

**Scheme of Teaching and Examination for
IV Semester DIPLOMA in MECHANICAL ENGINEERING (PRINTING TECHNOLOGY)**

THEORY

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1	Letter Assembly-I	34401	6	60	3	20	80	100	26	36
2	Binding & Finishing – I	34402	4	50	3	20	80	100	26	36
3	Printing Process-I	34403	4	50	3	20	80	100	26	36
4	Printer's Design	34404	6	50	4	20	80	100	26	36
5	Reproduction & Photography-I	34405	6	60	3	20	80	100	26	36
Total :-			26					500		

PRACTICAL

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Marks Internal Exam. (A)	Marks External Exam. (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6	Printer's Process Lab-I	34406	4	50	3	10	40	50	16	21
7	Printer's Design Lab.	34407	4	50	3	10	40	50	16	21
8	Letter Assembly Lab. – I	34408	4	50	3	10	40	50	16	21
9	Binding & Finishing Lab. – I	34409	4	50	3	10	40	50	16	21
Total :-			16					200		

SESSIONAL

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME			
			Periods per Week	Periods in One Session	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
10	Reproduction & Photography Lab-I	34410	-	-	20	30	50	25
Total :-			-				50	

Total Periods per Week	42	Total Marks	750
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LETTER ASSEMBLY - I

Subject Code 34401	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale & Objective:

Every printed product consists of text portion and illustrations, with the former occupying mechanical portion knowledge of text setting methods and equipment used for setting text, which is broadly termed Letter Assembly, therefore very essential.

The aim of this subject is to study letter assembly as an important part of print-production techniques, to enable the students to make judgment about the aspect of printing, particularly in relation to the requirements of designing the printed products.

This will cover development of typesetting methods, preparation for type setting inputs and outputs, page assembly, proofing imposition and planning.

The aim is to further develop the student's understanding and knowledge of letter assembly equipment, particularly in the areas of on-line integrated system, image generation system, editing and corrections, electronic page assembly, digital storage and outputs.

S.No.	Topics	Periods
01	Introduction	(06)
02	Preparation for Typesetting	(09)
03	Letter Assembly System	(06)
04	Typesetting Routines	(06)
05	Introduction to Phototypesetting	(09)
06	Typesetting Input	(06)
07	Photo-typesetting Output	(06)
08	Page Assembling and Proofing	(06)
09	Imposition and Planning	(06)

CONTENTS:

TOPIC: 01 – INTRODUCTION: [06]

- 01.01 Historical development of Typesetting from Gutenberg to present.
- 01.02 Review of various systems and their relationship with current production methods.

TOPIC: 02 – PREPARATION FOR TYPESETTING: [09]

- 02.01 Typographical unit of measurement. Angle-American point system.
- 02.02 Units of set, measurement of length;
- 02.03 Preparation of copy, house style.
- 02.04 Proof-reading.
- 02.05 Casting- off and copy fitting.

TOPIC: 03 – LETTER ASSEMBLY SYSTEM: [06]

- 03.01 Handsetting, Mechanical typesetting, typewriter composition phototypesetting, computerized typesetting.
- 03.02 Display composition by various system.
- 03.03 Editing, correction and page-make up in all the systems.

TOPIC: 04 –TYPESETTING ROUTINES: [06]

- 04.01 Different kinds of setting poetry; table, tabular, mathematical, scientific work, etc.
- 04.02 Methodical approach for each kind of job, tools, accessories, and precision aids, used in the letter assembly departments and their purposes.

TOPIC: 05 –INTRODUCTION TO PHOTOTYPESETTING:	[09]
05.01 Development from the earliest to the present.	
05.02 Principles of first to present generations photo-typesetting machines, their performance and usage.	
TOPIC: 06 –TYPESETTING INPUT:	[06]
06.01 Counting and non-counting keyboard, keyboard layout and ergonomics.	
TOPIC: 07 –PHOTO-TYPESETTING OUTPUT:	[06]
07.01 Application of various photo-typesetter, scopes, and limitation.	
07.02 Processing of photo-typesetting output.	
TOPIC: 08 –PAGE ASSEMBLING AND PROOFING:	[06]
08.01 Make-up of photo-typesetting products for book, magazine, newspaper, and general printing.	
08.02 Equipment and materials used.	
08.03 Photo headline setting and transfer lettering systems for display composition.	
08.04 Proofing Techniques-matrix printer, diazzo, electrostatic, diffusion transfer, photographic.	
TOPIC: 09 –IMPOSITION AND PLANNING:	[06]
09.01 Page shapes, margins, and size in relation to paper size.	
09.02 Rules for Imposition upto 32 pages.	
09.03 Accommodation of press and Finishing requirements, sheet work and halfsheet work, grip edge, signature and register marks.	

BINDING & FINISHING - I

Subject Code 34402	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	04	-	-	Internal Exam.	:	20

Rationale & Objective:

This is a core subject-After printing is complete; the printed sheets are required to be put in a proper shape such as books, magazine, registers, etc. For this, knowledge of various methods and techniques of binding and finishing is very essential. A diploma holder is required to supervise the binding and finishing section in a press.

S.No.	Topics	Periods
01	Warehouse Operations.	(08)
02	Securing Operations.	(08)
03	Forwarding Operations.	(08)
04	Binding Techniques	(08)
05	Preparation and Attaching Boards.	(08)
06	Covering Operations..	(05)
07	Finishing.	(05)

CONTENTS:

TOPIC: 01 – WAREHOUSE OPERATIONS. [08]

- 01.01 Printed paper warehouse and white paper warehouse, storing temperature, humidity, materials handling, safety.
- 01.02 Paper buying, stocking, storage and issue.
- 01.03 International paper sizes, and I.S.I. paper sizes, advantages, grammes per square metre GSM), ethod of substances specification; old imperial sizes and subdivisions of paper.

TOPIC: 02 – SECURING OPERATIONS: [08]

- 02.01 Use of thread, tape, cord, wire-stitching, looping, gluing, pasting, covering, pamphlet, work.
- 02.02 Different kinds of sewing, cord sewing and tape sewing, hand sewing and machine sewing, two-on and all-along sewing, over casting for loose-leaf works, suitability for different styles of binding.
- 02.03 End papers: single, made –end paper, reinforced, cloth-joint, leather-joint, silk-fly leaf and leather –flyleaf. Zigzag end papers, their object.

TOPIC: 03 – FORWARDING OPERATIONS. [08]

- 03.01 In board and out –board forwarding, different kinds of binding and styles, publishers, library, miscellaneous and deluxe extra leather, stationery binding- characteristics.
- 03.02 Gluing the back; founding and backing objects, care and precautions, reducing swelling in the back, flat backs, back lining.

TOPIC: 04 –BINDING TECHNIQUES [08]

- 04.01 Adhesive binding, thermoplastic, unsewn, threadless and perfect binding.

TOPIC: 05 –PREPARATION AND ATTACHING BOARDS [08]

- 05.01 Dimensional variation of boards, lining, cutting to size, warping of boards, prevention, attaching boards, lacing-in-split-board work.

TOPIC: 06 –COVERING OPERATION: [05]

- 06.01 Different kinds of covering materials, selecting leather as other materials, measuring and cutting to size and shape, applying adhesive and turning it, pressing, setting the groove or joints, settings the head, setting the band, polishing pressing and pasting down.

TOPIC: 07 – FINISHING [05]

- 07.01 Decorating the cover of the book with the finishing tools, blind blocking, gold blocking and sliding hand tools, fillets pallets, rules. Lottering, type holder, brass type, marking for tooling and lettering, heating, testing and pressing, cleaning, inlaying, lacing and bands open up and pressing.
- 07.02 Edge decoration, colouring, spraying marbling, guilding, gauffereing or tooling the edges, head bands, handmade and machine-made head bands.

PRINTING PROCESS - I

Subject Code 34403	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	04	-	-	Internal Exam.	:	20

Rationale & Objective:

It is a core subject of printing technology, It is essential for students to learn about the basics of various printing processes. Process photography, techniques of printing surface preparation and printing machines.

CONTENTS:

1. Printing Industry- historical background and structure.
2. Principles Involved and characteristics of different printing process-their suitability and limitations.
3. Introduction to Relief surface and Plano graphic surface.
4. Introduction to equipments and tools used for all printing processes.
5. Introduction to process photography: types of process cameras-their constructions and functioning-making negatives and positives.
6. Introduction to Surface Preparation (Overview only)

PRINTER'S DESIGN

Subject Code 34404	Theory			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale & Objective:

Even printed product should be designed before it is send to the printers or executing the work. The pront-technician should have a clear perspective of the design principles involved in designing a product, as the designing on the printing process to be decided. The aim of this subject will be to introduce the study of printed products, introduction to type and typography, design method, design organisation, visual studies, techniques of copy preparation, layouts and dummy for all kinds of jobs.

The aim is to further examine in details to design consideration and corporate design planning applied to different types of products, and to allow the students to apply the knowledge gained in the professional carrier.

S.No.	Topics	Periods
01	Various kinds for Printed Products, their format, and Design factors.	(06)
02	Design and Typographic Elements	(06)
03	Colour Elements	(08)
04	Illustrative Elements	(05)
05	Layout Preparation	(08)
06	Typography	(06)
07	Planning for Production	(05)
08	Display Composition	(06)

CONTENTS:

TOPIC: 01 – VARIOUS KINDS OF PRINTED PRODUCTS, THEIR FORMAT, AND DESIGN FACTORS: [06]

- 01.01 Leaflets, pamphlets, booklets, catalogyes, brochures, manuals, books.
- 01.02 Magazines and Newspapers.
- 01.03 Business forms and commercial stationary.
- 01.04 Labels, cartons, point-of-sale displays, etc.
- 01.05 Factors to be considered in print planning, such as, purpose, budget, materials etc.

TOPIC: 02 – DESIGN AND TYPOGRAPHIC ELEMENTS: [06]

- 02.01 Identification of design terms; point, line, space, shape, mass, size and scale, colour, tone, texture, pattern, balance and contrast.
- 02.02 Typographic Elements.
- 02.03 Type fundamentals, main groups of type face designs, type series, type families.
- 02.04 Choosing type face suitable to the subject or product, relation between type face and printing processes, type face and paper surfaces.
- 02.05 Legibility and readability.
- 02.06 Monograms, trade-marks and logotypes.

TOPIC: 03 – COLOUR ELEMENTS: [08]

- 03.01 Colour theory. Terms used to describe colour: warm and cold colours, hue, shade, tint.
- 03.02 Colour wheel. Term to describe their relationships, between colours, complementary colour, split-complementary colours, selection of colours for two or three or four colours jobs. Attributes and emotional appeal of colour.
- 03.03 Choose and effective use of colours, colour harmony, colour contrast and colour values.

TOPIC: 04 –ILLUSTRATIVE ELEMENT

[05]

- 04.01 Types of originals for illustration and re-production: continuous tone copy, line drawings, black and white and colour.
- 04.02 Requirements of art work and originals for reproduction, treatment of photographs, photomechanical transfer materials and their use.
- 04.03 Black and white photographs, high contrast and low contrast; improving quality of photographic prints; masking , scaling, cropping of illustration, reduction and enlargements; size of reproduction; care and protection; air brush and its use.

TOPIC: 05 –LAYOUT PREPARATION:

[08]

- 05.01 Materials, equipments and techniques used in the preparation of layout and art work.
- 05.02 Basic geometric shapes, disposition of elements and space; principles of symmetrical and asymmetrical arrangements; distinction between geometric and optical centres.
- 05.03 Preparation of the layouts, analysis of briefs, stages and house styles.
- 05.04 Methods of producing different forms of layout.
- 05.05 Page structures, arrangement of illustration and text matter.
- 05.06 Dummy preparation.

TOPIC: 06 –TYPOGRAPHY:

[06]

- 06.01 Methods of preparing a design in its various stages, for different classes of work book, display, news, magazines and other kinds, typographic specifications for different classes of work.
- 06.02 Copy preparation for different classes of work in relation to typesetting systems, artworks preparation for different printing processes paper etc.
- 06.03 Materials and tools used in preparation of layouts and art work.

TOPIC: 07 –PLANNING FOR PRODUCTION:

[05]

- 07.01 Selection and colour limitation of production processes, jobs selections, consideration of available methods of composition method possibilities and limitations of Bindings and ancillary processes as they affect design.
- 07.02 Technical influences and the selection and specification of ink, paper and other materials in relation to job specifications and the different production processes decided.
- 07.03 Casting-off copy, principles of copy-fitting, copy fitting tables.
- 07.04 Preparation of page: layouts for different parts of the book and preparation of dummies.

TOPIC: 08 –DISPLAY COMPOSITION:

[06]

- 08.01 Principles of display, factors affecting display setting, effective use of white space. Line shape and size of space, the type face combinations, suitability, use of initials, the techniques of layouts arrangements to guide the eye-dividing an area-use of grid preparation of dummy of different kinds of jobs.

REPRODUCTION & PHOTOGRAPHY - I

Subject Code 34405	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale & Objective:

Potomechanics, transfer of image and electronic image generation of the photography and their importance for a student to learn, in making tinting for the job and mainly deals with operation and handling of different equipments, machinery etc, used for reproduction photography.

S.No.	Topics	Periods
01	Function of graphic reproduction	(08)
02	Optical system	(08)
03	Cameras	(08)
04	Illuminants	(08)
05	Emulsion for graphic reproduction photography	(07)
06	Line and Halftone photography	(07)
07	Contact Processing	(07)
08	Processing.	(07)

CONTENTS:

TOPIC: 01 – FUNCTION OF GRAPHIC REPRODUCTION: [08]

Functions of graphic reproduction, Definitions of graphic reproduction photography; Originals for graphic reproduction classification of originals, line originals, Half Tone, Continuous tone, full colour originals, requirements of originals, scaling the originals.

TOPIC: 02 – OPTICAL SYSTEM [08]

02.01 Lenses. Lens aberrations, process lens, optical reversal, straight line reversal, lens aperture, diaphragm, its functions depth of focus, depth of field, water house etc.

TOPIC: 03 – CAMERAS [08]

03.01 Different types of process cameras and accessories, e.g. horizontal, dark room, vertical, vertical enlarger-types camera, roll-film cameras, Computerised Camera evaluation of modern cameras.

TOPIC: 04 –ILLUMINANATS [08]

04.01 Classification, requirements, colour temperature, comparative study of different illuminants, carbon arc lamps open and enclosed, incandescent lamps, tungsten, halogen lamps, pulsed xenon lamps, lens flap, units of illumination, inverse square law, relative intensity exposure calculations.

TOPIC: 05 –EMULSIONS FOR GRAPHIC REPRODUCTION PHOTOGRAPHY [07]

05.01 Ingredients, brief description of manufacture of emulsions, types of emulsions, emulsion structure, Requirement of emulsions, emulsion structure, Requirements of emulsion. Study of sensitometric waves-characteristic and gama curves. Latent image Theory : Reciprocity failure, intermittency effect, cavalier effect, etc.

TOPIC: 06 –LINE AND HALFTONE PHOTOGRAPHY: [07]

06.01 Basic Line exposure, magnification factor, line photography from black and white, and colour line originals, evaluation of line negatives. Brief study of halftone screens, manufacture, halftone theories, screen distance calculations, inverse system Various ratio system-calculations, Halftone exposure-single and multiple exposure system, flash no-screen exposure principles of dot formation, evaluation of halftone, negative & positives

TOPIC: 07 – CONTACT PROCESSING [07]

07.01 Application of Contact printing, determining the correct exposure dots, soft dots, spreads and chokes for multi-colour printing inspection of negatives and positives.

TOPIC: 08 –PROCESSING: [07]

08.01 Developers, Ingredients and their function. Different developers, their suitability, factors affecting of development, method of development, automatic processor, stop bath, fixing bath, their functions.

PRINTER'S PROCESS LAB - I

Subject Code 34406	Practical			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	-	-	04	Internal Exam.	:	10

1. Letter Assembly: Lay of case, use of tools and equipments, use of spacing materials, setting straight matter, setting techniques, proofing.
2. Process Photography: Handling and operation of process camera their units and accessories, making negatives and positives.
2. Surface Preparation:
 - (a) Use of equipments and accessories for plate making, graining, counter-etching, preparing coating, solution, coating plate for albumen process and;
 - (b) Equipments and tools used for making a line block.

PRINTER'S DESIGN LAB.

Subject Code 34407	Practical			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	-	-	04	Internal Exam.	:	10

1. Collection and study of all varieties of printed materials.
2. Classification of types faces: Block letters, Old face Transitional, Modern and Decorative types.
3. Identification of different display faces: method.
4. Layout procedure: Interpretation of copy and layout, preparing composing room layouts rough and finished layouts.
5. Tools of the layout man; care and handling.
6. Materials for the layout; preparation.
7. Lettering for layouts techniques.
8. Layout for simple title pages, letterheads, visiting cards envelopes, greeting cards, invitations, certificates, advertisements and folders.
9. Designing of monograms and trade marks.
10. Study of various kinds of originals used in the printed materials.
11. Study of colour and mixing of colours, two-three-colour-combinations.
12. Practicing layout and dummies for various, class of work: book, display, news, magazines, and other kinds of job work.
13. Practicing the techniques of copy preparation.

LETTER ASSEMBLY LAB -I

Subject Code 34408	Practical			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	-	-	04	Internal Exam.	:	10

1. Typesetting Routines
Setting various kinds of work-text/ poetry, table and tabular and display work by hand setting, mechanical composition and photo-typesetting.
2. Make up of pages
Procedure for making-up for different kinds of text pages which includes various components, such as, headlines and folio, footnotes, let-in-notes, let-in-notes, labels. Illustration with legends etc Make –up of preliminary and supplementary pages of books.
3. Display Composition
Setting up of display job as per the layouts, using suitable typesetting system for different kinds of display jobs
4. Practical work with different, proofing techniques
5. Imposition
Imposition up to 32 pages for upright and Landscape pages, half sheet and sheet work.
6. Practicing for keyboard operation for phototypesetting.

BINDING & FINISHING LAB - I

Subject Code 34409	Practical			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	40
	-	-	04	Internal Exam.	:	10

1. Study of tools and machinery, their uses and care in handling.
2. Materials and supplies essential for a book binding department.
3. Folding, counting and jogging.
4. Side and saddle Odd and even number stitching.
5. Endpapers.
6. Styles of binding: Quarter-bound cut-flush (library sewing). Quarter-bound turned in (library sewing) Quarter-bound turned in (Sawn-in Sewing)
7. Manifold book (Carbon duplicate book)
8. Tear-off pad.
9. One letter Index book,
Styles of binding Quarter-bound turned-in with squares (Flexible sewing), Quarter-bound turned – in with squares (Two-on sewing), case binding (Overcast sewing), Publishers binding (Library sewing).
10. Half-bound (conventional method); Calico and marble with gilding, spine preparing and spine decorating with ink. Photo-album with colour strings.
11. Account book binding: Hall bound (Modern style) leather and calico and gilding, file making of loose-leaf binding with screws.
12. Rebinding-Case binding.
13. Writing pad with gift cameras.
14. Practice on sewing machine, exercise on stitching machine.

REPRODUCTION & PHOTOGRAPHY - I

Subject Code 34410	Sessioinal			No of Period in one session : -		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	Annual Exam.	:	30
	-	-	-	Internal Exam.	:	20

Contents:-

1. Preparation of Line & Half Tone Negative.
2. Preventive maintenance of Crocess Camera.
3. Scaling of different types of originals.
4. Factor Controlling of exposure & development.
5. Basic Ingredient of Developers.