submitted.**

**Total Marks: 100**