# OFFSET PRINTING TECHNICIAN

## Compulsory Subjects

1. English
2. General Foundation, Industrial Sociology and Entrepreneurship

3 Environmental Education

## Elective Subjects

1. Printing Processes / Offset printing
2. Printing Materials / Paper and Ink
3. Film and Plate / Photo Reproduction
4. Binding / Finishing and Converting

## Project work

## PRINTING PROCESS &

## OFFSET PRINTING

### PRINTING PROCESS

**Class XI Theory 3 hours 50 Marks**

The four main printing processes
Letterpress
Lithography or Planography
Intaglio/Gravure,
Screen-printing

**Letterpress**

Brief History - Types of Letterpress Machine - Job suitability of letterpress - Basic principles of Letterpress - Advantages and disadvantages

**Lithography or Planography:**

History & Development of Lithography - Types of offset machines - Job suitability - Basic principle of offset machine - Its advantages and disadvantages

**Intaglio process( Photogravure):**

A brief History - Principles of Photogravure - Characteristics of Gravure printing - Advantages and disadvantages of Gravure

**Screen Printing**

Brief History - Job suitability of Screen printing - Its advantages and disadvantages

## PRESS WORK

### LETTERPRESS

**Class XI** **Practical** **3 Hours** **50 Marks**

**General**

Cleanliness - Safety precautions for avoiding accidents to personnel and machines - Lubrication of machines - Tools and appliances used in press rooms.

**Letterpress**

Types, furniture, quotations, chase, etc., used in letterpress - Hand composing and mechanical composing - make ready operations in platen and cylinder presses - Printing single page, two, four and eight pages - Bookwork forms with and without line - Halftone blocks - Printing Single, multicolours blocks - Common printing faults and their remedies.

**Offset**

Duplicators - Demonstration and handling different parts - Different controlling devices - Feeding systems and delivery systems in duplicators - Inkers, dampeners and their settings - Working on duplicators

**Small Offset**

Setting of Inking and dampening rollers - Delivery systems - Side and Front lays - Inking and dampening systems - Making ready and printing on small offsets.

**Sheet-fed Machines**

Single and double colour sheet-fed machine - Demonstration on working and setting on those machines.

**Screen Printing**

Different screen printing materials - sensitising and making direct stencils on screen fabrics.

Project work to be evaluated internally

## OFFSET PRINTING

**Class XII 3 hours . 50 Marks**

**History of Offset Printing**

Invention of Lithography, First Lithographic press, Introduction to Photography

**The offset machine**

Alternative cylinder arrangements for single colour machine cylinder arrangements for two colour and four colour machines blanket to blanket, sheet fed machines.

**The basic printing unit:**

Plate and blanket cylinders, cylinder setting, and comparison of types of gears, increasing the diameter of cylinders from packing, impression cylinder arrangement.

**Offset press Fundamentals:**

General Norms & Operation, Paper feeding and delivery types of inking and dampening system. Main cylinders arrangements, feed and delivery features

**The dampening system**

Fountain solutions, The water fountain, Distributor roller Care and adjustment of dampeners, the Purpose and problems of dampening

**The Inking system:**

Keeping the fountain clean, setting the fountain blade, regulating the ink flow, adjusting and setting rollers, storage rollers

**Machine Operation:**

Preliminary preparation, setting up for operation.

**Web-fed offset presses:**

Historical development of web offset presses, types of web offset presses. General terms used in web offset press rooms, web offset, in feed, delivery, folder, gear side, operator side, printing unit, perfecting, inline press, blanket to blanket presses common impression cylinder.

## OFFSET PRINTING

**Class XII Practical 3 hrs 50 marks**

### Offset Feeder setting:

Adjusting pile height governor and setting, Forwarding wheel auxiliary wheel adjustment front guides and side-lay adjustment, Adjustment of blowers, suckers and delivery board setting, Blind feeding with different thickness and sizes of stock. Plate and blanket fixing.

### ROLLER SETTING (INK AND DAMPENING)

### Printing

Single colour line and halftone work, Half-sheet work (4 pages), Sheetwork eight pages, Two-colour work and four colour work.

### Ink Mixing

Mixing of Primary and Secondary colours - Colour mixing and colour matching - Using additives to the inks.

### Dampening

Maintaining strength of the dampening solutions.

Project work to be evaluated internally

## PRINTING MATERIALS & PAPER AND INK

**PRINTING MATERIAL**

**Class XI Paper 2 Theory 3 hours 100 marks**

**Materials used for image carriers.**

**Relief Process:**

Type metal alloys - Original plates zinc and copper for blocks - Photopolymer plates - Duplicate plates - Stereo and electro.

**Planography:**

Zinc - aluminium - anodized aluminium - Bimetallic and tri-metallic plates - Pre-sensitized plates - Photopolymer plates -Intaglio - Metals used for gravure cylinders and plating.

**Other processes :**

Flexo - Screen - Dry-offset - Materials used.

**Photographic Materials and Light- sensitive Materials:**

Main kinds of films and photographic papers used in graphic origination - Film positives - Main-base - Stripping - Thickness - Right and wrong readings - Negatives - Paper positives materials.

**Substrates:**

Fibrous and non-fibrous raw materials used in paper and board manufacture.

**PAPER**

**Paper and board classification:**

The main classes of papers and boards - Physical Characteristics of various kinds of board - International and Indian Standard Paper sizes and sub-divisions.

**Properties affecting the runnability of papers:**

Grain direction - Two-sidedness - Density and moisture content of hygroscopic property - Properties affecting printability of papers - Brightness, opacity smoothness, gloss, tensile strength, bursting

strength, folding endurance, tear resistance, Pick resistance, stiffness.

**Handling papers in the pressroom:**

Temperature and moisture conditioning of pressroom, Pressroom Rh and paper Rh., handling paper rolls, static electricity and its elimination.

**INK**

**Printing ink ingredients:**

Printing ink components and chemical properties required in general. Special properties required for letterpress, offset, gravure, and screen printing processes. Mechanism of ink drying.

**OTHER MATERIALS:**

Other substrates : Metal foil, plastic cellophane, etc, Print-finishing Materials.

**Securing materials:**

Threads, tapes, stitching wire.

**Covering materials :**

Non-woven materials, woven materials, leather, leatherette, plastic. Finishing materials: Gold leaf and metal foils, colouring materials for-edge decoration. Materials used for varnishing and lamination.

**Adhesives:**

Classes, characteristics and applications, selections for specific purposes.

**A brief survey of material's handling and storage.**

## PAPER AND INK

**Class XII Theory 3hours. 100 marks**

**General**

History of paper – Paper making materials – Paper manufacturing - Forming, finishing and coating the paper

**Selection and use of paper**

Different kinds of papers – Paper specifications - Paper measurements - Universal basic size (the MM Size)

**Working with paper**

Paper faults during printing – Paper requirements for offset printing – Properties of paper

**Estimation and handling**

Paper sizes – Paper estimation – Handling and storage of paper

**Printing Inks**

History of printing ink – Ingredients of printing ink – Pigment – Vehicles - Drier – Printing ink modifiers.

**Manufacturing and types**

Different types of ink – Manufacturing of ink – Letterpress ink – Planographic inks – Intaglio inks – Screen Printing inks.

**Qualities and drying of inks**

Different qualities and varieties of printing inks – Methods of drying Absorption drying - Oxidation and polymerization - Resin solvent drying - moisture-set drying - Resin-oil drying - Cold set drying - Pigments - Natural, Synthetic and organic pigments - Daylight Fluorescent pigment - Permanency of pigment– Recent developments of ink drying Ultra-violet drying - Microwave drying - Chemical drying - Over coating drying - Printing ink Problems.

Project work to be evaluated internally

## FILM ASSEMBLY & PLATE MAKING

**Class XI Theory 3hours. 100 marks**

### THE FLOW OF LITHOGRAPHIC PRODUCTION

Lithographic prepress - Typography and typesetting - Art and copy preparation - Basic camera operation - Colour separation and correction - Film image assembly - Proofing - Plate making - Lithographic press - Presswork - Finishing.

### LAYOUT AND PLANNING INFORMATION

Layout the basis of all subsequent planning operations - Factors related to the preparation of layout - Sheet size - Sheet grain direction - Areas of critical register .

### PLANNING IMPOSITION SCHEMES

The imposition - heads - folio - fore-edge - tails - gutters - Perfecting - signatures - Collating marks - Inner and outer pages .

### METHODS OF PRINTING BOOKWORK

Work and turn - Work and tumble - Back margin allowances - Sewing and saddle stitching - Perfect binding - Side stitching - Spiral wire - Bookwork margins .

### MATERIALS USED FOR PLANNING

Layout sheets - Manilla paper - Cartridge paper - Goldenrod paper - Plastic sheet - Acetate based sheet - Vinyl (PVC) based sheet - Polyester sheet - Lamination masking strip film - Metal masking film - Petroleum jelly - Aluminum foil - Red masking tape - clear transparent tape

### TOOLS REQUIRED BY THE PLANNER

Pencils and ball-point pens - Ruled grid on plastic sheet - Ruled grids on glass - liquid opaque - Erasers - Compass - The beam compass –

Dividers - Sheet and plastic set squares - Steel or plastic rules - Irregular or French curves - T squares - Rubber and hand roller - Scalpels and cutting tool - Rotary trimmer - brushes - scribers - Punch register systems - Suitability of punch register. Project work to be evaluated internally

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## FILM ASSEMBLY & PLATE MAKING

**Class XI** **Practical** **3 Hours** **60 Marks**

Assembling of Negative & Positive line flats - Use of Pin bar - Reverse Screen tints - Silhouetting-Method of Duplicating films with orthochromatic & Daylight Film, - Procedure for making contact - Method of making spreads & Chokes- Manual method Superimposing - Preparing coating Solution for Either Albumin or wie-on process - Exposing & Developing a plate.

## PHOTO REPRODUCTION

**Class XII Theory 3hours. 40 marks**

### CHEMISTRY OF PHOTOGRAPHY

Photographic emulsion. Developing solution. Fixation, Reducer - Line Photography & Halftone photography - Theory of halftone reproduction - Understanding densitometry.

### FILM DEVELOPING AND DARK ROOM PROCEDURES

Layout of the dark room, Order of trays, Theory of negative, Preparation of tray solution, Developing procedure for negative, Manuel and Automatic processing, Advantages and Disadvantages.

### ASSEMBLING THE FLAT

Basic functions of the flat, Determining the Emulsion, Opaque and trimming, Cutting the windows and Reference marks, Stripping multi colour jobs, Use of resister marks and Register pins

### TYPES OF CONTEMPORARY PLATES

Surface plates, Pre-sensitized plates, Negative and positive, plates-exposing, developing, gumming, Bimetal plates, Direct image, Photomechanical principles, Photo-direct plates, Contemporary Lithographic plates:

### PLATEMAKING MATERIALS

Plate metals, Coating materials, other materials used in plate making.

### EQUIPMENT FOR PLATE MAKING

Plate making sinks - whirlers, vaccum printing frames - Exposure sources - Automatic plate processors.

### CHEMISTRY OF PLATEMAKING

Control of plate making variables- Wet ability of image and non image areas- Ink receptivity of image areas , water receptivity of non-image areas - Graining or surface preparation of metals

### PLATEMAKING TROUBLES

Scumming- Fogging- Incomplete development, Poor reproduction, Blind images, Image gain or sharpening, premature plate wear.
Computer to Plate- Advantages and disadvantages.

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**Project work to be assessed internally**

## BINDING

**Class XI Theory 3 hours. 40 marks**

### HISTORY AND CLASSIFICATION

Development of binding before and after 10th century - Revolution in book binding -Cutting and folding - Section binding - Adhesive binding - Loose leaf binding - Letterpress and stationery binding

### SECTION BINDING

Folding - Gathering - Stitching - sewing g - Cutting and finishing - Adhesive binding - Folding - Gathering - Trimming of back - application of adhesives - Cover pasting and finishing

### WAREHOUSE WORK AND FOLDING

Introduction - requirements of a good warehouse - Jogging and knocking - counting - Hand and machine folding - Methods of hand folding - Folding to papers - folding to print and lump folding - Cross folding and parallel folding - Folding to folio, Quarto, Octavo and Sixteenmo.

### GATHERING AND COLLATING

Gathering - Collating with signature marks and collating marks - Stitching - Centre and side stitching - Method and comparison between the two - Method and sequence of cutting, slitting and trimming.

### BINDING ROOM TOOLS AND EQUIPMENT

Liner - set-square - pencil - knife - Oil stove - cutting plate - scissors - folders - Needles - Piercing awl - Hammer - Tenon - saw - circular rods - spring - dividers - brushes - punch - trindles - backing boards - cutting boards - chisels - paring knife and paring stove - adhesive pots - press - paying press - nipping press - standling press - sewing frame.

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## FINISHING AND CONVERTING

**Class XII Theory 3hours. 40 marks**

### GENERAL

Finishing tools – Equipment and materials - Method of finishing
Printing – Tooling – Blocking – Blinding

### EDGE DECORATION

Methods – Colouring – Tinting – Marbling and Gilding – Procedures of colouring, tinting, marbling and gilding – Rules and kinds of marbling – Gilding tools and materials – methods of gilding – kinds of edge gilding.

### COVER DECORATION

Embossing – Die embossing – Gold foil embossing – Blind and gold finishing – lettering

### VARNISHING AND LAMINATING

Kinds of varnishing – Materials and method – Use of varnishing and laminating.

### CONVERTING

Slitting and creasing – Planning and execution of multi-up – Carton printing – Cutting and creasing – Hand pasting and machine pasting for cartons – steel cutting rules for cutting, scoring and creasing – Planning and cutting of envelops

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