

Introduction to Packaging and Printing (BT PPT301)

Total Credit: 4
Max. Marks: 100
Theory: 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 & equipment's 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, equipment's & accessories used in screen printing, Stencils – knife cut stencils, photo stencils – Indirect stencil systems, direct photo stencil systems, capillary systems, and direct/indirect photo stencil systems screen printing process steps, Introduction to screen inks, substrates & image carriers. Digital printing: Introduction, various, digital printing technologies & Brief introduction to digital inks & substrates.

Text Books

1. Handbook of Printing Processes (GATF publications) by Deborah L Stevenson (Author), Charles Lucas (Illustrator)
2. Printing Technology 5th edition, Publisher: Delmar, 2002
3. The Gutenberg Revolution: How Printing Changed the Course of History

Reference Books:

1. "Flexography: Principles & Practices", 5th Edition, FTA, 2000.
2. "FIRST: Flexographic Image Reproduction Specifications & Tolerances", 3rd Edition, FTA, 2003.
3. Samuel B. Hoff, "Screen Printing – A Contemporary Approach", Delmar Publishers, 1997.
4. Ingram, Samuel, "Screen Printing Primer", GATF press, 2nd Edition, 1999.

Fundamentals of Management (BT PPT302)

Total Credit: 2

Max Marks: 100

Theory: 70

Internal Assessment: 30

Time Allowed: 3hrs.

Unit – I

Meaning of management, Definitions of Management, Characteristics of management, Importance of Management; Management as Art, Science and Profession; Development of Management thoughts- – Fayol’s principles of Management, Taylors Scientific Management, Elton Mayo’s Human Relations School, System’s Approach to Management; Principles of Management. Management Processes- Planning, Organizing, Staffing, Leading and Controlling; Delegation and Decentralization.

Unit - II

Production Management: Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

Unit - III

Marketing Management - Definition of marketing, Marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

Unit - IV

An Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management, Role of Financial Manager. Brief Introduction to the concept of capital structure and various sources of finance.

Reference Books:

1. Pandey I. P., (2015). Financial Management (11th ed.). New Delhi: Vikas Publishing House.
2. Kotler, P., Keller K. L. (2015). Marketing Management (5th ed.). Pearson.
3. Robbins, S. P., DeCenzo, D., Agarwal, M. N., & Bhattacharyya, S. (2011). Essentials of Management (6 ed.). New Delhi: Pearson Education.
4. Stoner J. F., Freeman R. E., Gilbert D. R.(2003). Manangement (6th ed.). Delhi: Pearson.

Package Design & Development (BT PPT303)

Total Credit: 4
Max. Marks: 100
Theory: 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

Color theory: dimension of color, color schemes, color symbolism, and emotional effects of color. 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.

Text Books:

1. Understanding by Design, Expanded 2nd Edition(Package May Vary) Jul24, 2005 by Grant J. Wiggins and Jay McTighe
2. James G. Bralla – “Handbook of product design for manufacture”, McGraw Hill Book Co., 1986.

Element of Packaging (BT PPT304)

Total Credit: 4
Max. Marks: 100
Theory: 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.

Text Books:

1. The Big Book of Packaging by Mr. Sandeep Kumar Goyal
2. The Eight Elements of Powerful Package Design Paperback – November 19, 2013
by Fumi Sasada (Author), Giles Murray

Printing Process Lab (BT PPT305)

Total Credit: 1

Max. Marks: 50

External: 35

Internal: 15

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 color printing.
8. Study of running & printing faults on different printing process machine.

Package Design & Development Lab (BT PPT-306)

Total Credit: 1

Max. Marks: 50

External: 35

Internal: 15

Time Allowed: 3 Hrs.

1. Folders- Single fold & Double fold.
2. Sticker- Two Colours.
3. Label designing- 2 and 4 colours.
4. Introduction to computer, various softwares 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.

GEC (To be taken from other Departments)

List of GEC (General Elective Course)

“For students of other Departments”

BT PPT307 (Packaging Legislations)

BT PPT 303 (Package Design and Development)

BT PPT 306 (Package Design and Development Lab)

BT PPT308 (Printing and Packaging Materials Science)

BT PPT 309 (Printing and Packaging Materials Science Lab)

Packaging Legislations (BT PPT 307)

Total Credit: 4
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

UNIT – I

INDIAN REGULATORY SYSTEM -Introduction, The Standards of weights and Measures Act (SWMA), Standard Units, Laws, Regulations and Ministries involved, Essential Commodities Act, Agricultural Produce (Grading and Marketing) Act, Prevention of Food Adulteration Act, Codex Standard Act, Export (Quality Control and Inspection) Act, Bureau of Indian Standards

UNIT - II

DECLARATIONS ON PACKAGED COMMODITIES - Declarations for Interstate Trade and Commerce, Standard Packages, Maximum Permissible Error, Label Declarations, Standard Quantity specifications for various products, Symbols and Units used

UNIT – III

INTERNATIONAL LAWS AND VIOLATION OF LAW -Uniform Weights and Measures Law, Uniform Packaging and Labeling Regulation (UPLR),Uniform Unit Pricing Regulation (UPR), Details of Violations, offences, Penalties under various sections, EU-REACH Regulations in packaging.

UNIT - IV

PACKAGING STORAGE REQUIREMENTS -Various storage requirements of Products, Specifications of Raw Materials used, IS Specifications with respect to packaging and Packaging Materials, Packaging requirements under PFA, Declaration and Labeling, Specification of Display panels, Statutory Requirements on Packages, PFA Enforcement methods, Fruit Products Order (FPO) Meat Food Products Order (MFPO) Agricultural Grading and Marking Rules (AGMARK), Edible Oil Packaging (Regulatory) Order

REFERENCES

1. G C P Range Rao, " Modern Food Packaging, Packaging Laws and Regulations", CFTRI Mysore , IIP Publications, 2005
2. The Standards of Weights and Measures act, (1976) & Standards of Weights

Printing and Packaging Materials Science (BT PPT308)

Total Credit: 4
Max. Marks: 100
Theory: 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.

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

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.

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

Surface Chemistry :Surface tension, Contact angles, Capillary 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.

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.

Reference Books:

1. Fundamentals of Packaging Technology 3rd Edition by Walter Soroka (Author)
2. The Packaging User's Handbook 1991st Edition by Frank A. Paine (Author)

3. Optics by Brij Lal and Subrahmaniam
4. Optics by Ajay Ghatak
5. Engineering Chemistry by Jain and Jain
6. Digital Label and Package Printing: Terminology, technology, materials, management and performance May 23, 2014 by Michael Fairly
7. Cartons, Crates and Corrugated Board: Handbook of Paper and Wood Packaging Technology, Second Edition Dec 29, 2014 by Diana Twede and Susan E. M. Selke
8. Printing Surface Preparation by C. S. Mishra

Printing and Packaging Materials Science Lab (BT PPT309)

Total Credit: 1

Max. Marks: 50

External: 35

Internal: 15

Time Allowed: 3 Hrs.

1. To determine pH of Ink.
2. Study of different kinds of light sensitive materials used for printing image.
3. Light Fastness test of paper.
4. Study of different kinds of papers and paperboard used in printing and packaging.
5. Study of inks used in printing and Ink tackiness test.
6. Study of coating materials used in printing and packaging.
7. Study of adhesives and tapes used in printing and packaging.

Fundamentals of Gravure Technology (BT PPT401)

Total Credit: 4
Max. Marks: 100
Theory: 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 & equipment's, Electronic engraving systems today, Image generation Methods for Gravure cylinders - Diffusion-etch method, direct transfer, Electro-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 Metalized 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.

REFERENCES

1. "Gravure: Process and Technology", Gravure Education Foundation, 2003
2. Kaj Johansson, Peter Lundberg, Robert Ruberg, "A Guide to Graphic Print Production", Wiley, 2002

Introduction to Graphic Imaging (BT PPT402)

Total Credit: 3
Max. Marks: 100
Theory: 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, equipment's 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. Color reproduction: The visible spectrum additive synthesis and subtractive synthesis additive and subtractive combination for graphic for reproduction and practical interpretation.

Unit: 3

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

(a) Fake color reproduction.

(b) Filters- Color 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.

Text Books:

1. Graphic Design School: The Principles and Practice of Graphic Design 5th Edition by David Dabner (Author), Sandra Stewart (Author), Eric Zempol (Author)

ENVIRONMENTAL STUDIES (BT PPT403)

Non Credit
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit 1: Introduction to Environmental Science and Natural Resources

The multidisciplinary nature of Environmental Studies. Definition, scope and importance, need for public awareness

Renewable and non-renewable resources: Land resources: Land as a resource, land degradation, soil erosion and desertification. Forest resources: Use and over-exploitation, deforestation, case studies. Water resources: Use and over-utilization of surface and ground water

Unit 2: Ecosystems, Biodiversity and its Conservation

Concept of an ecosystem. Structure and function of an ecosystem. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids.

Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Hot-spots of biodiversity. Threats to biodiversity, Endangered and endemic species of India. Conservation of biodiversity.

Unit 3: Environmental Pollution, Environment policies & laws

Definition, Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Nuclear hazards. Solid waste management. Pollution case studies.

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 4: Human Population and Environment and Fieldwork

Human population growth, Impacts on environment, human health and welfare. Environmental Movements: Chipko, silent valley, Bishnois of Rajasthan.

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.

Reference books

1. Cunningham, W.P. and Saigo, B.W., 1995. Environmental Science.W.M.C. Brown Publishers, New York, USA.
2. Enger, D.E. and Smith B.F., 1995.Environment Science—A Study of Interrelationships.W.M.C. Brown Publishers, New York, USA.
3. Gupta, P.K., 1997, Elements of Biotechnology, Rastogi Publications, Meerut.
4. Negi, B.S., 1991, Geography of Resources, KedarNath Ram Nath, Meerut.
5. Odum, E.P., 1996, Fundamentals of Ecology, Natraj Publishers, Dehradun.
6. Kaushik A and Kaushik C P. 2008. Perspectives in Environmental Studies, New age International Publishers, New Delhi.
7. Rastogi, V.B., 1993, Environmental Biology and Biochemistry, KedarNath Ram Nath, Meerut and Delhi.
8. Sharma, P.D., 1997, Ecology and Environment, Rastogi Publications, Meerut.
9. Singh, S., 1997, Physical-Geography, PrayagPustakBhavan, Allahabad.

10. Trivedi, P.R., 1999, Encyclopaedia of Ecology and Environment, 1-10, Indian Institute of Ecology and Environment, New Delhi.

Economics (BT PPT404)

Total Credit: 3

Max. Marks: 100

Theory: 70

Internal: 30

Time Allowed: 3Hrs

UNIT-I

Nature and Significance of Human Resource Management, Functions of Human Resource Management, Manpower Planning, Job Analysis, Job Description & Job Specification, Recruitment, Selection, Training & Development, Compensation Management, Performance Appraisal, Employee Welfare, Safety and Health, Human Resource Development.

UNIT-II

Meaning, Scope and Goals of Financial Management, Investment Decision, Nature, Importance, Evaluation Criteria, Financing Decision, Long Term Sources of Funds, Cost of Capital, Capital structure, Leverage, Dividend Decision, Models and determinants of dividend decision, Working Capital Management, Theories and determinants, Forecasting of working capital, Management of Cash.

UNIT-III

Concepts of market, Marketing and marketing management, Marketing Environment-Analyzing needs & trends in macro environment, Economic environment, Technical environment, Political environment, And socio-cultural environment, Market Segmentation, Targeting and positioning strategies, Marketing mix, Product, Meaning, Product mix, Levels of product, Product life cycle, Price, Meaning, Importance, Pricing objectives and strategies, Place, Importance, Functions of distribution channels, Promotional mix-advertising, Sales promotion, Personal selling, Public relations, Direct marketing.

UNIT-IV

Meaning and significance of Economics, Role of economics in engineering and technology, Basic economic terms, Utility, Saving, Investment, Equilibrium, Micro and macro-economics, Economic policies, Globalization, Privatization, Liberalization, Demand & Supply Analysis, Meaning of demand and supply, Law of demand and supply, Elasticity of demand and its measurement, Production, Factors of production, Law of variable production, Production function, Cost Analysis, Types of costs and shapes of different cost curves, Theory of Firm and Pricing, Types of markets, Equilibrium of firm and industry under perfect, Monopoly and imperfect competition.

Text Books:

- Dessler, Human Resource Management, Pearson
- Rao V S P, Human Resource Management, Excel
- Khan M Y and Jain P K, Financial Management, Tata McGraw Hill
- Pandey I M, Financial Management, Vikas
- Kotler Philip, Marketing Management, Pearson

- Kotler Philip & Armstrong Gary, Principles of Marketing ,Pearson
- Ahuja H L, Micro Economic Theory, S Chand
- Ruder Dutt & Sundharam, Indian Economy, S Chand

Gravure Technology Lab (BT PPT405)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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.

Graphic Imaging Technology Lab (BT PPT406)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
Time Allowed: 3 Hrs.

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

GEC (To be taken from other Departments)

List of GEC (General Elective Course)

“For students of other Departments”

BT PPT407 (Brand Management)

BT PPT401 (Fundamentals of Gravure Technology) (GEC)**

BT PPT 405 (Gravure Technology Lab)

BT PPT 408 (Computers in Printing and Packaging) (GEC*)**

Brand Management (BT PPT407)

Total Credit:4
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

UNIT – I

CONCEPT OF BRAND MANAGEMENT -Introduction to the concept of Brand Management as an active working principle within the sales and marketing department, within the overall organization, Case Studies.

UNIT – II

STRATEGIC PROCESS - The strategic process, environment and analysis, segmentation and positioning for building brands. Brand information systems and the application of brand Management using marketing principles, Case Studies

UNIT – III

BUYER BEHAVIOR - Consumer and Industrial Buyer Behavior, Models, Behavioral Applications in Branding, Case Studies, Application of analytical and logical marketing techniques required to solve Brand Management problems, and develop creative skills necessary to their success, Case studies Brand

Affordability, Role of pricing in branding. Revenue – cost - profit relationships and their application to Brand Management. Revenue management and control, Case Studies

UNIT – IV

BRAND LAUNCHING - Brand Acceptance, Product innovation, development, management and control. Packaging and product design factors, product portfolio management , Brand Awareness promotional planning and control, rules of selling, advertising, PR and other specialist promotional tools, brand availability Physical distribution processes and channel decisions, Case Studies

REFERENCES

1. Kapferer - Jean Noel., Kogan, “Strategic Brand Management”, Page Publishers, 2008
2. Kevin Lane Keller, „Strategic Brand Management“, Pearson Education Ltd., 2008

Computers in Printing and Packaging (BT PPT408)

Total Credit: 4
Max. Marks: 100
Theory: 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. Quark-Xpress. Hardware & software for color. Peripherals & add ones- 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.

Text Books:

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

Computers in Printing and Packaging Lab (BT PPT409)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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.
9. Designing of package design.

Technology of Flexography (BT PPT501)

Total Credit: 4
Max. Marks: 100
Theory: 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 methods of preparation, Photopolymer plates its kinds and methods of preparation, care handling 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 equipment's - 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 color printing. Press room practices. Environment and safety concerns. Flexography and Bar-coding: Barcode structures. Types. Verifying/Analyzing printed barcodes. UPC and flexographic printing.UDC film masters and printing capability tests. The shipping container symbol (SCS). SCS shipping contain Barcode printing. 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. Tomorrow's flexographic plates. News print for water-base flexography. Markets for today and tomorrow.

REFERENCES

1. "Flexography: Principles & Practices", 5th Edition, FTA, 2000.
2. "FIRST: Flexographic Image Reproduction Specifications & Tolerances", 3rd Edition, FTA, 2003.

Sheet Fed Offset Technology (BT PPT502)

Total Credit: 4
Max. Marks: 100
Theory: 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 setoff spray powder unit. Machine production. Trouble shooting. Printing machine maintenance.

REFERENCES

1. John MacPhee, "Fundamentals of Lithographic Printing", Vol.1 Mechanics of Printing, GATF Press, 2002.
2. A.S.Porter, "A Manual of Lithographic Press Operation", Lithographic Training Services, London, 1998.
3. Helmut Kippan, "Handbook of Printmedia", Springer publications, 2004.

Cellulose Technology (PPT-503)

Total Credit: 4
Max. Marks: 100
Theory: 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 from 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. Runability 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.

Text Book:

1. The 2018-2023 World Outlook for Packaging and Substrates by Icon Group International (Author)

Flexography Technology Lab (BT PPT504)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
Time Allowed: 3 Hrs.

1. Introduction and familiarizing flexo machine and other related elements.
2. Preparation of rubber plates.
3. Study of liquid & 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 flexo machines.
8. Printing on various substrates i. LDPE, ii. HPDE, iii. Paper, iv. Aluminium foil.

Sheet Fed Offset Lab (BT PPT505)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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 color printing.
7. Two color printing.
8. Four color printing.

Cellulose Technology Lab (BT PPT506)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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.

List of DCEC (Discipline Centric Elective Courses)

BT PPT507 Wood, Glass and Metal Based Packaging

BT PPT508 Packaging Management

BT PPT 509 Paperboard and Corrugated Packaging

BT PPT510 Lean Six Sigma

BT PPT 503 Cellulose Technology (GEC**)**

BT PPT 506 Cellulose Technology Lab

Wood, Glass and Metal Based Packaging (BT PPT507)

Total Credit: 4
Max. Marks: 100
Theory: 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. 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.

Unit: 4

Manufacture of Black Plate, Tin Plate Characteristics and Properties, Tinplate ,Containers. Aluminium Foil - Manufacture, Properties and Applications in Packaging. 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. G.I. Drums - Oil Drums – Closures: Introduction, Capacity, Types of Drums, Manufacture of Drums, Quality Control. Closures: Introduction, Types, Parts, Essential Functions, Recent Developments, Advantage & Dis-Advantage & application of metal based packaging. Modern trends in metal based packaging.

REFERENCES

1. A. L. Brody, K. S. Marsh, “The Wiley Encyclopedia of Packaging Technology”, 2nd Edition, Wiley, New York, USA, 1995
2. Walter Soroka, “Fundamentals of packaging technology”, 3rd Edition, Institute of Packaging professionals, Naperville, Illinois, USA, 2002.
3. Joseph F. Hanlon, Robert J. Kelsey, and Hallie Forcinio, “Handbook of Package Engineering”, Third Edition, CRC press, 1998

Packaging Management (BT PPT508)

Total Credit: 3.0
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Quality Management- Management- Introduction of Management, Functions of management, scope of management, Quality Management in Packaging, Defect Prevention Techniques, Various Statistical tools used in maintaining Quality,

Unit: 2

Sales and Marketing of a Product – Classifications of Sales, Marketing, Type of Marketing, Consumer buying behavior

Unit: 3

STRATEGIC MANAGEMENT AND PROJECT SELECTION - Project selection models, Project portfolio process, Analysis under uncertainty, Project organization, Matrix organization

Unit: 4

Safety and Waste Management – Study of waste management, Recycling and Reuse of Materials, Evaluation of modern safety concepts – safety management functions – safety organization, safety department- safety committee, safety audit – performance measurements and motivation – employee participation in safety - safety and productivity.

TEXT BOOKS:

1. Project Management – A Managerial Approach, by Jack R. Meredith, and Samuel J. Mantel Jr., John Wiley and Sons, 2006
2. Project Management – A Systems Approach to Planning, Scheduling and Controlling, by Harold Kerzner, John Wiley and Sons, 2006
3. John.V .Grimaldi and Rollin. H Simonds, “Safety Management”, All India traveler book seller, New Delhi – 1989.
4. Krishnan N.V, “Safety in Industry” , Jaico Publisher House, 1996.

REFERENCES

1. M.Bakker, “Wiley Encyclopedia of Packaging Technology”, Joh Wiley & Sons Ltd., 2008
2. Jim Mc Dermott, Anne Emblem, “Packaging: The facts”, Institute of Packaging, USA, 2006
3. Edmund A Leonard, “Introduction to Economics of Packaging”, Morgan-Grampion Publishers, University of Wisconsin – Madison, 2007

Paperboard & Corrugated Packaging (BT PPT509)

Total Credit: 4
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Manufacturing & Appearance Properties: Sources, Paper and Paperboard Manufacturing process, Paper and board Coating, Appearance properties – Color, 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, Crease ability 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 fibre board 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.

TEXT BOOKS

1. Twede, D. and Selke, S. E. M., “Cartons, Crates and Corrugated Board – Handbook of Paper and Wood Packaging Technology”, DEStech Publications, 2005.
2. Walter Soroka, “Fundamentals of packaging technology”, 3rd Edition, Institute of packaging professionals, Naperville, Illinois, USA, 2002.

REFERENCES

1. A. L. Brody, K. S. Marsh, “The Wiley Encyclopedia of Packaging Technology”, 2nd Edition, Wiley, New York, USA, 1995
2. R. E. Mark, C. C. Habeger, Jr., J. Borch and M. B. Lyne, “Handbook of Physical Testing of Paper”, 2nd Edition, Marcel Dekker, 2002
3. Kenneth W. Britt, “Handbook of Pulp and Paper Technology”, CBS Publishers, 1984

Lean Six Sigma (BT PPT510)

Total Credit: 3.0

Max. Marks: 100

Theory: 70

Internal: 30

Time Allowed: 3 Hrs.

UNIT-I

EVOLUTION OF LEAN SIX SIGMA -Introduction to Lean Principles and Six Sigma Concepts-Similarities and differences – Synergy-Evolution of Lean Six Sigma

UNIT-II

LEAN SIX SIGMA APPROACH and IMPLEMENTATION - Lean Six Sigma Methodology- Phases of Lean Six Sigma Method, Managing Lean Six sigma Project ,Six sigma Methodologies (DMAIC, DMADV , DFSS), Identifying Lean Six Sigma Projects, Define Scope, Planning for Implementation, Selection of tools and techniques for each phase, measuring the Benefits

UNIT-III

SIX SIGMA TOOLS AND TECHNIQUES - Advanced Statistical Tools - Statistical Process Control-Process Capability Analysis Sigma computation -Hypothesis Testing-ANOVA-Design of Experiments- chi-square test, Regression analysis –Case studies

UNIT-IV

LEAN TOOLS - Value Stream Mapping – Poka Yoke-5S-Cycle Time Analysis-Push-Pull Systems- Waste Elimination- Total Productive Maintenance- Failure Mode Effect Analysis- Standard Work Practices-Control Plans, SMED , Kanban , Visual control , Kaizen –Case studies

REFERENCES

1. Michael L. George, David Rowlands, Bill Kastle ,What is Lean Six Sigma, McGraw-Hill, 2003
2. Thomas Pyzdek,The Six Sigma Handbook ,McGraw-Hill, 2000
3. James P. Womack , Daniel T. Jones ,Lean Thinking, Free press business, 2003.
- 4 Forrest W. Breyfogle III ,Implementing Six Sigma: Smarter Solutions Using Statistical Methods ,1999.
5. Liker, Jeffrey; Meier, David ,Toyota Talent , Tata Mcgraw Hills

Color Perception & Calibration (BT PPT601)

Total Credit: 4
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

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

Unit: 2

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

Unit: 3

Colorimeter and spectrophotometer, color calibration, densitometry, type of densities, specular, diffuse, double difference density. Color printing, factors in color printing, printed color density, trapping, tone value, UCR, GCR, color 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 color, scanner resolution, white & black point adjustment. Color correction, need for color correction, masking and types of masking, function of masking, brief introduction to retouching, retouching chemicals, intensification, grey balance.

Text Books:

1. Soroka W., “Fundamentals of Packaging Technology”, 3rd Ed, IoPP, 2002.
2. Paine F. A., “The Packaging User’s Handbook”, 1st Ed, Blackie Academic & Professional, 1991.
3. Byett J. et al., “Packaging Technology”, 2nd Ed, The Institute of Packaging (SA), 2001.
4. Selke, S. E. M., Culter, J. D. and Hernandez, R. J., “Plastics Packaging: Properties, processing, Applications and Regulation”, Carl Hanser Verlag, USA, 2004.
5. Joseph F. H, Robert J. K, Hallie F, “Handbook of Package Engineering”, Third Edition, Technomic Publishing, 1998.
6. Dr. R.W.G. Hont :- The reproduction of color. Fountain Press, 4th edition.
7. Miles Southworth & Donna Southworth :- Color Reproduction. Graphic Arts Publishing, 3.1 edition.
8. Gary G. Field :- Tone & Color correction (GATF).

References:

Yam K. L., “The Wiley Encyclopedia of Packaging Technology”, Third Edition, Wiley, 2009.

Image Carrier for Printing Processes (BT PPT602)

Total Credit:4

Max. Marks: 100

Theory: 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 color printing and multi color 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 & equipment's 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.

Text Books:

1. Handbook of Print Media Technologies and Production Methods **Editors: Kipphan, Helmut (Ed.)**
2. Handbook on Printing Technology (Offset, Gravure, Flexo, Screen) 2nd edition

Packaging Machineries (BT PPT603)

Total Credit: 3
Max. Marks: 100
Theory: 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, Co-extrusion 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, MAP Machine and CAP.

Text Books:

1. Packaging Machinery Handbook: The complete guide to automated packaging machinery including packaging line design Nov 17, 2012 by Henry CPP, John R

Packaging & Printing Inks (BT PPT604)

Total Credit: 4
Max. Marks: 100
Theory: 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 curing inks, ink cure considerations, chemistry of UVcuring-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. test-tests for chemical resistance, light fastness, rub resistance test, crumpling resistance test, color 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.

Text Books:

1. 'MANUFACTURE AND TESTING OF PRINTING INKS, ROLLERS AND BLANKETS. INK TECHNOLOGY FOR PRINTERS AND STUDENTS, PART 1' Hardcover – January 1, 1963 by E.A. APPS (Author)
2. The Complete Technology Book on Printing Inks Author: NIIR Board Format: Paperback ISBN: 8178330482
3. The Printing Ink Manual, Editors: Leach, Robert, Pierce, Ray (Eds)

Image Carrier for Printing Processes Lab (BT PPT605)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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 equipment's and their use in Image carrier department for various processes.

Package Testing Lab. (BT PPT606)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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 seal ability of various packaging materials.
7. Determination of gloss & haze of various packaging materials.
8. Measure the color of a packaging material and compute color differences between different batches.

Color Perception and Calibration Lab (PPT-607)

Total Credit: 1

Max. Marks: 50

External: 35

Internal: 15

Time Allowed: 3 Hrs.

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

List of DCEC (Discipline Centric Elective Courses)

BT PPT608 Packaging Attributes – Shelf Life

BT PPT609 Plastic & Polymer Based Packaging

BT PPT610 Sustainability and Environment Printing and Packaging

Packaging Attributes – Shelf Life (BT PPT608)

Total Credit: 4
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

UNIT - I

SHELF LIFE AND KINETICS OF PRODUCT DETERIORATION - Introduction, factors influencing shelf life, types of deterioration – physical, chemical, microbiological; measuring shelf life, predicting shelf life – predictive models, software systems; sensory evaluation methods, accelerated shelf-life tests – initial rate approach, kinetic model approach, Design of shelf life experiments, Extending shelf life

UNIT – II

BASIC PRINCIPLES OF MASS TRANSFER - Basic concepts of mass transfer, Mechanism of permeation, Sorption, diffusion, Permeability, Factors affecting permeability, Migration Interactions - volumetric method, gravimetric method, differential method, determination of solubility; Gas chromatograph

UNIT - III

DIFFUSION OF GASES AND VAPOURS - Diffusion - Fick's law of diffusion, film permeation, dimension of transport parameters, diffusion into film, Permeation of gases and vapors in polymers - basic equations and calculation, temperature and concentration dependence – sorption, Mass transfer through micro holes, Knudsen diffusion; Hydrodynamic flow of gases.

UNIT – IV

PERMEABILITY- Introduction, importance of permeation – effect of time and temperature, effect of moisture, effect of oxygen, choice of materials; Rate of transmission – variables of the polymer, effect of permeating species, temperature and pressure, wall thickness; Measurement of permeability- WVTR, GTR; multilayer structures, application of permeability to material selection and shelf-life estimation, Cycling conditions, Computer models, calculations, predictions ,Product fragrance and packaging material interactions, Migration of packaging material with product/solvents, Effect of irradiation of polymeric packaging materials in formation of volatile compounds, Flavour/Active ingredient absorption with packaging material, Shelf Life Prediction, Mold

REFERENCES

1. M. Mathlouthi, "Food Packaging and Preservation", Springer 1 edition, 1994
2. Otto G. Piringer, A. L. Baner, "Plastic Packaging: Interactions with Food and Pharmaceuticals", 2 edition, Wiley-VCH, 2008

Plastics and Polymer Based Packaging (BT PPT609)

Total Credit: 4
Max. Marks: 100
Theory: 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, PET, Met PET

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 color identification test, pyrolysis test, refractive index, basic equipments, and other testing measures for individual plastics.

Text Books:

1. Soroka W., "Fundamentals of Packaging Technology", 3rd Ed, IoPP, 2002.
2. Paine F. A., "The Packaging User's Handbook", 1st Ed, Blackie Academic & Professional, 1991.
3. Byett J. et al., "Packaging Technology", 2nd Ed, The Institute of Packaging (SA), 2001.
4. Selke, S. E. M., Culter, J. D. and Hernandez, R. J., "Plastics Packaging: Properties, processing, Applications and Regulation", Carl Hanser Verlag, USA, 2004.
5. Joseph F. H, Robert J. K, Hallie F, "Handbook of Package Engineering", Third Edition, Technomic Publishing, 1998.

Sustainability and Environment Printing & Packaging (BT PPT610)

Total Credit: 4
Max. Marks: 100
Theory: 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,

REFERENCES

1. Supply Chain Management, Strategy, Planning, and operation – Sunil Chopra and Peter Meindl- PHI, Second edition, 2007
2. Logistics, David J.Bloomberg, Stephen Lemay and Joe B.Hanna, PHI 2002
3. Logistics and Supply Chain Management –Strategies for Reducing Cost and Improving Service. Martin Christopher, Pearson Education Asia, Second Edition
4. Modeling the supply chain, Jeremy F.Shapiro, Thomson Duxbury, 2002
5. Handbook of Supply chain management, James B.Ayers, St.Lucle Press, 2000

Quality Control & Distribution and Transportation (BT PPT701)

Total Credit: 4
Max. Marks: 100
Theory: 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-color 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, NABL, Role of NABL in tracing and tracking of Lab test and Report.

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.

Text Books:

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

Finishing and Decorating Technology (BT PPT702)

Total Credit: 3
Max. Marks: 100
Theory: 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. Growth 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 Stitching, Side Stitching, 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 Pouching, Appliqué. Edge Decoration - Requirement, Coloring The Edges, Marbling Edges, Edge Gilding. Round Corner Cutting. Numbering - Folio Numbering, Double Numbering, Duplicate Numbering. Principle of Rotary Numbering. Skip Numbering, Automatic Numbering. Kinds of Indexes. Banding & Lacing, Poly Bagging, Mailing, Creasing, Bundling, Ticketing. 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, Coating.

Text Book:

1. Hand Bookbinding: A Manual of Instruction Paperback – July 2, 1996 by Aldren A. Watson (Author)
2. Binding And Finishing - Ralph Lyman Binding And Finishing Part-1 - B.D.Mendiratta
3. Binding Finishing Mailing - T.J.Tedesco Introduction to Printing & Finishing - Hugh Speirs

4. Finishing Process in Printing - A.G.Martin.

Quality Control Lab (BT PPT703)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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.
9. Identification of Polymeric material.
10. Scuff proof-ness test.

Finishing and Decorating Lab (BT PPT704)

Total Credit: 1
Max. Marks: 50
External: 35
Internal: 15
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.

Industrial Training (BT PPT705)

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

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

List of DCEC (Discipline Centric Elective Courses)

- BT PPT706 Food & Agro Based Packaging**
- BT PPT707 Digital & Advance Printing Processes**
- BT PPT708 Packaging of Healthcare and Pharmaceutical**
- BT PPT709 Costing and Estimating**

Food and Agro Based Packaging (BT PPT706)

Total Credit: 4
Max. Marks: 100
Theory: 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, 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: Packaging and bakery and snack foods.

Unit: 3

Aseptic Packaging - Sterilization of Packaging Materials, Using Aseptic 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, CAP, MAP, Shrink Puff

REFERENCES

1. Michal J.Burke, "Applied Ergonomics Handbook", Lewis Publishers, 2007
2. Wesley E.Woodson, Peggy Tillman & Bary Tillman, "Human Factors Design Handbook", Wiley publishing co., 2006
3. Gavriel Salvendy, "Handbook of Human Factors & Ergonomics", Wiley publishing co., 2007
4. Nigel Thoobald, "Packaging closures & Sealing systems", CRC Publishers, 2006

Digital & Advance Printing Processes (BT PPT707)

Total Credit: 4
Max. Marks: 100
Theory: 70
Internal: 30
Time Allowed: 3 Hrs.

Unit: 1

Digital Documents: Introduction to Digital Printing fundamentals Pixel image, Digital image, Digitization, Half toning color reproduction, color 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 description languages. Digital Printing Processes, Silver faldire, Pernal, Inkjet, electrostatic processes.

Unit: 3

Rendering Type line Art and images. Color 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 color 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. Short-run 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 In-house. 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.

Text Books:

- 1) Operator manual –GATF
- 2) Color scanning and imaging systems-Gary field, GATF
- 3) Production Planning and inventory control-Seetharama L.Narasimhan,Dennis W.Mcleavey, Peter J.Villington
- 4) Production Planning ,Control and management-K.C.Jain, L.N. Aggarwal

Packaging of Healthcare and Pharmaceuticals (BT PPT708)

Total Credit: 4
Max. Marks: 100
Theory: 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.

REFERENCES

1. Max Sherman, “Medical Device Packaging Handbook”, 2nd edition, CRC, 1998
2. H. Lockhart, Frank Albert Paine, “Packaging of Pharmaceuticals and Healthcare Products”, Springer, 1996
3. Otto G. Piringer, A. L. Baner, “Plastic Packaging: Interactions with Food and Pharmaceuticals”, 2nd edition, Wiley-VCH, 2008

Costing & Estimating (BT PPT709)

Total Credit: 4
Max. Marks: 100
Theory: 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, estimator's 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.

Text Books:

1. Principles of Accounting - B. S. Raman
2. Fundamentals of Financial Management - Prasanna Chandra.
3. Cost Accounting - B. R. Bhar
4. Print Management - Derek Porter
5. Printer's Costing & Estimating - B. D. Mendiratta
6. Management Aspect of Printing Industry - T. A. Saifuddin.
7. Estimating Methods and Cost Analysis for Printers - K. S. Venkataraman, K. S. Balaraman.
8. Printing Estimating Principle & Practice - Philip Kent Ruggles
9. Print Production Management - Gray G. Field
10. Principles of Applied Costing for Printing Industry - K. S. Venkataraman.

Project (BT PPT801)

Total Credit: 10
Max. Marks: 100
External: 70
Internal: 30

Project will be an innovative working model of machine/equipment's 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).