Bachelor of Technology
(Printing & Packaging Technology)

B. Tech. (Printing & Packaging Technology)
4 Year Programme

(70:30 CBS Scheme)

DEPARTMENT OF PRINTING TECHNOLOGY
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR

B. TECH. (PRINTING & PACKAGING TECHNOLOGY)

SCHEME OF STUDIES & EXAMINATIONS

w.e.f. 2011-2012

Sr. No.	Semester	Credits
1	I	24
2	II	27
3	III	25
4	IV	25
5	V	25
6	VI	24
7	VII	25
8	VIII	25
	Total Credits	200

Note:

1. Students are allowed to use single memory, programmable scientific calculator during examination for all subjects in B. Tech.
2. Teacher will conduct practical in group of 20-25 students.

B. Tech. (Printing & Packaging Technology) 2nd YEAR (3rd Semester)

Course No.	Course Title	Teaching Schedule				Credit
		L	T	P	Total	
PKT301	Basics of Printing Processes	3	1		4	3.5
PKT302	Computers in Printing & Packaging	3	1		4	3.5
PKT303	Fundamentals of Packaging Science	3	1		4	3.5
PKT304	Introduction to Package Designing	3	1		4	3.5
PKT305	Elements of Packaging	3	1		4	3.5
PKT306	Theory of Machines	3	1		4	3
PKT307	Basics of Printing Process Lab			3	3	1.5
PKT308	Computers in Printing & Packaging Lab			3	3	1.5
PKT309	Package Design Lab			3	3	1.5
	Total					25

B. Tech. (Printing & Packaging Technology) 2nd YEAR (4th Semester)

Course No.	Course Title	Teaching Schedule				Credit
		L	T	P	Total	
PKT401	Planning for Packaging Production	3	1		4	3.5
PKT402	Technology of Gravure	3	1		4	3.5
PKT403	Printing & Packaging Materials	3	1		4	3.5
PKT404	Computer Aided Composition & Designing in Packaging	3	1		4	3.5
PKT405	Introduction to Graphic Imaging	3	1		4	3.5
PKT406	Electrical Machine & its Utilization	3	1		4	3
PKT407	Gravure Lab			3	3	1.5
PKT408	Computer Aided Composition & Designing in Packaging Lab			3	3	1.5
PKT409	Graphic Imaging Lab			3	3	1.5
	Environment Science					Non Credit
	Total					25

B. Tech. (Printing & Packaging Technology) 3rd YEAR (5th Semester)

Course No.	Course Title	Teaching Schedule				Credit
		L	T	P	Total	
PKT501	Technology of Flexography	3	1		4	3.5
PKT502	Sheet Fed Offset Technology	3	1		4	3.5
PKT503	Packaging Substrates –I	3	1		4	3.5
PKT504	Wood & Glass Based Packaging	3	1		4	3.5
PKT505	Paper & Board Packaging	3	1		4	3.5
PKT506	Digital Electronic Circuits	3	1		4	3
PKT507	Flexography Technology Lab			3	3	1.5
PKT508	Sheet Fed Offset Lab			3	3	1.5
PKT509	Package Substrates Testing Lab			3	3	1.5
	Total					25

B. Tech. (Printing & Packaging Technology) 3rd YEAR (6th Semester)

Course No.	Course Title	Teaching Schedule				Credit
		L	T	P	Total	
PKT601	Tone & Colour Analysis	3	1		4	3.5
PKT602	Screen Printing	3	1		4	3
PKT603	Digital Pre-Press	3	1		4	3.5
PKT604	Plastic & Polymer Based Packaging	3	1		4	3
PKT605	Metal Based Packaging	3	1		4	3
PKT606	Packaging Substrates –II	3	1		4	3.5
PKT607	Screen Printing Lab			3	3	1.5
PKT608	Digital Pre-Press Lab			3	3	1.5
PKT609	Tone & Colour Testing Lab			3	3	1.5
	Total					24

STUDENTS WILL UNDERGO FOUR WEEKS INDUSTRIAL TRAINING IN VACATIONS AFTER 6TH SEMESTER AND IT WILL BE EVALUATED IN 7TH SEMESTER BY A COMMITTEE DULY CONSTITUTED BY THE CHAIRMAN.

B. Tech. (Printing & Packaging Technology) 4th YEAR (7th Semester)

Course No.	Course Title	Teaching Schedule				Credit
		L	T	P	Total	
PKT701	Image Carrier for Printing Processes	3	1		4	3.5
PKT702	Entrepreneurship Development	3	1		4	3
PKT703	Packaging Machineries	3	1		4	3.5
PKT704	Food & Agro Based Packaging	3	1		4	3
PKT705	Eco-Friendly Printing & Packaging	3	1		4	3
PKT706	Web Fed Offset Technology	3	1		4	3.5
PKT707	Image Carrier for Printing Process Lab			3	3	1.5
PKT708	Web Fed Offset Lab			3	3	1.5
PKT709	Package Testing Lab			3	3	1.5
PKT710	Industrial Training (4 weeks)					1
	Total					25

B. Tech. (Printing & Packaging Technology) 4th YEAR (8th Semester)

Course No.	Course Title	Teaching Schedule				Credit
		L	T	P	Total	
PKT801	Drug & Cosmetics Packaging	3	1		4	3.5
PKT802	Quality Control & Supply Chain & Logistic Management	3	1		4	3
PKT803	Finishing Technology	3	1		4	3.5
PKT804	Packaging & Printing Inks	3	1		4	3.5
PKT805	Costing & Estimating	3	1		4	3.5
PKT806	Digital & Advance Printing Processes	3	1		4	3.5
PKT807	Quality Control Lab			3	3	1.5
PKT808	Finishing Lab			3	3	1.5
PKT809	Project			3	3	1.5
	Total					25

Basics of Printing Processes (PKT-301)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Brief introduction on History of Printing, sequential developments in Printing, Printing in India, Recent trends in printing. Basic operations in printing: Pre-Press, Press and Post-press operations.

Unit: 2

Introduction to Printing process; Traditional printing processes, letterpress, lithography, flexo, gravure, screen printing. Digital printing process. Identification of different Print Products- Job suitability of various printing processes. Advantages and dis-advantages of various printing processes. Letterpress process of printing: Introduction, Characteristics of letterpress printing, tools & equipments used in the letterpress department, classification of letterpress printing machines, Pre-make ready & make ready steps, letter press substrates, inks & image carrier.

Unit: 3

Lithographic printing process: Introduction, characteristics of lithographic printing, classification of offset printing, different units of offset machine, pre-make ready & make-ready steps, machine production, introduction of offset plates, inks & substrates. Flexography printing process: Introduction, characteristics of flexography, components of flexo press, flexo plates, flexo presses, introduction to flexo inks & substrates.

Unit: 4

Gravure printing process: Introduction, characteristics of Gravure, Principles of Gravure printing, basic components of gravure press, brief introduction to image carrier preparation for Gravure printing, Gravure ink & substrate. Screen printing process: Introduction, application of screen printing, tools, equipments & accessories used in screen printing, screen printing process steps, brief introduce to screen inks, substrates & image carriers. Digital printing: Introduction, various, digital printing technologies & Brief introduction to digital inks & substrates.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Computers in Printing & Packaging (PKT-302)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Personal computers- Labeling standards – software applications, utilities, operating systems. Linking hardware and software, device interfaces, BIOS, device drivers. Memory – Introduction, types, Cache memory, Magnetic Tape, Optical disk, CCD, MBM (Magnetic Bubble Memory).

Unit: 2

Mass storage technology – data organization, FD, HD, SCSI, their storage capacity, Compact Disc. Display devices – CRT displays & its types.

Unit: 3

Input/ Output devices - Keyboard, mouse, scanners, printers (dot matrix, ink jet, laser). Introduction to DTP, usage of computers in printing. DTP in printing technology, Style Sheet etc.

Unit: 4

Introduction to DTP software, Use of Text tool Adobe PageMaker, Photoshop, and Corel Draw. Story editing, formatting, and Working with graphics: using different graphic tools, importing graphic working with color, table editing. Desk Top Publishing Hardware, Macintosh, Cost estimation of DTP. Electronic Image, BMP, TIFF, GIF file formats. Image compression & its types.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Fundamentals of Packaging Science (PKT-303)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

pH and Printing– Definition of pH, Method of determining pH, Importance of pH in Printing & Packaging, pH of paper & Ink, role of pH control in printing & packaging applications. Relative Humidity in Printing and Packaging: Humidity – Definition, Relative Humidity, Measurement, Control by air conditioning , Role of Relative Humidity in Printing & Packaging, Effect of Relative Humidity in packaging operations.

Unit: 2

Optics & Optical Instruments : Reflection, Transmission, Opacity, Density, Visual Angle, Angular Magnification , Magnifying Glass, Simple Microscope, safe Light Condition, Introduction to Photographic Cameras and Contact printer, Introduction to Densitometer and its types. Chemistry of Photography & Light Sensitive Materials : Introduction to photo-chemistry, Light Sensitive Material, Types of LSM, Constituents of LSM, Properties.

Unit: 3

Surface Chemistry : Surface tension, Contact angles, Capilliary Action, Interfacial Tension, Hydrophobic & Hydrophilic, Water and Ink Interaction, Emulsification of Ink. Effect of light in printing and Packaging : Effect of light on different film and plate coating, Adhesives & Ink-films, Light fastness, Print Characteristics, effect of light on different poly films / Substrates.

Unit: 4

Polymers and Printing : Monomer, Polymer, Types of Plastics – Thermo-sets &Thermoplastics. Introduction to Natural Polymers, Cellulose Derivatives, Synthetic Polymers, Polythene, Polypropylene, Polyvinyl Plastics. Understanding Colour : Fundamental of colours, Light, Source of Colour, Primary Colours, Secondary Colours, Adsorption, Selective Adsorption, Additive Colours, Subtractive Colour, Spectral Transmission Curves. Introduction to Colour Measurement.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Introduction to Package Designing (PKT-304)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction to “Graphic Design” : What is design, Graphic design,
Printer’s design. Fundamentals of design: line, tone, value, weight, texture, shape, size, space, etc. Principles of design- balances, proportion, rhythm, unity, contrast, simplicity, fitness.

Unit: 2

Colour theory: dimension of colour, colour schemes, colour symbolism, and emotional effects of colour. Methods of type arrangement, classification of typeface of font designing.

Unit: 3

Printing planning: rough layout, comprehensive, artwork, type of originals, sizing, masking and cropping, perspective, scale, sense of proportion. Design management: Definitions in advertising art, modern art abstract art, applied art, advertising, publicity, public relations, role of design in sale promotion.

Unit: 4

Design with D.T.P: Various software’s used for designing. House style, Good and bad copy, proofing stager; concept of impositions method of costing off.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Element of Packaging (PKT-305)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

History and evolution of packaging. Basics of Packaging: Introduction, Classification of Packaging, Functions & roles of a packaging, Factors influencing design of a package.

Unit: 2

Packaging Cycle, Product-Package Relationship, Product life cycle curve, Elements of Package Design, types of Packaging - Flexible package, Rigid package & semi-rigid package. Markings on package – Handling marks, routing marks, information marks.

Unit: 3

Cushioning materials – Functions, properties. Classification – space fillers, resilient cushioning materials, non resilient cushioning materials. Introduction to Packaging Media.

Unit: 4

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. Introduction to Innovative Packaging Techniques/ Processes: Gas packaging – MAP & CAP, Vacuum packaging, shrink packaging, stretch wrapping, blister packaging, skin packaging, strip packaging, Aerosol packaging container.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Theory of Machine (PKT-306)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Fluctuating loads and stress concentration, reduction of stress concentration effect, Fluctuating stress, endurance limit, noten sensitivity. Cams and Followers: Types of cams and followers, analysis of motion, determination of cam profiles, followers for cams with specified contours.

Unit: 2

Kinematics linkages and levers: Classification of linkage systems, study of typical kinematics systems used in machines. Gears: Spur and helical gears, Terminology, types, selection criteria, tooth form, strength of teeth, minimum number of teeth, formative number of teeth, applications. Worm and bevel gears: Terminology, strength, applications. Rack and Pinion, gear trains, applications. Geneva mechanism.

Unit: 3

Power Transmission Devices. Pneumatic drive system. Machine drawings: Introduction, Specification for fits, limits, tolerances and materials. Miscellaneous drawings of spur, helical and bevel gears etc..

Unit: 4

Friction: - Types of friction, laws of friction, motion along inclined plane, screw threads, efficiency on inclined plane, friction in journal bearing, friction circle and friction axis, pivots and collar friction, uniform pressure and uniform wear. Introduction to computer aided design.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Basics of Printing Process Lab (PKT-307)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Identification of different tools & equipments used in various printing process.
2. Introduction of different printing process.
3. Schematic diagram of different printing processes.
4. Study of various types of Image carriers for different printing process.
5. Overview pre-make ready & make ready.
6. Study of different printing press.
7. Overview of machine production for multi colour printing.
8. Study of running & printing faults on different printing process machine.

Computers in Printing & Packaging Lab (PKT-308)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Introduction to computer terminologies.
2. Use of different Hardware devices.
3. Word-Processing Software.
4. DTP and its features, Software used in Printing.
5. Page set-up with different sizes and margins.
6. Preparation of Text rich documents.
7. Different kinds of Scanners, their working and uses.
8. Image and Text merging, modifications and Editing of Illustrations and Text.

Package Design Lab (PKT-309)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Folders- Single fold & Double fold.
2. Sticker- Two Colours.
3. Label designing- 2 and 4 clours.
4. Introduction to computer, various softwars's used for designing purpose Demonstration (Manipulation of same design).
5. Logo designing on computers.
6. Knowledge of different computer commands.
7. Designing of visiting card. Letterhead, Envelop, Bill form, Receipt, Invitation card, posters.
8. FMCG package .Design fast moving consumer goods package.

PLANNING FOR PACKAGING PRODUCTION (PKT-401)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction to design**;** Importance of a good design, Impact of a design in relation to various target audience, Relationship between design and sale of a product. Role and importance of graphic designer. Visual ingredients of graphic design; point, line, graphic space, shape, texture, colour, scale, balance contrast, etc. Use of computers in designing, various designing softwares. Suitability of a design for various printing techniques and printing substrates.

Unit: 2

The relationship between text, illustration and photography. Various types of images. Selection and assessment of originals. Factors to be considered for preparation of a design. Relationship of a design studio with production department of packaging. Control and checking of artwork at all stages, employment of free-lance artists, designers and photographers. The advertising agency, its structure and various services provided.

Unit: 3

Methods of preparing a design; design for books, magazines, newspapers, catalogues, cartons and FM CG products. Materials and tools used in preparing layouts and artwork. Copy preparation, casting-off and marking-up. Legibility & readability.

Unit: 4

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

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Technology of Gravure (PKT- 402)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

History & Introduction: History of Gravure, Gravure Products & its market, Types of Gravure Printing: Publication Gravure, Packaging Gravure & Converting, & Product Gravure, Gravure Presses & Presswork: Gravure printing process & basic Gravure Machine Designs.

Unit: 2

Image Carrier Preparation & Image Generation : Gravure screens, Cylinder construction & Preparation - Thin layer method, Thick Layer method, Ballard Shell Treatment, Cylinder Design & its types, Gravure cylinder preparation, Sleeve & Solid cylinders, Considerations for Gravure Cylinder preparation. Chemical engraving methods & equipments, Electronic engraving systems today, Image generation Methods for Gravure cylinders - Diffusion-etch method, Direct transfer, Elecro-mechanical process, Laser cutting, Cell configuration, advantages & disadvantages, Cylinder correction method. Well formation- Variables, Basic types, balancing the cylinder, copper plating & polishing, Reuse of cylinders. Sleeve & integral shafting of cylinders. Cylinder Imbalance- static & dynamic.

Unit: 3

Doctor Blade & Impression Roller Mechanism: Doctor blade assembly: Doctor Blade Materials, Doctor Blade assembly, Blade angles, Blade distance from nip, blade edge, blade mounting. Doctor blade holder configurations, Preparing blade for use doctor blade problems. Doctor blade wear - Fatigue, corrosion, abrasive, adhesive wear. Gravure Impression Roller- Function of Impression Roller, Roller covering, Roller pressure, Balance- static & dynamic. Gravure roller coating. Handling & Storage of impression roller. Impression roller problems. Impression mechanisms- mechanical, hydraulic, pneumatic. New developments. Drying system in Gravure: Gravure Ink dryers - Need for ink dryer , Dryers Functioning , Dryer Limitations, Heat sources- steam , Electric and Gas, Combination gas/Oil. Thermic oil, Waste heat from incinerators.

Unit: 4

Gravure substrates and their Calculations : Publication Paper substrates, Packaging Paper Substrates, Non paper substrates Metalised Films & Foils. Inks & Additives for Gravure and their Calculations : Gravure Inks – Constituents of Gravure Ink, Dilution of Printing Ink, Types of Gravure Ink Water based, Solvent based. Polyurethane based, Vinyl based, Dye based. Diff. Kind of additives used for respective inks, other additives, Solvent Recovery System - Solvent Recovery System and their advantage in Gravure Printing Ink. Recent Trends and Future of Gravure : Future of Gravure printing & Packaging Industry, Future of Gravure Publication industry. Recent Trends and new developments in Gravure Industry.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Printing and Packaging Materials (PKT 403)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Metals for Plate-making, Printing & Packaging: Types and characteristics of metal used for type alloys, foundry type, & Hot metal composition. Physical and Chemical properties metals used in printing & packaging industry in relation to printing & packaging application, Lithographic properties of Metals. Photographic Materials: Main kinds of films and photographic papers used in graphic organisation, Cross section of films, Main-base, Stripping, Anti halation Coating, Protective Coating, Paper positive materials, Developers, Reducers, and Intensifiers. Light sensitive materials for printing image carrier for major printing processes.

Unit: 2

Paper Substrates & Non-Paper Substrate for Printing & Packaging: Paper and Non- paper Substrate used for printing and packaging industry. Types of Plastic Substrate – Polyethylene, Polypropylene, Polyvinyl Chloride (PVC), Polyethylene tera-phthalate (PET), Polyester, Polystyrene, Cellophane, Metal, Foils, Laminates.

Unit: 3

Printing Inks for Printing & Packaging Applications: Ingredients used in Printing Inks, Colorant – Dyes, Pigment, Vehicles, Additives, Binders, Types of printing Inks – Paste Inks, Liquid Inks, Letter Press Inks, Offset/ Lithographic Inks, Gravure Inks, Flexo-graphic Inks. Cushioning Materials - Cushioning materials, Solid vs loose fill, Foam-in-place, Cushion curves and design, corrugated as a cushioning material, Economics of design - packaging costs vs product damage.

Unit: 4

Adhesives for Printing & Packaging: Adhesion, Types of Adhesive – Animal Glues, Fish Glues, Casein Adhesives, Starch Based Adhesives, Natural resin Adhesives, Cellulose Adhesives, Rubber Based adhesives, Synthetic resin adhesives, Inorganic Adhesives, Hot Melt. Miscellaneous Materials : Different types of rubber used in printing, Book binding Materials – Leather, Cloth, Rexene, Threads, Tapes, Stitching Wire, Covering Materials, Varnishes, Laminates Eye-lets, thermoform.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Computer Aided Composition & Designing in Packaging (PKT-404)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Elements in copy preparation: Preparing copy for press, Acquisition of Text-Automatic input, human input, keyboards, offline, online, optical character recognition, working principal, factors affecting performance, automatic voice recognition. Desktop scanners, pointing device, mouse, light pen, touch screen. Text transferring data-capture device, telecommunications, modems, ISDN. Typesetting commands- code syntax, menu driven systems. General rules of page make up. Compositions Software- Automatic Page Make up, Text and graphics integration, Page display.

Unit: 2

Typesetting methods: Hot type composition, Cold Type, Photo letter drawing, Photo composing- Introduction, Advantages, Basic principle, image setter, film transport systems (online & offline modes), price, Laser type, Processing, environmental issues, other factors. Small, Medium and large format image setters. Page description languages. Post Script Language-Introduction. Postscript Fundamentals- Structure of PS file. Adobe acrobat, Reader & Distiller.

Unit: 3

Desk Top Publishing: Introduction, Origin, components of DTP, applications of DTP, Benefits of DTP, Developments. Output quality, output speed, output & color input, page make up. Software for DTP word processing, Graphic programmes, Business graphics. Type manipulation software, OCR software, image software. Presentation Graphics. Editing commands-crop, cut & paste . Page make up software- approach, typography, document & text handling, applications. Standard program features- Adobe PageMaker,. QuarkXpress. Hardware & software for colour. Peripherals & add ons-front-end peripherals, graphics tablets, scanners for text, line art & images, Digitisers. DTP as a typesetting front end- distributed desktop. Exploring MS-office.

Unit: 4

Digital Fonts : True type fonts, post script type-1, Bitmapped fonts, Adobe type manager, Transferring fonts, font manipulation software, Vector & Bitmap text and Graphic creation, Raster image processing. Digital O/P, creation of type for digital system, future trends and developments, font embedding, open type fonts.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Introduction to Graphic Imaging (PKT-405)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Basic principles of reproduction photography : line photography; Basic density range of line original Basic line exposure for computerized camera with on-line densitometer, equipments and accessories. Difficult line originals. Evaluation of film elements. Halftone photography- selection of screen ruling, introduction to different halftone screens glass screen (brief study), contact screens – gray and magenta contact screen manufacture.

Unit: 2

Contrast control: Contrast with glass screen : contact screens. Auxiliary or supplementary exposures. Colour reproduction: The visible spectrum additive systhesis and subtractive synthesis additive and subtractive combination for graphic for reproduction and practical interpretation.

Unit: 3

Mechanism of vision and theories of colour-vision. colour separation : direct & indirect.

(a) Fake colour reproduction.

(b) Filters- Colour separation filters and other filters: overlap in the filters. Wide band and narrow cut filters. Factors and filter ratios.

Unit: 4

Digital photography: Electronics and digital imaging introduction. Digital camera image quality, digital camera bags, resolutions, spaitial resolution. Introduction & working of image capturing techniques of drum, flat bed Scanners & image setters.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Electrical Machines & its Utilization in Printing (PKT-406)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

D.C. Generator: Construction; Types, series, shunt, compound, E.M.F. equation, Building up of E.M.F. in shunt generator, Significance of residual magnetism, Generator characteristics. D.C. Motor : Types, Principles of operation, Significance of back e.m.f., Torque equation, Torque-speed characteristics of series, shunt and compound motors, Speed control of d.c. motors by armature resistance, flux control and thyristor control method, Applications.

Unit: 2

Single Phase Motors: Types, Single phase induction motor, Principle of operation of induction-motor , Repulsion motor, A.C. series motor, Application. Measurement of power in three phase circuit by three wattmeter method, Two Wattmeter's method, Single Wattmeter method.

Unit: 3

Three Phase Induction Motor : Basic principle of operation, Cause of rotating rotor, Slip frequency of rotor current, Relation between torque and rotor power factor, Starting Torque for squirrel cage Induction motor, Starting torque for slip ring induction motor, Condition for maximum torque, Effect of rotor resistance on torque, torque-slip characteristics, Different type of starters. Electrolytic Processes: Introduction, Electrolyte, Ionization, Definition of various terms used in electrolysis, Faradays' laws of electrolysis, Extraction of metals, Refining of metals, Electro deposition, Power Supply for electrolytic processes.

Unit: 4

Electric Welding: Principle, Resistance welding, Arc welding, Atonics hydrogen welding, A.C. & D.C. welding, Welding transformer. Electric-heating: Introduction, Resistance heating, Direct resistance. Consideration and selection of electric motor for different industrial drives.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Gravure Technology (PKT- 407)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Study of Various Gravure Printing Machine Configurations.
2. Study of Various Gravure components of a Gravure Printing Machine.
3. Overview of Cylinder Preparation Methods.
4. Pre-make and Make Ready in Gravure printing process.
5. Study of Feeding Unit of Gravure printing process.
6. Cylinder setting in Gravure Printing Machine.
7. Printing on Single color and multicolor on different Substrate.
8. Check the Practical problem in Gravure printing.

Computer Aided Composition & Designing in Packaging Lab (PKT-408)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Familiarizing with key board.
2. M.S.Word- Justification works, column work, single column, double column, fonts & type style changing, cut, copy & paste commands, wordart.
3. Page Maker- Designing of pamphlets & advertisements.
4. Introduction to Photo Shop & Corel Draw.
5. Comparing various outputs- Dot matrix, inkjet printers, laser printers, digital printers.
6. M.S. PowerPoint- Getting acquainted with presentation tools, MS Excel.
7. Multicolumn printing customized settings etc.
8. Preparation of posters, visiting cards etc.

Graphic Imaging Technology Lab – PKT-409

Total Credit:1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Line negative preparation.
2. Half negative preparation.
3. Line tone positive preparation.
4. Half tone positive preparation.
5. Fake colour separation negative preparation.
6. Fake colour separation positive preparation.
7. Planning for colour page and its preparation.
8. Electronic scanning and manipulation.

Technology of Flexography (PKT 501)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction to Flexography: Definition. flexographic printing, flexographic market, flexographic products, growth potential, Advantages of flexography, Press development. Mechanical principles of flexography - Fountain roll, Anilox roll, plate cylinder, impression cylinder. Flexographic printing plates: Introduction. Plates for printing Rubber plates , its kinds and methodes of preparation, Photopolymer plates its kinds and methods of preperation,care handeling and storage of flexographic plates.

Unit: 2

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.

Unit: 3

Rewind equipments - surface winders, canter 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. 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: 4

Mounting and Proofing: Introduction. Checking the equipment. Operation care of equipment. Understanding the mounting instructions. 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. Beyond the Horizon- Tomorrows Flexography: Flexo graphic substrates. Narrow web presses-Narrow web press components, Future narrow web flexography. Wide web presses. Corrugated presses. Pre printed liner presses. Future of Ink distribution system. Tomorrows flexographic plates. News print for water-base flexography. Markets for today and tomorrow.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Sheet Fed Offset Technology (PKT-502)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

History of lithography, Print media and Classification of Printing Organizations. Recent trends in offset press technology. Basic principles of sheet fed offset printing. Construction and categories of sheet fed offset press. Safe handling of tools, equipment and materials in offset press.

Unit:2

Feeding unit: Functions of the feeding section, sheet feeding types, feeding cycle, components of feeder, sheet conveying mechanisms, sheet detectors, sheet register, front lay and side lay, sheet insertion systems, grippers. Inking unit: role and function of inking system, different parts of inking system, split duct techniques, types of rollers in the inking system, setting of the rollers, care and maintenance of rollers, different inking systems, shore durometer.

Unit: 3

Dampening system: role and function of the dampening system, fountain solution, pH and conductivity of the fountain solutions, role of water in fountain solution, role of alcohol or alcohol substitutes in fountain solution, different rollers in the dampening system, roller coverings, doctor dwell, desensitizing the metal rollers, different dampening systems, care and maintenance of the dampening system. Printing unit; different cylinders and their construction, cylinder gears, cylinder gap, bearers, undercut, cylinder packing, patching, printing pressures, cylinder setting theories, cylinder balancing. Pre-make ready and make ready. Progressive print out.

Unit; 4

Delivery section: role and function of delivery section, transfer cylinder, sheet transfer, sheet delivery, short and extended delivery systems, sheet control devices, anti set off spray powder unit. Machine production. Trouble shooting. Printing machine maintenance.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Packaging Substrates –I (PKT-503)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30

Unit: 1

History of paper and papermaking.Raw materials for papermaking: fibrous materials, natural fibers and artificial fibers. Source of fibers for papermaking, their structure, properties and characteristics. Selection of fibers for papermaking; technical considerations and economic considerations. Non-fibrous materials; functional additives and chemical processing additives.

Unit: 2

Raw material preparation: pulping process; mechanical, chemical and semi-chemical process, screening, cleaning, and bleaching of the pulp. Stock preparation: dispersion/re-pulping, beating/refining, metering and blending, addition of non-fibrous materials. Paper and board making machines: overview of the papermaking machine. Different sections of a papermaking machine; wet end and head box, press and felt section, drying section, sizing section, and reeling section. Functions and working principles of different sections of the papermaking machine. Board making machine, its different sections, and working principles of these sections. Care and maintenance of paper and board making machine.

Unit: 3

Recycled paper: Source of recycled paper. Benefits of recycled paper. Deinking system; pulping, ultrasonic treatment, flotation deinking, wash de-inking. Paper recycling process. Environmental aspects of using recycled papers. Specifying paper for printing: paper characteristics form the printer's point of view. Printing and writing papers; un-coated mechanical paper, coated mechanical paper, un-coated wood-free paper, and coated wood-free paper. Grain direction of paper and its significance in printing operation. Runnability and printability of paper.

Unit: 4

Different tests on paper: Physical properties tests and strength properties tests. Paper trouble shooting. Storage and handling of paper. Paper conditioning in the press room. Substrates other than the paper and paperboard: different substrates, their surface characteristics, and suitability to the particular printing system.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Wood and Glass Based Packaging (PKT-504)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Wooden Based packaging: Introduction, Design factors, Qualities of timber, classification of timber, Moisture in timber, effect of moisture on the properties of wood, seasoning of wood, physical and mechanical properties of timber, Defects of timber, methods of preservation of timber. Wooden Container considerations: Form and size of each component, thickness of components, size and spacing of nails, number of planks in a shook, type of joints, style of container, reinforcements, workmanship.

Unit: 2

Consideration for box design: Type of loads, Grouping of Indian timbers, Plywood boxes-battened construction, timber species suitable for the manufacture of packing cases, wooden box styles. Crates: Introduction, Classification of crates, Selection of crate, Size and weight, Degree of protection, types of Bases, handling of crates, Packaging considerations.

Unit: 3

Glass Packaging: Introduction, Properties, Types of Glass, Glass Manufacturing, Applications, Advantages, Standards. Glass containers: Types, Testing of glass, glass containers parameters.

Unit: 4

Testing of glass: Physical Testing: Annealing Test, Thermal Shock Test, Pressure Test, Impact Test, Density Test, Gauging, Chemical Testing: USP Tests. Modern trends in wood & glass based packaging.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Paper & Board Packaging (PKT-505)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Manufacturing & Appearance Properties: Sources, Paper and Paperboard Manufacturing process, Paper and board Coating, Appearance properties – Colour, Surface smoothness, surface structure, gloss, opacity, printability and varnish ability, Surface strength, Ink and varnish absorption and drying, Surface pH, Surface tension, Rub resistance. Performance Properties: Basis Weight, Thickness, Moisture Content, Tensile strength, Stretch or elongation, Tear Strength, Burst strength, Stiffness, Compression strength, Crush strength, Creasability and fold ability, Ply bond strength, Flatness and dimensional stability, Porosity, Water absorbency, Gluability/Sealing, Taint and odour neutrality,

Unit: 2

Paper and Paper Board – TYPES: Paper - Tissues, Greaseproof, Glassine, Vegetable Parchment, and Label paper, Bag Papers, sack craft, Impregnated Papers, Laminating papers. Paperboard – Folding box board, white lined chipboard, solid bleached board, solid unbleached board, Liquid packaging board, Container boards, Specialty boards

Unit: 3

Conversion Process: Flexible packaging manufacturing; Paper bags – types, manufacture, Composite cans –manufacturing, applications; Fibre drums. Multiwall paper sacks - types, manufacture; Rigid boxes, Folding Cartons – Design, Manufacturing; Solid fibreboard packaging, Paperboard based liquid packaging, Moulded pulp containers.

Unit: 4

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.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Digital Electronic Circuits (PKT-506)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Fundamentals of Digital Techniques: Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCH, Error detection and correction codes. Combinational Logic Circuits: Simplification of Boolean expression and realization using logic gates, sum of products and product of sums, Karnaugh map & variable, minimization of Boolean expressions using Karnaugh map, don't care conditions, variable entered mapping, minimization using variable entered maps.

Unit: 2

EXOR and EXNOR gates, half adder, full adder, full subtractor, adder-subtractor, look ahead and carry. Multiplexers, decoders, demultiplexers, BCD to decimal decoder, seven segment decoder, encoders, decimal to BCD encoder, parity generators and checkers.Flip-Flop : NAND gate latch, NOR gate latch, SR flip-flop, JK flip-flop and T flip-flop, clocked flipflops, edge-triggered flip-flops, flip-flop conversions.

Unit: 3

Sequential Logic Circuits: Comparison between combinational and sequential logic circuits, shift registers, SISO, SIPO, PISO and PIPO shift registers. D/A & A/D Converters: Variable-Resistor network, binary ladder, D/A accuracy & resolution, A/D converters-simultaneous conversion, counter methods, continuous conversion, successive approximation method, single slope & dual slop A/D converters.

Unit: 4

Programmable logic devices: ROM, PLA, PAL, FPGA AND CPLDs. Application of digital electronic in printing & packaging.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Flexography Technology Lab. (PKT-507)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Introduction and familiarizing flexo machine and other related elements.
2. Preparation of rubber plates.
3. Study of iquid & sheet polymer plates.
4. Registering and plate mounting on flexo plate cylinder.
5. Make ready procedures for a flexo machine.
6. Printing i.single color, ii.two color, iii.four color.
7. Studying of 6 color and 8 color flexomachines.
8. Printing on various substrates i.LDPE, ii.HPDE, iii.Paper, iv.Aluminium foil.

Sheet Fed Offset Lab (PKT-508)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Study of various controls and operations.
2. Study of the various mechanisms.
3. Study of the lubrication system.
4. Setting the feeder, feed board, lays and delivery.
5. Setting the water and ink rollers and fixing the plate.
6. Single colour printing.
7. Two colour printing.
8. Four colour printing.

Package Substrates Testing Lab (PKT-509)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Study of grain direction of the substrate.
2. Study of the machine direction of the substrate.
3. Study of GSM of the substrate.
4. Study of bursting strength of the substrate.
5. Study of testing strength of the substrate.
6. Study of Light fastness of the substrate.
7. Study of Water absorbance of the substrate.
8. Study of Ash content of the substrate.

Tone & Color Analysis (PKT-601)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction of colour theories and its application, Detail study of colour reproduction from original to colour printing. Colour management – Introduction, WYSWYG, functions of colour mgt, colour management module, principle of colour management, models of colour management, RGB, HSB & ICC.

Unit: 2

CIE – Spectral reflectance, CIE colour standard, standard observer, and tri-stimulus values, metamerism, memory colour. Types of originals, transparencies, The ideal transparencies, grey balance, tone reproduction, introduction of manual colour separation.

Unit: 3

Colorimeter and spectrophotometer, colour calibration, densitometry, type of densities, specular, diffuse, double difference density. Colour printing, factors in colour printing, printed colour density, trapping, tone value, UCR, GCR, colour control strips and punch register system, dot area measurement.

Unit: 4

Basic elements of scanners, principles of electronic scanning, pixels – binary resolution, AM, FM screening, basic scanner types-pantone, focal tone, true match, special/spot colour, scanner resolution, white & black point adjustment. Colour correction, need for colour correction, masking and types of masking, function of masking, brief introduction to retouching, retouching chemicals, intensification, grey balance.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Screen Printing (PKT-602)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

History of Screening Printing, Stencils – knife cut stencils, photo stencils – Indirect stencil systems, direct photo stencil systems, capillary systems, and direct/indirect photo stencil systems. Screening materials, Screens – multifilament, mono filaments, Selecting mesh material, stretching screen fabric to frame, screen preparation, screen reclamation – Trouble shooting clogged screens. Care and storage of screens.

Unit: 2

Image transfer – The squeegee, Squeegee considerations, squeegee preparation, hardness categories of squeegee blades, Variety of blade shape and application. On contact printing, off contact printing. Screen ink uniqueness – U.V.inks. Manual Printing Process, Semi automatic Screen Printing m/c. Automatic Screen Printing m/c. Screen Printing machines- flat bed, hinged frame, flat bed vertical lift, Cylinder-bed presses, Container printing m/c, Rotary Screen Printing m/c, Carousel m/c. Special Machine configurations. Basic registration techniques.

Unit: 3

Drying methods – Evaporation, Oxidation, Penetration, and Polymerization. Drying Equipments – Drying racks, wicket dryers. Jet dryers, Infrared dryers, Ultraviolet dryers. Flocking process. Introduction, Paper and Paper board, wood, Textiles, Plastics, Metals, Ceramics and glass.

Unit: 4

Specialized Areas – Printed circuit boards of screen printing. Screen printing process; introduction, applications of screen printing, tools, equipments & accessories used in screen printing, screen printing machines, printing operational steps, screen printing inks. Screen printing cycle, job suitability, merits and limitations of screen printing.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Digital Pre-Press (PKT-603)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit; 1

Digital Back, Digital camera, types, components, principles. Types of scanning advanced scanning techniques and processing method.

Unit: 2

Interactive and software packages, digital representation and manipulation of images, advanced image editing software. Electronics impositions techniques and software & used in digital printing.

Unit: 3

CTF: components, principles, features and recent advancements. CTP: components, principles, features and recent advancements.

Unit: 4

CTM: components, principles, features and recent advancements and study of different CTM machine. Different types of Lasers used in imaging for CTF, CTP, CTM and its maintenance.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Plastics and Polymer Based Packaging (PKT-604)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Plastics: Introduction, Distinction between plastics, fibres and elastomers, classification of synthetic polymers, techniques of polymerization, processing techniques of plastics. Co-Extrusion: Cast film co-extrusion, Blow film co-extrusion, raw materials, support materials, bonding agents, application of co-extruded film.

Unit: 2

Polyethylene: LDPE: Manufacturing, Effect of density, LDPE resins, additives, conversion techniques, properties, applications, developments, LLDPE: Introduction, Manufacturing, Properties, Processing, Modifications, Conversion, Material Handling, Application, HDPE: Introduction, Injection Moulding, Applications, Blow moulding, Extrusion, compression moulding and applications, HMHDPE: Introduction, Production, Properties, Applications, Examples. Polypropylene: Introduction, Properties, Applications, Polypropylene copolymers, BOPP: Basic Categories of film, Qualities.

Unit: 3

Polystyrene: Properties, Grades, Processing: injection moulding, extrusion, sheet forming, applications. PVC, Nylon, Polyester: PVC: Introduction, Properties, Applications, Nylon: Introduction, Process, Technology of Co-extrusion, Applications, Polyester: Introduction, Properties, applications.

Unit: 4

Miscellaneous Polymers: Expanded Polyethylene: Properties and applications, Plastic Woven Sacks: Material, Method, construction, use, Polycarbonate: Introduction, application in packaging. Testing on Plastics: Introduction, Scope, and Preparation of sample, solubility test, melting behaviour, approximate density, Ignition test, Dry distillation test, chemical colour identification test, pyrolysis test, refractive index, basic equipments, and other testing measures for individual plastics.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Metal Based Packaging (PKT-605)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Manufacture of Black Plate, Tin Plate Characteristics and Properties, Tinplate , Containers. Aluminium Foil - Manufacture, Properties and Applications in Packaging.

Unit: 2

Aluminium Collapsible Tubes and Containers: Advantages, Major Uses, Filling Equipments, Quality Control Measures. Aerosol Packaging: Definition, Advantages, components, Manufacturing, Working Principle, Pack contents, Method of filling aerosol containers, Application of Aerosols, Developments.

Unit: 3

G.I. Drums - Oil Drums – Closures: Introduction, Capacity, Types of Drums, Manufacture of Drums, Quality Control. Closures: Introduction, Types, Parts, Essential Functions, Recent Developments.

Unit: 4

Advantage & Dis-Advantage & application of metal based packaging. Modern trends in metal based packaging.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Packaging Substrates –II (PKT-606)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Plastic : Polyolefin like low density polyethylene, linear low density polyethylene, high density polyethylene, metallocene, cast polyethylene, Biaxially oriented polypropylene, pearlised BOPP, properties of polyolefins and application, manufacturing processes for polyolefins. Other plastic substrates such as polyamide, polystyrene, acrylonitrite buta dience styrene, polyethylene terephthalate.

Unit: 2

Wood-classification, effect of moisture on wood, preservation of wood, advantages and disadvantages of wood. Applications of wood in packaging. Glass- properties, advantages, types, basic approaches to designing a bottle, production, process of glass, tests on glass0annealing test, thermal shock test, pressure test, impact test, density test.

Unit: 3

Metals-functions, uses, cross section of in plat, tin plate, black plate. Aluminium foils Manufacturing of foil, properties, applications, method of laminating foil to film or paper. Fabric; types, various properties and uses.

Unit: 4

Composite; paper-poly, metal-poly, poly-glass, wood-paper-poly. Future trends in packaging substrates.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Screen Printing Lab (PKT-607)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Study of various types of screen materials.
2. Screen stretching techniques
3. Operating of automatic machine.
4. Stencil preparation – Direct, indirect, Direct/indirect, Capillary stencil preparation.
5. Multi colour printing of visiting cards, greeting cards, letter heads, certificates, invitations, folders, cover pages, photographs.
6. Printing on various substrates – wood, leather, textile, acrylic, metal, paper & paper products, plastics.
7. Screen printing on Irregular Surfaces – Bottles, Ceramics, glass.
8. Screen printing on printed circuit boards (PCB). Screen Reclamation.

Digital Pre-Press Lab (PKT-608)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Study of image manipulating.
2. Study of components and working of CTF.
3. Study of components and working of CTP.
4. Study of components and working of CTM.
5. Study of advantages and features of Advanced CTM.
6. Study of Electronic imposition techniques (s/w)
7. Study of online & offline models.
8. Inspection of digital plates.

Tone & Colour Testing Lab (PKT-609)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Electronic colour separation.
2. Study of flat bed scanner.
3. Study of colour drum.
4. Study of manual colour separation technology.
5. Study of UCR.
6. Study of GCR.
7. Study of Masking.
8. Study of colour density instruments.

Image Carrier for Printing Processes (PKT-701)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction to Film Image elements and Assembly of films - Photographic film, camera film, contact film, Room light Handling Films. Proofing Materials – Diazo Papers, Polymer Papers, Brown Print Papers, Diffusion Transfer Materials, Photographic and Stabilization paper. Assembly and masking materials. Basic Steps in Planning a Film Image Assembly. Film assembly for single colour printing and multi colour printing. Planning Consideration for Films and plates – Imposition consideration, Machine Assembly, Book Signature Consideration, and Post Printing Operations. Tools & Equipments & Light Sources for Image Generation – Introduction to tools & equipments used in Preparation of Image carrier for Major printing Processes. Introduction to light source for Plate-making department for various printing processes, Metal Halide Lamps, Laser Source for CTP and CTF.

Unit: 2

Image carrier for Offset – Introduction, Types of Plates – Conventional Plates, New Era Plates, Basic steps in preparation of Conventional Plates –Surface Plates and Deep Etch Plates, General processing Sequence for a Positive and Negative Working Plates, General processing Sequence for a New Era Plates – Diazo Plates, PS, Photo polymer, Photo Cross Linking Plates, CTP Plates . Working with CTP Plates, Introduction of Multi-metal plates, Paper/ Film Based Plates. CTP Technology. Image generation for Offset DI Presses. Image Carrier for Gravure – Types of Gravure Cylinder – Mandrel, Integrated shaft, Gravure Image Cylinder Manufacturing – Thin layer Method, Ballard Skin Method, Thick layer Method. Consideration for Image Cylinder Preparation. Gravure Cylinder Imaging Diffusion Etch, Direct transfer, Electro-mechanical process, Laser Cutting Process. Introduction to Gravure Wells and their types. Copper Plating & Polishing, Reuse of Cylinder.

Unit: 3

Image Carrier for Flexography – Introduction, Types of Flexography Plates – Rubber and Solid Photo Polymer Plates, Liquid Photo Polymer Plates, their Advantage and Limitations, Base materials for Photopolymer Plates. Plate making process for Rubber Plates, Liquid Photo Polymer Plates, Solid Photo Polymer Plates. Computer to Plate Technology: - Introduction to CtP Technology and their working, Types of CTP and their Plates, Direct Imaging Technology for Image generation.

Unit: 4

Image Carrier for upcoming printing Processes: - Driography, Dry-offset, Toray Waterless Plates, and Silicon Plates for Dry offset Printing / Water Less Printing, Image carrier for Screen printing. Quality Control in Image Carrier Department: - Introduction to Quality Control Aids, tools and Equipments.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Entrepreneurship Development (PKT-702)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

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 entrepreneurship, Small business/ enterprise-the driving force for national growth.

Unit: 2

Types of small enterprises, Economic, social and psychological need for entrepreneurship, characterization, qualities and pre-requisites of entrepreneur. Quick Start Method: life cycle of new business, selection of a potential entrepreneur, identifying & Evaluating Business opportunities.

Unit: 3

Business Planning Process: Why is a good business plan required? Business Plan-the major benefits, sub plan. Forms of Ownership: Different forms of ownership-sole proprietorship, partnership, joint stock company, Selling, Selling your venture, planning for succession.

Unit: 4

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. Ways to be successful entrepreneur in field of printing and packaging. New entrepreneurship aspects.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Packaging Machineries (PKT-703)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Packaging of Accessories and Spares - Skin, Blister and Shrink, Packaging: Skin Packaging: Introduction and advantages, Blister Packaging: Introduction, advantages and equipment attached, Shrink packaging: Introduction and Advantages. Stretch Wrapping and Systems: Introduction, Pilfer-proof packs, pallet stretch wrapping, Material used and advantages.

Unit: 2

Strip Packaging: Introduction, Machinery, operating skills, selection of material, machine speed. Blister Packaging: Introduction, Materials, Forming a blister, blister design, continuous blister packing.

Unit: 3

Form - Fill - Seal Machine (systems): Vertical and horizontal FFS Machines, Pouch types, Filling operation, Pouch material and its selection. Developments in Packaging of Stand-Up Pouches: Developments in materials, properties and functions.

Unit: 4

Blow Moulding Machines: Introduction, concept, Extrusion blow moulding machine, Coextrusion blow moulding. High Flow PEs - a New Trend in Injection Moulded Containers; Plastic Packaging applications, advantages, forms, advantages of injection moulded thin all containers over thermoformed containers, Properties and benefits of PE's

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Food and Agro Based Packaging (PKT-704)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction: Packaging of Processed Foods: Properties, Glass and tin containers, Caps and closures, Other packaging materials, Packaging Machines, Food Processing Techniques: Objectives, Methods, Effects of processing. Packaging of Meat, Fish & Poultry: Introduction, Properties of such food products, Package selection according to spoilage rate criteria and transport conditions.

Unit: 2

Packaging of Flesh foods & Fruit Juices: Flesh foods: Characteristics, Processing Methods, Packaging, and Fruit Juices: Introduction, suitability of containers, packaging in flexible materials. Packaging of Dairy Products: Requirements, Package characteristics, Materials and their properties, Packaging of Biscuits, Bread & Confectionery: Introduction, Packaging Materials Used.

Unit: 3

Aseptic Packaging - Sterilization of Packaging Materials, Using Aspetic System, Aseptic Packaging, Sterilization by Irradiation, Radiation Sterilization - Process Norms, Guidelines & Applications. Packaging of Ready to Use Foods: Classification, objectives, choice of material, factors affecting rte products, Materials used in Ready to use foods, advantages of RTE.

Unit: 4

Packaging of Horticultural crops: Introduction, reasons for spoilage, role of ethylene and its effects on quality, removal of ethylene. Packaging of Fertilizers and Pesticides: Material, Developments, Printing, and optimization of materials.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Eco-Friendly Printing & Packaging (PKT-705)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction: Environment, ecology and sustainable development concept. Printing and Packaging environmental aspects; environmental impacts of printing and packaging operations.

Unit: 2

Packaging wastes, effluent treatment and waste minimization. To study reuse, reduce, recycle concept related with printing and packaging.

Unit: 3

To study degradable and non degradable printing and packaging materials. Environmental impact including risk assessment, environmental legislation, Packaging effluent and its treatment.

Unit: 4

Deming Cycle, Problem Solving, Auditing i.e. Quality safety, environmental integration quality assurance practices into a production stream or packaging line. Supply/ storage/ vaporization, Awareness on-site generation, pressure swing/ membrane/ cryogenic methods, Health and Safety. Energy conservation mechanisms with printing and packaging,

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Web Offset Technology (PKT-706)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Development and growth of web offset presses : Full size and mini web presses ; four basic types of web offset presses specially used for newspaper and magazine production in single and multi colour 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. Web Control: Roll stands and automatic pasters, Detection of web breaks and control of tension, Web Flutter, causes and correction of mis-register Control of fan out, Side lay, cut-off, web-to-web and ribbon control.

Unit: 2

Auxiliary equipment: Various types of in-built and optional equipment availability for web-offset and their uses; equipment essentially needed for newspaper & magazine production. Plate and blankets: Various types used for web-offset their characteristics, merits and demerits for specific work, Cylinder pressures and Printing Make-ready. Web-paper: Properties and requirements of paper used for web offset Printability, Care and handling of rolls.

Unit: 3

Dry Offset: Why 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. Driography or Waterless lithography: Description of the process, Method of producing image and non-image areas Importance of the correct formulation of waterless lithographic inks.

Unit: 4

Introduction to types of drives used in web offset machines. Brief introduction to control pannels of the web offset machines. Folders : Introduction, folding principles, parts of folder, combination folder, ribbon folder, double-former folder, the me-chains of folding process of jaw fold, chopper fold mechanism. Operation of collect cylinder, press folders, double former prefolder, flow folders, insert folders. 8 Inline Finishing: Introduction, gluers, paster wheels, remoisterable pattern gluers, segmented gluers.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Image Carrier for Printing Processes Lab (PKT-707)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Introduction and Practice of Drawing of layout and preparation of pasting for exposing.
2. Study of Tools, materials and equipments used in Offset Image generation Lab.
3. Study of Tools, materials and equipments used in Flexographic Image Generation Lab.
4. Study of tools, materials and equipments used in Gravure Image Generation Lab.
5. Preparation of various Types of Offset Plates.
6. Preparation of various Types of Flexo-graphic Plates.
7. Preparation of various Types of Gravure Image Cylinder
8. Quality Control equipments and their use in Image carrier department for various processes.

Web Offset Technology Lab (PKT-708)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Pre-make ready operations.
2. Make ready operations.
3. Multi-color job printing.
4. Study of electronic panel.
5. Blanket and plate cylinder setting.
6. Damping roller setting & Inking roller setting.
7. Study of Web-breaks.
8. Operations of Folding machine &Trouble shooting during printing.

Package Testing Lab. (PKT-709)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Determination of Burst strength of various packaging materials
2. Determination of Crush strength of various packaging materials
3. Determination of Ply bond strength of various packaging materials
4. Determination of Stiffness of various packaging materials
5. Determination of Scuff resistance of various packaging materials
6. Determination of Heat saleability of various packaging materials
7. Determination of gloss & haze of various packaging materials
8. Measure the color of a packaging material and compute colour differences between different batches

Industrial Training (PKT-710)

Total Credit: 1
Max. Marks: 100
External: 70
Internal: 30

REPORT OF INDUSTRIAL TRAINING WILL BE EVALUATED BY A COMMITTEE DULY CONSTITUTED BY THE CHAIRMAN

Drugs and Cosmetic Packaging (PKT-801)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Packaging of Drugs – Introduction, Classification, design guidelines. Packaging of Drugs -Injectables– Material used for drug packaging: Glass, Rubber, Plastic, Aluminium, paper and board.

Unit: 2

Packaging of Drugs-Orals – Package requirements, Forms of 'Orals', Materials for oral products packaging, Auxiliary Packaging Materials and Closures. Growth and development of drug packaging industry in India.

Unit: 3

Cosmetic Packaging: Introduction, Classification, Factors affecting Cosmetics. Cosmetic Packaging: Cosmetic packaging materials and Techniques.

Unit: 4

Growth and development of cosmetic packaging industry in India. Modern trends in drugs & cosmetic packaging.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Quality Control & Supply Chain & Logistic Management (PKT-802)

Total Credit: 3
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction : Definition of Quality, Quality control, its meaning and purpose setting up a Quality Control Programme, and establishing necessary System and procedures, economic consideration. 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: 2

Materials Control: Establishing clear specifications and standardization of materials to be purchased - particularly Packaging substrates, 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 Packaging Plant.

Unit: 3

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 multi-colour 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. Introduction to ISO:9000 and ISO:14000 series. Supply chain management (SCM) – concept of logistics and SCM – decision phases – design, planning and operation – decision areas – type of supply chain views - flows in supply chain – supply chain and competitive performance – performance measures for SCM – strategic fit – drivers of supply chain.

Unit: 4

Sourcing and Procurement : sourcing – factors in source selection – vendor rating – qualitative and quantitative methods – purchasing – objectives and procedure – purchasing systems – tender method – computer based systems/EDI – inventory concept – functions of inventory – selective inventory control techniques – structure of inventory problem – costs associated with materials management – relevant costs. Independent demand items – probabilistic – single order quantities – payoff matrix – incremental analysis – mathematical formulation of discrete and continuous cases – independent demand items – deterministic and dynamic – deterministic inventory models without and with backordering – sensitivity analysis – quantity discount – all units and incremental discounts. Independent demand items – probabilistic and dynamic inventory models – Q and P system models – dependent demand items – deterministic models – lot sizing models –lot by lot – EOQ – part period balancing – wagner-within method – concept of just-in-time – kanban – introduction to distribution requirement planning.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Finishing Technology (PKT-803)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

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

Unit: 2

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. Securing Methods: Wire Stitching - Saddle Stiching, Side Stiching, Stabbing. Thread Sewing Adhesive Binding/Perfect Binding - Advantages.

Unit: 3

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. Banding & Lacing, Poly Bagging, Mailing, Creasing, Bundling, Tacketing. Ultra Violet Curing & Infra Red Curing.

Unit: 4

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

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Packaging & Printing Inks (PKT-804)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Introduction, solvent based inks, water based ink, ingredients in ink-pigments properties, types, carbon black, inorganic pigments, organic pigments, physical characteristics of organic pigments. Vehicles- vehicles for liquid inks, vehicles for paste inks, UV curing vehicles. Additives – driers, extenders, anti oxidants, waxes. Oils-vegetable drying oils, semi drying oils, non drying oils. Drying mechanisms – physical drying mechanisms, absorption drying, evaporation drying, chemical drying systems, oxidation polymerization drying, radiation drying and curing, microwave drying, infrared drying. Viscosity – Newtonian flow, units of viscosity, viscosity & temperature, factors influencing viscosity, simple low viscosity inks, complex high viscosity inks.

Unit: 2

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. 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: 3

Radiation curing: Introduction, radiation curring inks, ink cure considerations, chemistry of uv curring-photo initiation, propagation, termination. Cationic curing, electron beam curing. Security Inks: Range of security inks special security features- fluorescence, phosphorescence, reflected by improved filters, magnetism, security printing inks for cheques-penetrating L/p inks, water fugitive, inks, inks reacting with pen evadicators, red-ox reagents, inks reacting with solvent, invisible reactive inks, carbonizing inks.

Unit: 4

Security ink conformity tests and Q.C. teste-tests for chemical resistance, light fastnee, rub resistance test, crumpling resistance test, griding control, colour control, control of the rheological properties, control of drying time, control of various specific properties. Environmental consideration in security printing. Study light fastness of inks, factors affecting light fastness of ink, new improvements in light fastness properties of inks.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Costing & Estimating (PKT-805)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Concept of cost, Analysis of cost, fixed cost, variable cost, Elements of cost and its method of recovery. Function and Purpose of costing and estimating from printer's point of view & customer's point of view, Difference between costing and estimating, Qualification of an estimator, estimators tools. Introduction to finance & DBMS.

Unit: 2

Job costing, its need and procedures, Cost sheet, Daily Docket, WIT and its importance in costing. Type of costing system for printing industry & related problem.

Unit: 3

Estimating paper- selection of papers, allowance for wastage, allowance for trimming, weight of loose sheets, and weight of reel of papers. Estimating inks – Inks consumption formula, Ink allowance for spoilage.

Unit: 4

Estimating binding materials – board requirement, covering materials. Estimating sewing thread, estimating wire, estimating adhesives.

Note: -Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Digital & Advance Printing Processes (PKT-806)

Total Credit: 3.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Digital Documents: Introduction to Digital Printing fundamentals Pixel image, Digital image, Digitization, Half toning colour reproduction, colour jumbs, resolution and its qualities. Acquiring: Scanning of different original, Selection of technology of Programme. Transfer of Digital Photographs.

Unit: 2

Documentation: Image file formats, TIFF, EPS JPEG files text files and past discription languags. Digital Printing Processes, Silver faldire, Phernal, Inkjet, electrostatic processes.

Unit: 3

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

Unit: 4

Advance printing processes and techniques and Hybrid systems for printing on pre formed objects. Various methods to take care of counterfeiting in printing & packaging. Networking:Networks for printing. Networks for publishing. Networks for Inhouse. Ideal Network. WAN (Wide Area Networks). Flexibility. Changing Markets for Print. Market projections, Projection of changes in the no.of colors. Moving towards shorter runs.

Note: - Examiner is required to set eight questions in all, selecting two questions from each unit. Students will have to answer 05 questions in all, selecting at least one question from each unit.

Quality Control Lab (PKT-807)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Tensile strength, burst strength, Substance, caliper, porosity test, cobb sizing value test.
2. Tearing , brightness, gloss test, G.S.M. testing, Weight, folding endurance and other related tests.
3. Moisture contents test, ash contents test.
4. Hot air oven tester, absorbing test.
5. Pick strength, humidity control test, room temp testing.
6. Ink film thickness test.
7. Investigation of pigment properties.
8. Investigation of solvent properties.

Print Finishing Lab (PKT-808)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30
Time Allowed: 3 Hrs.

1. Preparation of writing board.
2. Preparation of Photo Album.
3. Preparation of following type of Mechanical binding - Spiral wire binding, Wire ‘O’ binding, Ring binding.
4. 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.
5. Preparation of telephone directory with Indexes and Tabs.
6. Study of various controls, operations and mechanisms of the following machines: Folding machine, Guillotine machine, Cutter and Creaser, Varnishing machine, Laminating machine, Miscellaneous machines.
7. Print finishing operation to be conducted, Gold blocking, Embossing, Edge decoration,
8. Thermography, Marbling, Velvet printing, Rubber printing, Die printing, Pouch lamination.

Project (PKT-809)

Total Credit: 1.5
Max. Marks: 100
External: 70
Internal: 30

Project will be an innovative working model of machine/ equipments used in Printing & Packaging Industry with required modifications and will be demonstrated during examination with the help of project report by a group of maximum ten students under the guidance of project guide (Regular faculty member of the department).