## DETAILED SYLLABUS FOR THE POST OF LECTURER IN PRINTING TECHNOLOGY

## (TECHNICAL EDUCAION (GOVT.POLYTECHNIC COLLEGES))

## (Cat.No. : 512/2022)

# (Total Marks – 100)

**MODULE I:**                                                           **(10 MARKS)**

## PRINT PRODUCTION PLANNING, COSTING AND ESTIMATION

Printing Press Organisation Structure. Planning Consideration- Material Management, Production Scheduling, Production Control, Quality Control. Role of Supervisor and Manager in effective Management Workflow. Managerial roles. Interpersonal relationship skill, Communication skill, Leadership skill.

Components of cost. Types of cost- Fixed, variable and semi variable. Estimation of paper-selection of paper, allowance for wastage, allowance for trimming, weight of loose sheets, weight of reel of paper. Estimation of ink- Ink consumption formula, ink allowance for spoilage, Estimating of binding material- board requirement, Estimating of covering materials, Estimating of sewing thread, Estimating of stitching wire, Estimating of adhesives.

**MODULE II:**                                                          **(10 MARKS)**

## MATERIALS FOR PRINTING

**Printing Ink**: Ink ingredients, ink properties, drying and, Ink manufacturing, ink manufactures, Types of printing ink-Standard inks, special Inks, Security inks, Common ink related printing problems.

**Printing Substrates:**

*Paper and board* - invention of papermaking, raw materials used, Pulping and papermaking Finishing and Converting-Calendaring, Coating, Slitting, Cutting. Recycled Paper, Paper properties, Paper and Board- Sizes, Paper and Board -Classifications and their uses. BIS & TAPPI standards for paper printing industry.

*Plastics* – Classification, Manufacturing Process, Plastics used for printing and packaging, Surface treatment on plastics.

*Leather, Aluminium foil, Glass, Metals, Multi layered*: -Properties and their suitability for various printing applications.

**Miscellaneous materials:** Functions, basic constituents and properties of- Dampening solution, Blanket, Adhesive, Photographic or light sensitive materials, Plate treating solutions. Cleaning solutions etc.

**Image Carriers** -Basic characteristics, preparation methods and advantages of- Lithographic plate, Gravure cylinder, Flexographic plate, Screen printing stencil, and Digital imaging.

## MODULE III: (10 MARKS)

### PREPRESS BASICS

Setting of a digital document - Art box, trim box, bleed box, media box. Features of - Optical Character Recognition (OCR) software, PageMaker, Illustrator, InDesign, Quark-Express, Ventura Publisher, Photoshop, Corel Draw etc.

Designing, Imposition, Colour Separation, RIP (raster image processer).

Data exchange standards- (PDF, PDF-X series). Data transfer in print shop (servers, prepress workstations, CTP, data to machines etc). Post Script (PS) fundamentals. Digital print production workflow, JDF, Job ticket.

Open prepress interface (OPI), Pre-flight.

Basic networking knowledge – Link, nodes, servers, hub, router, topology, types of networks. Protocols – TCP/IP. IP address.

## MODULE IV: (10 MARKS)

### TYPOGRAPHY, DESIGN, PROOFING

**Fundamentals of Typography:**

Alphabet design, Type face classification, Typographical measurement, Size of Type, set of a type face, Page widths & depths, Recognition of typefaces - ascenders, descenders and xheight, width of various letters, serifs, sans serifs, weight of the type face, angle of shading in round letters, design of letters. Printers' measurement systems. Casting up, Casting off - word count method, character count method, en-count method.

**Print Design:**

Elements of design. Principles in designing, Visual ingredients of graphic design, point, line, graphic space, texture, colour, scale, balance and contrast. Legibility and readability, monograms and trademarks.

**Proofing:**

Proofing stages, proof correction marks, correction of type set matter. Output quality and speed, colour input and output, Page make-up. General rules for makeup.

## MODULE V: (10 MARKS)

### TONE AND COLOUR REPRODUCTION, COLOUR MANAGEMENT

Halftone image - Halftone dots - features and types. Optical Density, Tonal Gradation.

Attributes of colour - Hue, Saturation, Lightness, Colour Schemes, Colour wheel, Memory colour, Metamerism. Colour Theories: Additive and Subtractive colour theories.

CIE - milestones, Standard Observer, Tristimulus values & Colour Matching functions. Chromaticity coordinates and Chromaticity Diagram. Standard illuminant, Colour temperature. Colour Gamut.

**Colour Models:** Muncell, RGB, CMY, HSB, CIE Colour spaces - CIE XYZ, CIE L*a*b*, CIE LUV. Device dependant and independent colour Models.

Elementary principles of Multi colour printing. Colour Separation: Conventional and Electronic principles of colour separation. Scanners - Working Principle & Types.

**Colour management:** Open loop and Closed loop colour management, 3C's of Colour Management - Calibration, Characterization, and Conversion. ICC profile in Colour Management. Components of CMS- Device profile, PCS, CMM and Rendering indents.

## MODULE VI:                                             (15 MARKS)

## PRINTING TECHNOLOGIES – IMPACT AND NON-IMPACT PRINTING TECHNOLOGIES.

Machine design considerations, working principle, classifications, basic features and applications of Impact printing technologies such as Offset, Gravure, Flexography and Screen Printing.

Non-impact printing technologies – working principles, Merits, digital printing machines; Ondemand and variable data printing – workflow, data mail formats. CTF, CTP, Computer to Press/Direct imaging.

3D Printing: Additive Printing, Additive Manufacturing File Format (AMF).

Printed Electronics - Substrates, Organic electronics, Applications.

## MODULE VII:                                             (10 MARKS)

## POST PRESS – TERMINOLOGY, BINDING AND FINISHING OPERATIONS.
Post Press Terminologies; Importance of Post press; Book Binding Operations; Print Finishing Operations.

Paper folding schemes, Folding styles, End paper.

Styles of binding- Quarter bound, Half bound, Three quarter bound, Full-bound.

Modernization & Advancements in post-press.

## MODULE VIII:                                             (5 MARKS)

## PACKAGING TECHNOLOGY

**Classification of Packaging:** Primary, Secondary, Tertiary Packages; Flexible package type, Rigid package types.

**Packaging techniques:** MAP & CAP, Vacuum packaging, shrink packaging, stretch wrapping blister packaging, skin packaging, strip packaging, Aerosol packaging, Vacuum metallization. Vacuum forming, Thermo forming.

**Folding cartons** – Carton style, Corrugated containers.

Futuristic trends in packaging. Legal aspects in packaging.

## MODULE IX:                                               (10 MARKS)

## QUALITY CONTROL AND STANDARDIZATION

**Print-Quality Control Aids:** control strips, grey balance elements, register targets, tone patches, micro lines, variable dot size elements, coarse and fine screen halftones, slur gauge, star target, concentric circles, line tint areas etc.

**Test Form-** Different types, characteristics and features of various elements.

**Instrumentation and quality control**: Densitometry, Colorimetry and Spectrophotometryconcept. Method of evaluating tonal gradation of process colour print. Print quality parameter - Print contrast, Hue error, Greyness, Ink Trapping, Dot gain & Delta E. Control charts, attributes vs. variables.

**Printing Quality Standards:** SWOP, SNAP, ISO standards- ISO 9001, ISO 12647, ISO 12647-2, ISO 2846-2.

## MODULE X:                                               (10 MARKS)

## GREEN PRINTING AND WASTE MANAGEMENT

**Green Printing:**
Importance of green printing. Eco friendly printing paper, Eco friendly inks, Ink recycling, Eco friendly offset plates – low chemical, chemical free, etc. recycling of plates. Eco friendly chemicals – IPA substitutes, bio chemicals etc. Eco friendly print production.

**Waste Management in Printing:**
Types of waste – solid, water, air. Recycling of print materials and consumables. Printing waste management. Solid waste management. Solvent management. Ink management. Hazardous waste management. Air emission management. Noise management. Water and energy consumption.

*NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.*