TAMIL NADU PUBLIC SERVICE COMMISSION

Printing Technology (Diploma Standard)

Code No.248

UNIT I – Imaging Technology

Design – Concept, Typography, Graphic Design Layout – Stages in Preparing a Layout; Imposition Schemes; Book Work – Margin Calculations, Dummy. Various designing software used for Designing of Newspapers, Booklets, Magazines and Label works. Digital Pre Press - Image Acquisition – Digital Camera – Principles, Types, Resolution, Memory, Scanner Types – Flatbed and Drum, Screening Frequency, DOT Structure AM and FM Screening, File Formats - OPI, Trapping, Postscript, PDF, CIP3 — JDF; Workflow – File Preparation, Colour Management, Preflighting, Digital Imposition – RIP (Raster Image Processing), Resolution – Input, Output, Plate Setters – Types, Digital Proofing - Need, Proofing Technologies - Inkjet, Dye sublimation, Thermal Wax, Electro Photography . Inks, Dyes, Toners, Quality and Relative Merits.

UNIT II – Image Preparation

Imaging for offset process; Plate chemistry - Light source - Types – advantages,disadvantages - Desensitizing process, gum, Quality Control Aids; Computer to plate (CTP) and Computer to press systems , their architecture, type of plates used- silver halide, thermal fuse, photopolymer plates and their structures and technique of imaging – laser, UV, thermal imaging. Computer to Polyester Plate (CTPP) and technique of imaging, quality control devices.

Imaging for Gravure Process: Electromechanical engraving. Laser cutting of gravure cylinders, system architecture workflow and quality control.

Imaging of Flexography: Plate types – Rubber and Polymer plates, production of design rolls and quality aspects.

Imaging for screen printing: stencil preparation types and quality aspects.

UNIT III – Offset Printing

Sheet-fed offset: Principle, types of offset machines - single colour, multi colour, perfecting presses and small offset presses; Feeding unit; pile board, Feeder head, feed board, registering system and Control. Printing unit - Plate cylinder, blanket cylinder, Impression cylinder, inking system, dampering system drying system and delivery system. Printability and runnability problems.

Web offset: Principle, web fed offset machines - In-line web offset, blanket to blanket press, stack type press, Satellite (CIC) presses; Infeed: Types of reel stands, Automatic pasters, web control devices; Printing Unit design configuration, inking and dampering system, Drying, Chilling, folding, sheeting units and mail room operation. Printing and inline Operations – Make-ready operations, multi colour printing, automatic plate fixing, computer controls in printing, automatic blanket washing devices roller washing devices, spot coating, varnishing and accessories. Print problem identification and quality control.

Unit – IV - Gravure, Flexography, Screen and Digital Printing

Gravure: Principle, Press configuration, doctor blade – types, positioning; impression rollers, inking and drying system. Proofing, feed in, feed out and converting operations.

Flexography Printing: Principle, press configuration, corona treatment, Anilox roller, plate mounting, inking, drying and proofing. Feed in, feed out and converting operations.

Screen printing – Screen fabrics, frames and squeegees – types; screen printing machine-types; maintenance.

Digital Presses: computer to press, types, advantages and applications; Green Printing - Principles.

UNIT V: Post Press and Converting Operations:

Production Flow in Print Finishing, Folding - types of fold for sheet and web, methods of feeding and delivery, cutting machine – parts, types of cutting machine, knife, mechanism and maintenance of guillotines, gathering - Principles of Gathering and types of machines, securing -

Stitching, Sewing – types; Perfect binding, miscellaneous operations – Edge treatment , Case making, Embossing, Foil Stamping , Die-Cutting, Indexing, Lamination - types, Shrink Wrapping, Automation in Finishing operations; Package design – types, CAD applications in packaging, folding carton manufacturing, collapstble tubes – manufacturing and its applications.

UNIT VI - Printing and Packaging Materials:

Paper – Raw materials, Manufacturing, Paper making machines, paper coatings. Paper classification and sizes. Boards: Raw materials, manufacturing, machineries, classifications and sizes. Paper and Board Properties and testing. Printing Inks – Raw Materials, Manufacturing, types of inks, ink properties and testing. Coating materials, varnish, laminating films and adhesives. Plastic in packaging - types and advantages, Flexible and Rigid Packaging - materials used, properties and its applications. Glass, wood, textile Metals – Tin, Aluminum, Steel, Foils and its applications in packaging, Label - types, Adhesives used, Closures and Sealing; Cushioning materials, Lacquers, Special Additives and Material Testing.

UNIT VII: Planning, Scheduling and Cost Estimation

Planning; Job order docket, scheduling the work, sequencing, inventory management, materials and capacity requirement.

Cost Estimation – Basic concept of costing, Pricing, Estimation and Investment analysis – Cost estimation for printing materials and for different printing process in respect to various print jobs.

UNIT VIII: Printing Machinery Maintenance:

Maintenance Management: Definition, Planned Maintenance and Unplanned Maintenance. Total Planned Maintenance – Safety precautions and House keeping. Preventive, Predictive scheduled maintenance Documentation and Spare parts management. Unplanned maintenance -

Breakdown or emergency maintenance. Total Production Maintenance - Six big losses, Pre press maintenance, Press maintenance, Printing and allied equipment maintenance, Electrical component maintenance, Mechanical component maintenance; Equipments and tools used in Erection and Testing. Repairs and Reconditioning of old machines.

UNIT IX - Total Quality Management in Printing:

Concepts of TQM, TQM Framework, Barriers to TQM; TQM Principles – Customer focus, Customer orientation, customer satisfaction, customer complaints, customer retention; TQM Tools and Techniques - Traditional tools of quality, New management tools - Six-sigma: Quality Circles, TPM, 5s, Kaizen. Process control: Visual inspection, Quality Systems and ISO 9000, Statistical Quality Control, Control charts and wastage management. Materials, process control, ISO standards for process, Implementation and Guidelines, Quality Control Devices, Quality control aids - Offset, Flexography and Gravure.

Unit X - Advanced Printing Technology

Digital printing Technology: Definition, Non-impact printing technology (NIP), basic principle; Electrophotography, Ionography, Thermography and Inkjet printing. Security Printing; Hologram, Lenticular printing, waterless offset printing, 3D printing, Hybrid printing and its application. E-publishing Layout and Design preparation, work flow, eBook, eJournals, eNewspaper, internet advertising and digital libraries.