

## PRINTING TECHNOLOGY

### INTRODUCTION TO PRINTING PROCESSES

History, Brief Introduction of Printing Industry in India, Basic operations in printing, Introduction to Printing Processes, basic principles, Letter Press Printing Machines, Rollers, their types, Running Defects, History of Screen Printing, Stencils, Screen Printing Machines, Screen Printing Substrates

### TECHNOLOGY OF TYPOGRAPHY & TYPESETTING

Definition, concept and scope, Printing type, definition, its two - dimensional and three -dimensional concept, Dimensions of printing types. Printers Measurement and Systems: Point System, Physical structures of printing types, Design features and design principles of printing types, Classification of printing types based on serifs, Identification of printing types, principles of size and design identification, Calculations relating to type sizes and dimensions of printing pages, up devices, proofing presses, Imposition, Sheetwork, Half -sheet work, Work and tumble & Work and twist.

### PRINTER'S SCIENCE

Colloids :Characteristics, Proportion, application, Theory of Electrodeposition, chromium Plating, Anodising of metal, Introduction of Photo chemistry, Surface characteristics in printing, method of determining pH, pH of paper, ink, pH application in Printing, Photometry, laws of illumination - inverse square law and Lambert's cosine law, types of photometers, Photographic cameras, Effect of light on different plate and film coatings, adhesives & Ink -films, Light fastness and print characteristics, process cameras, contact printer and safe light and process chemicals.

### GRAPHIC DESIGN

Fundamentals of design , Colour theory: dimension of colour, colour schemes, colour symbolism, emotional effects of colour, Division of design, Methods of type arrangement, classification of typeface of font designing, rough layout, comprehensive, artwork, type of originals, sizing, mashing and cropping, Design management, Design with D.T.P., Selection of an appropriate printing process for printing of a job, What is 3D, Perspective, scale and sense of proportion.

### 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, its kinds and methods of preparation, Photopolymer plates.  
The Printing press: Flexo press types, Rewind equipments, Printing stations - two roll, anilox roll, reverse angle doctor blade system, CI drum, plate cylinders. Anilox roll, Fountain rolls, Flexo roller covering..  
Mounting and Proofing: Checking, operation care of equipment, mounting instructions. Mounting and proofing a complete line job, removing plates from the cylinder, mounting metal-backed plates, reusing sticky back, plate staggering, use of release agents.

### PRINTING MATERIALS

Metals, Type of metals and characteristics of metals used for type alloys for foundry types, hot metal composition and stereos Physical and chemical properties of aluminium, zinc, copper, nickel, chromium, magnesium in relation to printing applications.  
Photographic Materials, Main kinds of films and photographic papers used in graphic origination Films positives, mainbase, stripping, thickness, right and wrong reading, negatives; paper positive materials. Developers, Reducers, Intensifiers, Light Sensitive Materials, , contrast and spectral sensitivity, characteristics and gamma value curve. Paper and Ink, Fibrous and Non-fibrous materials used in paper and board manufacturing. General characteristics and requirements of printing inks formulations pigments, vehicles, varnishes, solvents, agents. Adhesives, Classes and characteristics of adhesives used in binding and warehouse work and their range of applications Selection for specific purpose

### REPRODUCTION TECHNOLOGY

Basic principles, Difficult line originals - Line originals with colour; line originals with fine lines screen; line originals with fluorescence effect. Contact photography, Line separation from black and white art work, Evaluation of line negative, Halftone photography, Half tone exposure, Contrast control, contact screen determining CC filters and exposure calculations, Auxiliary or supplementary exposures, Line and halftone combination, Colour reproduction, Mechanism of vision and theories of colour-vision, Colour separation, Digital photography Basic principles of lens selection.

### GRAVURE TECHNOLOGY

History of gravure, Gravure products and markets, Diffusion etch - Direct Transfer-Electromechanical process - Laser cutting. Electronic engraving systems, Chemical engraving, Cylinder correction methods, Colour balance etches, spot plating. Well formation, Cylinder construction and preparation, Balancing the

cylinder, Copper plating and polishing, Doctor blade uses, Doctor blade problems. Gravure Impression Roller, Gravure Press and Its components, Typical press configurations, Gravure publication presses, Flexible Packaging presses, Label presses, Product gravure, Gravure Ink Dryers, Dryers functioning, Dryer limitations, Solvent Recovery Methods. Gravure cylinder preparation, Gravure Substrates, Paper substrates-Roto news papers, Coated papers, Gravure packaging paper substrates - properties. Label stock, Paper board. Non Paper substrates - surface preparation, plastics-properties.

#### OFFSET TECHNOLOGY

Basic principles in planographic printing, Principle, advantages, limitations. Press configurations. Infeed unit, Types of feed board sheet control devices, conveyor, Sheet separation system, Forwarding system, Front lay, Side lay, Sheet detectors, Double sheet detectors, Grippers, compression spring, tension spring, Plate insertion system, Sheet transfer section, Delivery unit, Inking system, Theory of ink-film flow. Dwell time. Ductor, ink duct. Ink feed roller. Oscillating roller. Drive rollers. Intermediate & plate inking rollers. Drum type inking system. Roller maintenance-roller removal, replacement, roller storage, roller hardness. Ink agitators. Dampening system, Fountain roller. Dampening feed roller. Scavenger roller. Dampening solution composition, Iso propanol alcohol - substitute of alcohol. pH of dampening solution. Conductivity of dampening system. Damper setting. Brush system for metering. Printing unit, Cylinder gears - spur gear, helical gear, bevel gear. Cylinder design. Plate cylinder - cylinder driving, cylinder body, cylinder gap, plate clamping, plate punching, bearer contact cylinder, Process of printing operation, Pre make ready, make ready, inspection of press sheets, control of press function during press run, maintaining the dampening system,

#### PRINTING IMAGE GENERATION

Assembly of film images, Facilities. Equipments and tools required. Materials and supplies. Assembly and masking materials, Screen printing, Heat transfer printing, Collotype, Stencil making. Hand painted stencil - Introduction, blockout methods (selective process), swivel knife. Planographic plates, Introduction. Light sensitive coating - dicromated colloids, diazo compounds, photo polymers, diffusion and transfer methods, electrostatic. Sensitivity of coating to light. Dye-sensitized photo polymerization, dark reaction, post exposure, safe lights, reciprocity law.

#### PRINT MEDIA ETHICS

Morality and ethics, Workplace Justice Issues, Electronic Property and Copyright, Work life In Indian Philosophy, Attitudes, Beliefs & Life Positions, Overview of the Ethical Value System, Role of Legislation & Other Bodies in Enforcing Ethical Business Behaviour, Social and Economic Responsibilities of Business

#### ADVERTISING AND MULTIMEDIA

Advertisement, Advertisement Budgeting - Methods, determining and appropriation, Advertisement Research- Research methods, sampling, data analysis and representation, surveys, attitudinal research, Media Planning, Budgeting, allocation of budget, calculating cost of media, media mix. Types of media. Advertisement Agency, Advertisement and Computers, Public Relations

#### PRINTING MANAGEMENT

Business Environment – Printing Industry in India & Abroad. Impact of globalization & IT, Management, Production and operations Management, Marketing management, Human resource management, Financial Management, Work flow and organizational structure in a printing press, Cost Accounting, Depreciation

#### PRINTING SUBSTRATES

Paper, Introduction, Paper fibres & pulps paper performance, strengths and durability, absorbency, dimensional stability. Recycled paper- Introduction. recycling process, fibre preparation- screening, centrifugal cleaning, flotation, washing, deinking plant function, continuous drum pulper, prescreening and cleaning, primary flotation, cleaning, fine screening, thickening, dispersing, brightness control, washing, thickening and storage. Choosing a suitable paper- Characteristics of paper. Printing process requirement. Paper varieties for printing. Printing defects associated with paper. Reel defects. Introduction to Non Paper substrates, Surface preparation, plastics-properties. Metalized films - Aluminium foil, Foil laminations

#### PRINTING INK TECHNOLOGY

Printing Inks, 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, Drying mechanisms, Viscosity, Ink requirements for printing

<p>processes, Optical properties of ink films, Paste inks, Liquid inks, Radiation curing, Introduction, radiation curing inks, ink cure considerations, chemistry of uv curing-photo initiation, propagation, termination. Cationic curing, electron beam curing.</p>
<p><b>ENTREPRENEURSHIP DEVELOPMENT</b>          Entrepreneurship: A Perspective: Recognition of the need for entrepreneurship and self-employment development, Entrepreneurship spirits, Significance of entrepreneur in Economic Development, Scope and trends of small enterprises, Quick Start Method, Business Planning Process, Forms of Ownership, Instructional Models</p>
<p><b>QUALITY CONTROL</b>          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, Materials Control, Establishing Quality control programme in different departments of Printing organization, Quality Control Instrumentation, Introduction to ISO:9000 and ISO:14000 series.</p>
<p><b>COLOUR SEPARATION TECHNIQUES</b>          Introduction to colour, Basic colour theory, additive and subtractive colours, process colours, application of the colour theory to colour reproduction. Overview of colour reproduction from original to printing. Choosing a Transparency for Reproduction, Exposure level, colour balance, memory colours; grainers, contrast, Colour Reproduction, Colour Separating methods, Colour correction, Colour proofing, Planning for colour work, Introduction &amp; Working of image capturing techniques of Drum, Flat Bed Scanners &amp; Image Setters.</p>
<p><b>PACKAGING TECHNOLOGY</b>          Basics of Packaging, Introduction, Function of a package, Factors influencing design of a package, Computer Aided Package Design, Packaging Cycle, Packaging Media, Effect of moisture on wood, preservation of wood, advantages. Boards-types, paper-types. Glass- properties, advantages, types, basic approaches to designing a bottle, Carton Production, Folding cartons, Corrugated containers, Innovative Packaging Techniques/Processes- Gas packaging - MAP &amp; CAP, Vacuum packaging, shrink packaging, stretch wrapping, blister packaging, skin packaging, strip packaging, Aerosol packaging container, Futuristic trends in packaging, Environmental implications of packaging - recycling, Legal aspects in packaging.</p>
<p><b>PRINTING MACHINERY MAINTENANCE</b>          Drive and Control Systems, Transmission systems such as AC and DC motors, belt, chain, gear, cranks, connecting rods, paul and ratchet machani sms, Hydraulic, Pneumatic, Electrical, Electronics and mechanical controls, Erecting and Testing, Repairs and Reconditioning, Cylinders, Bushes and Bearings, Maintenance procedures, Identification &amp; rectification of faults . Maintaining differen t types of Letterpress, Offset, Gravure &amp; Flexo Machine.</p>
<p><b>PRINTER'S COSTING AND ESTIMATING</b>          Printing Company Organization, Printing management, principles, functions, Organizational criteria, Skills requirements, Human Resource Management Concepts, HRM for printing, employment policy, evaluation of skills, recruitment, job evaluation, staff appraisal, motivation training, Estimating, Purpose and functions of estimating from printer point of view &amp; customers point of view, Board requirement, estimating covering materials, estimating sewing thread, Costing, Job costing, its need and procedures. Elements of cost and their method of recovery, Daily Docket, Work Instruction Ticket and their importance in costing</p>
<p><b>DIGITAL PRINTING</b>          Digital Documents, Introduction to Digital Printing fundamentals Pixel image, Digital image, Digitization, Half toning colour reproduction, colour jumbs, resolution andits qualities.AC quiring, Documentation, Digital Printing Processes, Rendering Typeline Art and images, Colour management, Market &amp; Applications, Database Marketing's Role, Customizing traditional print. Customized on-demand print. The future. Networking, Networks for printing. Networks for publishing. Networks for Inhouse. Ideal Network</p>