B.Tech (Printing, Graphics & Packaging)

Credit based system

Syllabus

w.e.f. Academic Session: 2019-2020 for 5th to 8th semester

Institute of Mass Communication and Media Technology

Kurukshetra University

STUDIES & EXAMINATIONS
5th semester

w.e.f. 2019-20 in phased manner

B. Tech. (Printing, Graphic & Packaging) – 2019-20

Subject Code	Subject area	subject Title	Teaching Schedule				Credits	Allotments of Marks				Duration of Exams(Hrs)
								Major Test	Minor Test	Practical	Total	
			L	T	P	Hours/Week						
PGP 501	PC	PRINTING MATERIAL	4		0	4	4	60	40		100	3
PGP 502	PC	PRE PRESS TECHNOLOGY	4		0	4	4	60	40		100	3
PGP 503	PC	WEB OFFSET TECHNOLOGY	3		0	3	3	60	40		100	3
PGP 504	PC	FLEXOGRAPHY TECHNOLOGY	4		0	4	4	60	40		100	3
PGP 505	PC	PRINTING IMAGE GENERATION	3		0	3	3	60	40		100	3
PGP 506	PC	PLASTICS IN PACKAGING	3		0	3	3	60	40		100	3
		LAB										
PGP 511	PC	PREPRESS TECHNOLOGY LAB			2	2	1		30	45	75	3
PGP 512	PC	WEB OFFSET TECHNOLOGY LAB			2	2	1		30	45	75	3
PGP 513	PC	FLEXOGRAPHY TECHNOLOGY LAB			2	2	1		30	45	75	3
PGP 514	PC	PRINTING IMAGE GENERATION LAB			2	2	1		30	45	75	3
		Total					25/25	360	360			

501
PRINTING MATERIALS

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit - I

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 adheisves used in binding and warehouse work and their range of applications selection for specific purpose.

Miscellaneous Materials

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

Unit - IV

Materials Handling

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

Recommended Books :-

- Printing Surface Praperation by C. S. Mishr

502

PRE-PRESS TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit - I

Introduction to colour

Basic colour theory - additive and substractive colours , process colours, application of the colour theory to colour reproduction. Overview of colour reproduction from original to printing, Exposure, colour balance, memory colours; graining, contrast; Film transparency.

Unit - II

Colour Reproduction

Process camera, Parts of process camera and their types. Tone and colour controls - Gray scale and colour control patches , densitometers.

Colour Separating methods

Basic principles of colour separation, Direct separation method and Indirect colour separation method, Black Printer negative for the indirect method, for making continuous tone positives. Final Screened negatives and positives establishing a colour reprodcution procedure.

Unit - III

Colour correction

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

Unit - IV

Colour proofing

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

Planning for colour work

Scanner, Types of scanner - Drum, Flat Bed Scanners. Image Setters.Types of imagesetter.

Recommended Books :-

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

503

WEB OFFSET TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit - I

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

Recommended Books :

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

504

FLEXOGRAPHY TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit - I

Introduction to 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 makeready, wrapping mounted cylinders. Miscellaneous procedures - removing plates from the cylinder, mounting metal-backed plates, reusing sticky back, plate staggering, use of release agents. Tools for the operator. Basic requirements for process colour printing. Press room practices. Environment and safety concerns.

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:

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.

505

PRINTING IMAGE GENERATION

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit - I

Assembly of film images:

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

Unit - II

Planographic plates:

Introduction. Light sensitive coating -dicromated colloids, diazo compounds, photo polymers, diffusion and transfer methods, electrostatic. Sensitivity of coating to light. Dye-sensitized photo polymerization, dark reaction, post exposure, safe lights, reciprocity law. Action of light sources on coatings, stabilities of coatings. Positive working plates, Negative working plates- additive presensitized plates, subtractive diazo PS plates, photo polymer presensitized plates, aqueous developable plates, driographic plates, multi metal plates. Producing a multimetal plate. Types- bimetalic, trimetalic. Projection-speed negative plates. Positive working lithographic plates- Presensitized plates, Baking of positive plate Process of making deep etch plate - counter etching, exposing, developing, deep etching, cleaning the image areas, stopping out unwanted areas, copperizing the image areas on aluminum plate, applying non blinding lacquer applying deep etch developing ink, remaining the gum stencil, desensitizing, gumming up,

Unit – III

Driography- Outline, system, structure, processing and use, precautions.
Waterless plates – outline, structure, processing and use, advantages and disadvantages.
Role of photopolymer in Image formation – Raised and Recessed.
Diffusion processes – Reflex and Projection plates.
Electro photography – Introduction, process, toner transfer theory, Equipment.
Water soluble photosensitive resin plates – introduction, characteristics, structure, processing, image reproductivity.
Laser plate making – introduction, system outline, system performance, implifications.
Computer-to-plate: – Thermal plate, Polyester plate.

Unit - IV

Digital Image Carriers:

Image generation of a Digital Offset Machine. Basics of other digital image carriers.
Auto plate processor ,Troubleshooting for plates,Quality control aids for plate making.

Recommended Books:-

Heidelberg DI Press- Manual Chemistry for Graphic Arts - **Dr. Nelson R. Eldred**.
Offset Plate Making - **Robert F. Reed**.
Printing Technology 3rd Edition. - **Adams, Fax &Rieber**.
Screen Process Printing - **John Stephens**.
Sheetfed Offset Press Operating - **Lloyd P. Dejidas**.
Flexography Premier - **Donna C. Mulvihill**.
Stripping - **Harold L. Peck**.
Gravure Process And Technology –GAA.
Selecting The Right Litho Plate - BPIF.
A. L. Gatehouse; Manual for film planning and plate making; roper – GATF Publication, 1983 edition.
Lithographers manual – GATF seventh edition.
Paul J.Hartsuch Chemistry for the Graphic Arts, GATF, 1983 edition.
Lan Faux, Modern lithography, MacDonald & Evans Publication, 1973. Edition.
W.R. Durrant Printing – A guide to systems and their uses, Heinemann Professional Publishing, 1989 edition.
D.C. MulvihillFlexo Primer, GATF & Foundation of FTA 1985 editon

Plastics in Packaging (506)

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit I

Plastic Introduction

Packaging, Types of packaging,Purposes of packaging.Plastic-introduction, Classification of synthetic polymer. Techniques of polymerization, Distinction between Plastic, Fibres and Elastomers. Application of plastic in packaging

Unit II

Classification of Plastic

Miscellaneous plastics - polycarbonate, nylon , Low-Density Polyethylene (LDPE), Linear low-density polyethylene (LLDPE) High-Density Polyethylene (HDPE) High molecular high density Polyethylene(HM HDPE)Polyethylene Terephthalate (PETE or PET), Polyvinyl Chloride (PVC) - Introduction, properties and applications.

Unit III

Environment and pollution in plastic industry

Plastic Industry effects on environment and its components; water, soil, air and living things, Storage and handling of plastics, Pollution and Hazards related to Plastics, Plastic Waste Management- Public awareness regarding hazards caused by indiscriminate use of plastics, proper disposal of plastics.Alternate Packaging material.

Unit IV

Testing and Recycling of plastic

Introduction, Process, Solubility test, Lenition test, Dry distillation test, Chemical color identification test, Pyrolysis test, Refractive index. Recycling of plastic-Processes–Thermal depolymerization, distributed recycling, plastic identification code

RECOMMENDED BOOKS

1. Handbook of Plastics, Elastomers and Composites by Charles A. Harper; Published by McGraw Hill Company, New Delhi
2. Plastic Waste Management by Nabil Mustufa; Marcel Dekker
3. Introduction to Environmental Engineering and Science by Gilbert M Masters; Prentice Hall of India, New Delhi
4. Recycling and Recovering of Plastics by Brandrup (Hanser Publications)

511

PRE PRESS TECHNOLOGY- LAB

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

LIST OF EXPERIMENTS

1. Making of Half tone negative using process camera.
2. making of own colour control patches.
3. Gray Scale (Drawing).
4. Drawings spectrophotometric curve by using spectrodensitometre.
5. How to make colour separtion negative of a four coloured original by using Electronic colour seperation system.
6. Working of Image Setter and obtaining output on Image Setter.
7. colour Correction by using photography masking.
8. Six Colour Wheel.
9. Planning for four Colour Newspapers designs.
10. Software for colour seperationphotoshop, 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

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

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.

513

FLEXOGRAPHY TECHNOLOGY - LAB

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

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.singlecolor, ii.twocolor, iii.fourcolor.
7. Studying of 6 color and 8 colorflexomachines.

514

PRINTING IMAGE GENERATION - LAB

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

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,
4. Preparation of letter set plates.
5. Study of gripper margin and registration processes,
6. Positioning of images for plate making,
8. Page makeup -folders, pamplets, journals/magazines, newspaper, book work.
9. Layout preparation - Single page layout, 2 page layout, 4 page layout, 8 page layout, 16 page layout, 32 page layout, 64 page layout for work & turn, work & tumble, work & twist.

SCHEME OF STUDIES & EXAMINATIONS

6th semester

w.e.f. 2019-20 in phased manner

B. Tech. (Printing, Graphic & Packaging) – 2019-20

Subject Code	Subject area	subject Title	Teaching Schedule				Credits	Allotments of Marks				Duration of Exams(Hrs)
								Major Test	Minor Test	Practical	Total	
			L	T	P	Hours/Week						
PGP 601	PC	PRINTING SUBSTRATE	4		0	4	4	60	40		100	3
PGP 602	PC	SECURITY AND STATIONARY PRINTING	4		0	4	4	60	40		100	3
PGP 603	PC	Food Packaging	3		0	3	3	60	40		100	3
PGP 604	PC	NEWSPAPER PUBLISHING	4		0	4	4	60	40		100	3
PGP 605		a. SALES AND ADVERTISING b). RESEARCH & DEVELOPMENT C)PLANNING &COORDINATION	3		0	3	3	60	40		100	3
PGP 606	PC	COSTING AND ESTIMATING	3		0	3	3	60	40		100	3
		LAB										
PGP 611	PC	PRINTING SUBSTRATE LAB			2	2	1		30	45	75	3
PGP 612		FOOD PACKAGING LAB			2	2	1		30	45	75	3
PGP 613	PC	Newspaper Publishing			2	2	1		30	45	75	3
PGP 614	PC	SECURITY AND STATIONARY PRINTINGLAB			2	2	1		30	45	75	3
		Total					25/25	360	360			

A Special Paper of Environment Studies will be the part of 6th semester curriculum

601

PRINTING SUBSTRATE

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit - I

Paper:

Introduction, Paper fibers& Non Fibers materials, Fiber structure- cellulose, hemi celluloses and lignin, Paper manufacture – Stage 1 - pulp preparation, mechanical pulp - refiner mechanical pulp, thermo mechanical pulp, chemical pulp processes - sulfate or Kraft process, sulfite process, Semi - chemical process. Screeing, Cleaning Bleaching: Stage 2- stock preparation, Stage 3- Paper Making Machine. Wet-end, Head box and slice. MD: CD ratio. Wire section, Press and drier sections. Calendaring and Finishing- Hard calendaring, soft nip calendaring, super calendaring, machine glazing, paper coatings - coated papers and boards.

Unit - II

Recycled paper:

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

Unit - III

Choosing a suitable paper:

Characteristics of paper. Paper varieties for printing. Printing defects associated with paper. Reel defects. Ppaer Testing, Measurement and calculations: - Paper sizes. Influence of moisture and RH on paper and boards. Paper storage – Requirement. Methods. Variables affecting paper storage. Paper properties -, printability, runnability. Surface and directional properties of paper & board – substance, caliper, bulk, compressibility, surface smoothness/roughness, air permeance, static and dynamic friction. Surface strength and internal bond strength - picking, fluffing, splitting. Strength properties - stiffness, folding endurance, bursting strength, tear resistance. Optical properties - gloss, brightness, whiteness, yellowness and tint indices, flurescence, opacity.

Unit - IV

Introduction to Non Paper substrates

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

602
SECURITY AND STATIONARY PRINTING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit-I

Introduction:

Security Printing its definition and requirement, currency printingIntroduction 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, fibres, 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. 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-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 – CertificatesPassports – Packaging - Card printing. Different types of machines used for producing various security products. Recent trends and developments in security printing.

Recommended Books :

603

FOOD PACKAGING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-1

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

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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,

604
NEWS PAPER PUBLISHING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-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

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

UNIT-III

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

UNIT-IV

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

605 (A)

SALES & 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 Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

UNIT-I

Advertising as a tool of communication, Role of Advertising in marketing mix. Types of Advertising – Product advertising, Service advertising, Institutional Advertising, Public Relations advertising, Public Service Advertising, Financial Advertising Sales Management: Introduction, Sales Management, Sales organization, functions of sale department, duties of sales manager. The selling concept vs marketing concept. Sales forcasting, advertising, sale promotion, channels of distribution, product packaging.

UNIT-II

Market & Advertising Research – Types / Scope of research, Market Research – Market surveys – Audience surveys Market segmentation Targeting, Advertising Research, Advertising evaluation, ADGMAR approach, Types of Advertising evaluation

UNIT-III

Media & Product Types of media, Media Vehicles, Functions, Audience surveys, TRP, NRS, ABC, Product research meaning & scope, Analyzing& Testing of products, Important of product research, Limits, Product Positioning

UNIT-IV

Construction of advertisement Construction of effective advertising, Visualization, cope writing, Headlines, slogan, Types of copy, Requisites of an effective layout, Advertising agency structure, Responsibilities of personnel , Advertising Budget, methods of budgeting, Budgeting process.

Recommended Books:-

Mass Communication Principal & Concept- SeemaHasan
Business Ethics Concepts & Cases - **SadhriSorab**.
Advertising Theory & Practice - **Chunawalla, Kumar, Sethia, Subramanian, Suchak**.
The Concept of Marketing-By Philip Kotler
Advertising and Promotion-By Belch & Belch

605(B)

Research & Development

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

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

Unit-I

Introduction: Introduction of Research& Development, types of R & D-Basic Research, Applied research, development. R&D in business,Innovation, New product development, Design ,Product design, R& D Decision- Proprietariness, Timing ,Risk ,Cost. Importance of R& D

Unit-II

R&D Process: Foster ideas, Focus ideas, Develop, Prototype and trials. Regulatory, Product development activities, Launch. An effective R& D Process, Advantages of R& D- Tax breaks, cost ,financing, recruitment,Patents. R&D challenges- High cost, Uncertain result, Market condition.

Unit-III

R&D in the Printing Industry – Innovation in Printing, Reducing the environmental impact of printing, Waste reduction of printing processes, Minimizing solvent use,Process and machine optimisation in offset and flexo printing, Quality evaluation and standardisation in digital printing, Packaging and label printing, Print finishing, Measurement and testing methods for controlling machine settings and the printing process,Functional coatings,Ink curing and migration

Unit IV

R&D in Packaging Industry-Packaging machinery research and development, especially paperboard forming, Converting of fibre-based packaging materials,Tool design and manufacturing, Sealing solutions for fibre-based packages, Package quality control development, Packaging material technology, Coating and dispersion barriers,Digital printing,Fibre engineering and technology,Nanothin functional coatings.

605(C)

PLANNING & COORDIANTION

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

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

UNIT-I

DECISION MAKIING

TIME AND HUMAN RELATIONSHIPS IN DECISION MAKING, PROBLEM AND OPPORTUNITY FINDING

THE NATURE OF MANAGERIAL DECISION MAKING

Programmed and Nonprogrammed Decision, Certainty, Risk, and Uncertainty .

UNIT-II

THE RATIONAL MODEL OF DECISION MAKING

Stage 1: investigate the Situation, Stage 2: Develop Alternatives , Stage 3: Evaluate Alternatives and Select the Best One Available , Stage 4: Implement and Monitor the Decision ,

UNIT-III

PLANNING: AN OVERVIEW

THE IMPORTANCE OF PLANNING AT ORGANIZATIONS

The Hierarchy of Organization Plans

HOW STRATEGIC AND OPERATIONAL PLANS DIFFER

The Strategic Management Process **.**

UNIT-IV

THE CONTENT OF A CORPORATE STRATEGY

The corporate Portfolio Approach , "Five Forces" Corporate Strategy , Corporate Enterprise Strategy

LEVELS OF STRATEGY:SOME KEY DISTINCTIONS

Corporate-Level Strategy ,Business-Unit Strategy ,Functional-Level Strategy

606
COSTING AND ESTIMATING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

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.

Special Paper

ENVIRONMENTAL STUDIES

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : in-situ and ex-situ conservation of biodiversity.

Unit 5 : Environmental Pollution

Definition

- Causes, effects and control measures of :
  a) Air pollution
  b) Water pollution
  c) Soil pollution
  d) Marine pollution
  e) Noise pollution
  f) Thermal pollution
  g) Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 6 : Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness.

Unit 7 : Human Population and the Environment

- Population growth, variation among nations
- Population explosion – Family Welfare Programme
- Environment and human health.
- Human Rights.

- Value Education.
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Unit 8 : Field Work

- Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc.

611

PRINTING SUBSTRATE LAB.

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

LIST OF EXPERIMENTS

1. Different samples of Papers and their study.
2. Light fastness test.
3. Machine Direction and Cross Direction of paper.
4. Effect of Humidity and Temperature on paper.
5. GSM Test.
6. Printed samples of different printing processes and their study.
7. Ink Viscosity Test.
8. Introduction to various chemicals used in printing.
9. Consumables and miscellaneous used in printing.
10. Study of different printing defects associated with paper

612

FOOD Packaging

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

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 magzines

613

NEWS PAPER PUBLISHING -LAB

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

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.

614

SECURITY AND STATIOARY PRINTING LAB

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

5. Design of fan fold forms computer letter & mailers
6. Design of computer envelops and snap-out-forms
7. Various types of web offset printing
8. Processes use for packaging and dispatch
9. Study of collators
10. Dot loss and dot gain in film imaging
11. Plate making
12. Colour sequence for security printing

SCHEME OF STUDIES & EXAMINATIONS

7th semester

w.e.f. 2019-20 in phased manner

B. Tech. (Printing, Graphic & Packaging) – 2020-21

Subject Code	Subject area	subject Title	Teaching Schedule				Credits	Allotments of Marks				Duration of Exams(Hrs)
								Major Test	Minor Test	Practical	Total	
			L	T	P	Hours/Week						
PGP 701	HC	MANAGEMENT PROCESS	4		0	4	4	60	40		100	3
PGP 702	PC	PRINTING PLANT LAYOUT	4		0	4	4	60	40		100	3
PGP 703	PC	GRAVURE TECHNOLOGY	3		0	3	3	60	40		100	3
PGP 704	PC	PRINTING INK TECHNOLOGY	4		0	4	4	60	40		100	3
PGP 705	PC	PRINT FINISHING	3		0	3	3	60	40		100	3
PGP 706	PC	QUALITY CONTROL IN PRINTING & PACKAGING	3		0	3	3	60	40		100	3
		LAB										
PGP 711	PC	GRAVURE TECHNOLOGY LAB			2	2	1		30	45	75	3
PGP 712	PC	PRINTING INK TECHNOLOGY LAB			2	2	1		30	45	75	3
PGP 713	PC	PRINT FINISHING LAB			2	2	1		30	45	75	3
PGP 714	PC	QUALITY CONTROL IN PRINTING & PACKAGING LAB			2	2	1		30	45	75	3
PGP 770	PC	MINOR PROJECT				2	1		-	-	50	3
		Total					26	360	360		950	

701

MANAGEMENT PROCESS

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Business Environment – Printing Industry in India & Abroad. Impact of globalization & IT. Management – Nature scope and importance of Management, Functions of Management – Scientific, Management, CPM & PERT (Introduction)

UNIT-II

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Production and operations Management – Locations and Layout of plant, Maintenance management. Quality assurance, Total quality management (TQM), ISO.

Marketing management – Marketing and its functions, distribution channels, salesmanship and advertising.

UNIT-III

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

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

UNIT-IV

Work flow and organizational structure in a printing press.

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

. Depreciation – Introduction to different methodes and their comparison.

Recommended Books :-

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

702
PRINTING PLANT LAYOUT

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Site Selection:

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

UNIT-II

Plant Layout:

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

UNIT-III

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Factors governing flow patterns:

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

Plant layout procedure:

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

UNIT-IV

Factory Building (Press Building):

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

frame construction,Reinforced concrete construction, Precast concrete construction. Specific parts of factory buildingroof, walls,floor.

Plant layout-An analytical approach:

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

Recommended Books :

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

703
GRAVURE TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

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

GravureDoctor blade assembly –

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

UNIT-III

Gravure Press and Its components:

A generic printing unit.Sleeve&solid cylinder,single and two revolution ,sheet fed and web fed machines, Typical press configurations.Gravure publication 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, Electo-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 – Aluminium foil, Foil laminations. Gravure advantages, limitations. Future of Gravure Printing Industry.

Recommended Books :

Gravure process and technology – GAA.
Printing Technology – Adams, Faux, Rieber.

704

PRINTING INK TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Printing Inks

Solvent Based Inks, Water Based Ink, Ingredients in Ink- pigments Vehicles, Additives . Drying mechanisms – physical drying mechanisms, absorption drying, evaporation drying, chemical drying systems, oxidation polymerization drying, radiation drying and curing, microwave drying, infrared drying. Viscosity – Newtonian flow, units of viscosity, viscosity & temperature, factors influencing viscosity, simple low viscosity inks, complex high viscosity inks. Ink requirements for printing processes – offset, letterpress, flexography, gravure, screen printing. Optical properties of ink films, rheology and ink transfer requirements, ink distribution and transfer on the press, method for the direct measurement of ink setting on coated paper.

UNIT-II

Printing Ink manufacturing machines &equipments

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

UNIT-III

Radiation curing

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

UNIT-IV

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Security Inks

Range of security inks, Special Security Features – fluorescence, phosphorescence, reflected by improved filters, magnetism, Different types of security printing inks. Application of security printing inks. Security inks conformity tests and Q.C.tests – tests for chemical resistance, light fastness, rub resistance test, crumpling resistance test, grinding control, colour control, control of the rheological properties, control of drying time, control of various specific properties. Environmental considerations in security printing.

Recommended Books :-

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

705
PRINT FINISHING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Introduction:

Latest Developments in Print Finishing. Organization and Workshop Layout. Growths Factors in Print Finishing. Book Binding Tools &Equipments,Book Binders Materials & Quality Control.. Kinds of Paper and Boards. Reinforcing Materials. Securing Materials, Covering Materials, Adhesives and Types of Adhesives in Print Finishing, Solvent Based Adhesives, Water Based Adhesives, Pressure Sensitive Adhesives.Adhesion- Physical, Specific. Miscellaneous Material.

UNIT-II

Structure Of A Book:

Physical Parts of a Hard Bound Book.Forwarding Operations, Finishing Operations. 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. Gathering, Collating – Collating Marks,Insetting and Inserting.

UNIT-III

Securing Methods:

Kinds of Stitching and SewingAdhesive 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 Case. Ring Binding – Inter Screw, Ring Metal – Types, Loose Leaf Ring Binding. Ring Shapes. Burst Binding, On Demand Booklet Binding.

End Papers:

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

UNIT-IV

Finishing Processes:

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

Numbering

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

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

Binding & Finishing Machines:

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

Recommended Books :-

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

706

QUALITY CONTROL IN PRINTING AND PACKAGING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Introduction

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

UNIT-II

Management Consideration

Quality Control as an attitude and management tool, 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.

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

Recommended Books:

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

711

GRAVURE TECHNOLOGY LAB.

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

LIST OF EXPERIMENTS

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

712

PRINTING INK TECHNOLOGY LAB

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

LIST OF EXPERIMENTS

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

713

PRINT FINISHING LAB

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

LIST OF EXPERIMENTS

I. Preparation of the following types of books.

1. Quarter bound a/c books,Half bound a/c books,Full bound a/c books by – French sewing method, Tape sewing method, Cord sewing method, Saddle sewing method, Side sewing method, Whip sewing method..
2. Preparation of Receipt books with numbers in duplicate & triplicate.
3. Preparation of Cheque books with 25 leaves.
4. Preparation of following type of Mechanical binding – Spiral wire binding, Wire 'O' binding, Ring binding.
5. Preparation of files of following designs – Loose leaf file – single piece, Loose leaf file – Two piece tab binder, Loose leaf guard file – Boards joined with spine strip, Court case file, Portfolio – Closed file to keep confidential loose sheets.
6. Preparation of these types of End papers – Single End paper, Double or Inserted End paper, Made end paper, Cloth joint end paper, ZigZag end paper, Cloth joint ZigZag end paper.
7. Preparation of telephone directory with Indexes and Tabs.
8. 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.

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714

QUALITY CONTROL IN PRINTING AND PACKAGING LAB.

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

LIST OF EXPERIMENTS

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

770
MINOR-PROJECT

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

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

SCHEME OF STUDIES & EXAMINATIONS

8th semester

w.e.f. 2019-20 in phased manner

B. Tech. (Printing, Graphic & Packaging) – 2020-21

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

801

PRINTING MACHINERY MAINTENANCE

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Drive and Control Systems

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

UNIT-II

Erecting and Testing

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

UNIT-III

Repairs and Reconditioning

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

Cylinders, Bushes and Bearings

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

UNIT-IV

Maintenance procedures

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

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

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Recommended Books :-

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

802
DIGITAL PRINTING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Digital Documents

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

UNIT-II

Digital Printing Processes

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

UNIT-III

Database Marketing's Role:

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

UNIT-IV

Networking&Digital Workflow:

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

ecommended Books :

Digital Printing -

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

803
ENTREPRENEURSHIP PROCESS

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

Recommended Books :

Entrepreneurship Development - Colombo Plan Staff College for Technician Education.
Entrepreneurship Development & Management - Jose Paul, N. Ajith Kumar.
Entrepreneurship Development Programmes & Practices - Jasmer Singh Saini.

804
BOOK PUBLISHING

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Book Publishing

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

UNIT-II

Press Organization

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

Production & Estimating in Book Publishing

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

UNIT-III

Marketing and Distribution in Book Publishing

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

UNIT-IV

Legal Aspects in book Publishing

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

805

Corrugation Box Packaging

Total Credit: 3 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit-1

Introduction-Introduction to Corrugated Fibre Board Packaging, Components and their Functions
Corrugated Fibre Board Packaging Industry-An Overview
Corrugated Fibre Board Box Packaging- Properties and Applications
Types of Corrugated Fibre Board and Boxes.

Unit-2

Corrugation Box Materials: -Selection of Kraft paper for Corrugated fiber board and box Paper and different types of Papers- Properties and Applications
Selection of Adhesive for Corrugated Fibre Board and Box.Addition of Chemicals.Types of glue,ink and Coating Materials.

Unit-3

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

Unit-4

Layout of Corrugation Box:-Carton Production: Carton styles. Folding cartons – Production steps, types.Corrugated containers – classifications, components in a corrugated board, flutes & stages in preparation in corrugated boards. Plastic corrugated boards- features &advantages.Considering the dimension of Product Performance
Layout of various carton styles- Bellows (Gusset) Tuck ,Airplane Style Straight (AST) , Side/End Load,regular-slotted carton,Folding Carton,Corrugated / Folding Carton,

806 (A)

ADVANCE PRINTING TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

UNIT-I

Modern Trend in Printing

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

UNIT-II

Pre-Press Techniques

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

UNIT-III

Print job planning and Stock control

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

UNIT-IV

Print Industry in India and Abroad

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

References Books:

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

806(B)

ADVANCE GRAPHICS TECHNOLOGY

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit-I

Overview of : Computer Graphics, Interactive graphics, passive graphics. Advantages of interactive graphics. **Display Devices** : Refresh CRT, Random-Scan and Rester-Scan Monitor, Color CRT Monitors, DVST, Prasma-Penel Displays, LED and LCD monitors. Hard copy devices.

Scan conversion : Scan Converting a point, line, circle, ellipse and arcs.

2-D graphics transformations (Rotations, Scaling, Translations, Reflecting, Shearing) Composition of 2-D transformation, 2-D viewing and clipping, Windowing concepts, clipping algorithms (Line, Area and Text-Sutherland-Cohen, Mid-point subdivision), Window-to-view port transformation, Primitive and attributes. Exterior and Interior clipping.

Unit-II

Document Processing Language

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

Unit-III

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

Unit-IV

Font Management

Interactive graphics: Concept of Positioning and Pointing. Interactive Graphic Devices (Key Boards, Touch Panels, Light Pens, Graphic Tablets, Joysticks, Mouse-Voice System) Interactive Graphical Techniques: Basic Positioning Methods, Constraints, Gride, Gravity field, Rubber-Bank Methods, Sketching, Dragging, Inking and Painting.

Computer Graphic Software : Introduction, GKS (Primitive, attributes and Viewport, Display subroutines)

Introduction to 3-D Graphics

Publishing software: PageMaker, CorelDraw etc.

References:

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

806(C)
Advanced Packaging Technology

Total Credit: 4 Max. External: 60
Internal: 40
Time Allowed: 3 Hrs.
Marks: 100

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

Unit-I

Packaging of Food Products

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

Unit-II

Packaging of other specific items

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

Unit-III

Method of storage

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

Unit-IV

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

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

811

PRINTING MACHINERY MAINTENANCE-LAB

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

LIST OF EXPERIMENTS

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

812

DIGITAL PRINTING-LAB

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

LIST OF EXPERIMENTS

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

813

BOOK PUBLISHING-LAB

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

LIST OF EXPERIMENTS

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

814
CORRUGATION BOX PACKAGING

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

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

880

MAJOR-PROJECT

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

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