Curriculum

Three Year (Six Semesters) Diploma Course In

PRINTING TECHNOLOGY

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Semester System

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Prepared by:

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Curriculum Development Cell

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INSTITUTE OF RESEARCH DEVELOPMENT & TRAINING U. P., KANPUR-208002

To be

Approved and Implemented by B.T.E.

U.P.

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THIRD SEMESTER

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PREFACE

An important issue generally debated amongst the planners and educators world over is how technical education can contribute to sustainable development of the societies struggling hard to come in the same bracket as that of the developed nations. The rapid industrialization and globalization has created an environment for free flow of information and technology through fast and efficient means. This has led to shrinking of the world, bringing people from different culture and environment together and giving rise to the concept of world turning into a global village. In India, a shift has taken place from the forgettable years of closed economy to knowledge based and open economy in the last few decades. In order to cope with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate professional knowledge, skills and attitude. Technical education system is one of the significant components of the human resource development and has grown phenomenally during all these years. Now it is time to consolidate and infuse quality aspect through developing human resources, in the delivery system. Polytechnics play an important role in meeting the requirements of trained technical manpower for industries and field organizations.

In order to meet the requirements of future technical manpower, we will have to revamp our existing technical education system and one of the most important requirements is to develop outcome-based curricula of diploma programmes. The curricula for diploma programmes have been revised by adopting time-tested and nationally acclaimed scientific method, laying emphasis on the identification of learning outcomes of diploma programme.

The real success of the diploma programme depends upon its effective implementation. However best the curriculum document is designed, if that is not implemented properly, the output will not be as expected. In addition to acquisition of appropriate physical resources, the availability of motivated, competent and qualified faculty is essential for effective implementation of the curricula.

It is expected of the polytechnics to carry out job market research on a continuous basis to identify the new skill requirements, reduce or remove outdated and redundant courses, develop innovative methods of course offering and thereby infuse the much needed dynamism in the system.

F. R. Khan
Director
I.R.D.T. Kanpur

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i) Sh. Narendra Kumar Bhushan, IAS Additional Chief Secretary, Technical Education Govt. of U.P. for his exemplary vision & approach.

ii) Sh. F. R. Khan Director I.R.D.T. Kanpur for continually motivating, guiding and taking keen interest in the review of curriculum.

iii) All the participants from industries, Polytechnics and other technical institutions for their professional inputs during curriculum workshops.

iv) CDC Officer and other concerning staff of IRDT for their support and assistance in the conduct of curriculum workshops.

v) In the last but not least would like to thanks management of the industries who spare not only their precious time but also allowed the visit of their industries to the team making the curriculum.

Ravindra Kumar
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I.R.D.T. Kanpur

LIST OF SUBJECT EXPERTS

The following experts participated in various workshop for Developing the Curricula Structure and Contents of **PRINTING TECHNOLOGY** at I.R.D.T. Kanpur.

1. Shri Rakesh Tiwari, HOD NRIPT Prayagraj.
2. Shri Mohammad Imran, Lecturer NRIPT Prayagraj.
3. Shri C.P. Maurya, Lecturer NRIPT Prayagraj.
4. Shri S.K. Vishwkerma, Lecturer NRIPT Prayagraj.
5. Shri Chandra Kant Gupta, Lecturer G.P. Chandausi.
6. Shri Kshitiz Kumar Gupta, Lecturer G.P. Chandausi.
7. Smt. Mamta Rani Lecturer, G.P. Chandausi.
8. Shri Rohit Kumar Lecturer, G.P. Chandausi.

1. SALIENT FEATURES

1) Name of the Program	➢ Diploma in Printing Technology
2) Duration of the Program	➢ Three years (Six Semesters)
3) Entry Qualification	➢ Matriculation or equivalent NEP-2020/NSQF Level 4 as Prescribed by State Board of Technical Education, U.P.
4) Pattern of the Programme	➢ Semester Pattern
5) NSQF Level	➢ Level – 5
6) Ratio between theory and Practice	➢ 40% (Theory)/60% (Practical)

1) <u>Industrial Training/Internship:</u>

Four and six weeks of industrial training is made mandatory after the II and IV semesters during summer vacation. Total marks allotted to industrial training will be respectively 50 & 100.

In the last (6^{th} Semester) we have made the one semester Industrial training/Internship as optional along with usual classroom training.

2) <u>Audit & Pathways Subjects</u>:

As per AICTE and NEP-2020 directives, Essence of Indian Knowledge, & Tradition, Indian Constitution and Entrepreneurship & Startup subjects on Environmental Studies have beenincorporated in the curriculum.

3) <u>Student Centered Activities</u>:

A provision of 3-6 hrs per week has been made for organizing Student Centered Activities for overall personality development of students. Such activities will comprise of co– curricular activities such as expert lectures, self-study, games, hobby classes like

photography, painting, singing etc. seminars, declamation contests, educational field visits, NCC, NSS and other cultural activities, disaster management and safety etc.

4) <u>Project work:</u>

Micro/Mini/Major project work has been included in the curriculum to enable the student to get familiarized with the practices and procedures being followed in the industries and provide an opportunity to work on some live projects in the industry.

2. EMPLOYMENT OPPORTUNITIES

The following are the major employment opportunities for diploma holders in PRINTING TECHNOLOGY:

1. Packaging Industries.
2. Government Presses.
3. Security Presses.
4. Currency Presses.
5. Advertisement Agencies.
6. Government Mints.
7. Publication Sector.
8. Proof Reading Sector.
9. Defense Sector.
10. Banking Sector.
11. Outsourcing Agencies.
12. Newspaper Organizations.
13. Design Studios.
14. Education & Research Sector.
15. Teaching Professionals in different colleges & Universities.
16. Textile industries.
17. Pharmaceutical & Health Care.
18. Software Industries.
19. Service Provider Industries.
20. Free Lancer.

3. LEARNING OUTCOMES OF THE PROGRAM

1. Program Outcomes (POs)

The Program Outcomes (POs) describe the knowledge, skills, and attitudes that students are expected to develop by the time they graduate from the Diploma in Electronics and Communication Engineering program. These outcomes reflect what graduates will be capable of doing because of the learning and training received throughout the course. They represent the professional abilities and attributes that define a diploma holder in engineering.

As defined by the **National Board of Accreditation (NBA)**, the following are the seven Program Outcomes for an engineering diploma graduate:

PO1: Basics and Discipline specific Knowledge
Assimilate knowledge of basic mathematics, science and engineering fundamentals.

PO2: Problem's Analysis and solution
Identify, analyse and solve problems using standard methods and established techniques.

PO3: Design and Development
Design solutions for technical problems.
Assist in designing components, systems, or processes to meet specific requirements.

PO4: Engineering Tools, Experimentation, and Testing

Use modern engineering tools and appropriate techniques to conduct experiments as per BIS standard.

PO5: Socio/ Economic /Environmental impact assessment/remedy.

Apply relevant technologies while considering societal needs, environmental impact keeping in view sustainable and ethical responsibilities.

PO6: Project Management and Communication
Apply engineering management principles, work effectively as an individual or in a team, and communicate clearly on activities.

PO7: Lifelong Learning
Recognize the importance of continuous learning and actively pursue self-improvement to keep pace with technological developments.

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After undergoing this program, students will be able to:

1.	Understanding of the fundamentals of printing technology, including printing processes, ink types, and paper properties.
2.	Knowledge of printing industry safety procedures and guidelines.
3.	Familiarity with the design and prepress process for printed materials.
4.	Ability to operate and maintain various types of printing presses, including letterpress, offset, silk screen, flexographic, gravure, and digital.
5.	Understanding of color theory and color management in printing.
6.	Familiarity with printing substrates, including paper, plastic, and metal.
7.	Ability to troubleshoot printing issues and optimize print quality.
8.	Familiarity with finishing processes, such as cutting, folding, and binding.
9.	Knowledge of the various printing market segments, such as packaging, commercial printing, and publishing.
10.	Ability to estimate print costs and provide quotes for printing jobs.
11.	Understanding of the environmental impact of printing and knowledge of sustainable printing practices.
12.	Knowledge of digital printing technologies, including variable data printing and web-to-print.
13.	Familiarity with printing software, such as Adobe Creative Suite, and prepress software, such as illustrator, InDesign etc.
14.	Ability to operate and maintain post-press equipment, such as cutting machine and die-cutters.
15.	Understanding of the principles of typography and layout design.
16.	Interpret factory acts and laws.
17.	Ability to communicate effectively with clients, coworkers, and vendors.
18.	Understanding of quality control processes in printing.
19.	Ability to analyze customer needs and recommend appropriate printing solutions.
20.	Familiarity with printing industry trends and technological advancements.
21.	Understanding of print production workflows and process optimization.
22.	Knowledge of color calibration and profiling techniques.
23.	Familiarity with packaging design and printing processes.
24.	Ability to manage multiple printing projects simultaneously.
25.	Understanding of the role of print in marketing and communication.
26.	Use computer and IT tools for creating document, making spread sheet and Making presentation.
27.	Ability to troubleshoot and repair printing equipment.
28.	Familiarity with different types of inks and their properties.
29.	Maintain and repair printing equipment to ensure smooth and uninterrupted production.
30.	Understanding of the importance of branding in print design.
31.	Knowledge of the printing sales process and customer relationship management.

32.	Understanding of the role of printing in e-commerce and online retail.
33.	Ability to work effectively in a team environment.
34.	Familiarity with international printing standards and requirements.
35.	Knowledge of industry-specific regulations and guidelines, such as those governing food packaging.
36.	Understanding of the impact of digital media on print production.
37.	Ability to manage inventory and materials for print production.
38.	Complete finishing processes, such as cutting, folding, and binding.
39.	Operate and maintain digital printing technologies, including variable data printing and web-to-print.
40.	Understand the impact of digital media on print production to adapt to changing technological trends.
41.	Knowledge of intellectual property laws and copyright requirements in print production.

4. STUDY AND EVALUATION SCHEME

THIRD SEMESTER

Sr. No.	SUBJECTS	COURSE TYPE & CATEGORY	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
							INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
			L	T	P		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
3.1	INTRODUCTION TO PRINTING PROCESSES	PROGRAM CORE (THEORY)	03	-	-	3	40	-	40	60	3	-	-	60	100
3.2	GRAPHIC DESIGN & TYPOGRAPHY	PROGRAM CORE (THEORY)	02	-	-	2	40	-	40	60	3	-	-	60	100
3.3	DESK TOP PUBLISHING FOR PRINT PRODUCTION	PROGRAM CORE (PRACTICUM)	01	-	04	3	-	60	60	-	-	40	3	40	100
3.4	PRINTING MATERIALS	PROGRAM CORE (THEORY)	03	-	-	3	40	-	40	60	3	-	-	60	100
3.5	DIGITAL PREPRESS	PROGRAM CORE (PRACTICUM)	01	-	04	3	-	60	60	-	-	40	3	40	100
3.6	SCREEN PRINTING	PROGRAM CORE (PRACTICAL)	-	-	04	2	-	60	60	-	-	40	3	40	100
3.7	**(Q)** OPEN ELECTIVE-1 **OR**	OPEN ELECTIVE (THEORY)	02	-	-	2	50	-	50	-	-	-	-	-	N/A
	*ADVANCE SKILL DEVELOPMENT	OPEN ELECTIVE (Certification Course)					-	-	-	-	-	-	-	-	N/A
3.8	SUMMER INTERNSHIP** (4) WEEKS	-	-	-	-	2	-	50	50	-	-	-	-	-	50
#Student Centered Activities		-	-	-	12	-	-	50	50	-	-	-	-	-	50
TOTAL		-	**12**		**24**	**20**	**120**	**280**	**400**	**180**	**-**	**120**	**-**	**300**	**700**

NOTE:-**(Q)** It is compulsory to appear and to pass the examination, but marks will not be included for percentage and division of obtained marks.

* Advance skill development mention at **3.7** in the table provide the scope of selecting the course as per choice from the elective list provided in the syllabus conducted by various agency of repute of duration not less than 20 Hrs (Offline/Online).

** SUMMER INTERNSHIP (4-6 WEEKS) duration to be organized after second semester exam. Evaluation will be in third semester.

Student Centered Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, library, Cultural Activities and self-study etc.

FOURTH SEMESTER

Sr. No.	SUBJECTS	COURSE TYPE & CATEGORY	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
							INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
			L	T	P		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
4.1	TEXT AND IMAGE SETTING	PROGRAM CORE (PRACTICUM)	01	-	04	3	-	60	60	-	-	40	3	40	100
4.2	PACKAGING TECHNOLOGY	PROGRAM CORE (THEORY)	03	-	-	3	40	-	40	60	3	-	-	60	100
4.3	BINDING AND FINISHING	PROGRAM CORE (PRACTICUM)	01	-	04	3	-	60	60	-	-	40	3	40	100
4.4	OFFSET PRINTING	PROGRAM CORE (PRACTICUM)	01	-	04	3	-	60	60	-	-	40	3	40	100
4.5	IMAGE CARRIER TECHNOLOGY	PROGRAM CORE (THEORY)	03	-	-	3	40	-	40	60	3	-	-	60	100
4.6	FLEXOGRAPHY PRINTING	PROGRAM CORE (THEORY)	03	-	-	3	40	-	40	60	3	-	-	60	100
4.7	**(Q)** OPEN ELECTIVE-2 **OR**	OPEN ELECTIVE (THEORY)	02	-	-	2	50	-	50	-	-	-	-	-	N/A
	*ADVANCE SKILL DEVELOPMENT	OPEN ELECTIVE (Certification Course)					-	-	-	-	-	-	-	-	N/A
4.8	**(Q)** ESSENCE OF INDIAN KNOWLEDGE AND TRADITION	AUDIT COURSE	02	-	-	-	50	-	50	-	-	-	-	-	N/A
	#Student Centered Activities	-	-	-	8	-	-	50	50	-	-	-	-	-	50
TOTAL		-	**16**	**-**	**20**	**20**	**120**	**230**	**350**	**180**	**-**	**120**	**-**	**300**	**650**

NOTE:- (**Q)** It is compulsory to appear and to pass the examination, but marks will not be included for percentage and division of obtained marks.

* Advance skill development mention at **4.7** in the table provide the scope of selecting the course as per choice from the elective list provided in the syllabus conducted by various agency of repute of duration not less than 20 Hrs (Offline/Online).

** SUMMER INTERNSHIP (4-6 WEEKS) duration to be organized after fourth semester exam. Evaluation will be in fifth semester.

Student Centered Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, library, Cultural Activities and self-study etc.

OPEN ELECTIVE-1

SR.NO.	(Q) THEORY COURSES NAME
1.	LIBRARY AUTOMATION AND DIGITALISATION
2.	TYPE FACE DESIGNING
**********	
SR.NO.	***CERTIFICATE COURSES**
1.	COURSES CONDUCTED BY CENTRE OF EXCELLENCE (ESTABLISHED BY THIRD PARTY AS: - TATA TECHNOLOGIES. etc)
2.	COURSES CONDUCTED BY INFOSYS PRINGBOARD
3.	COURSES CONDUCTED BY TCS ION
4.	COURSES CONDUCTED BY OTHER RELEVANT GOVERNMENT, INTERNATIONAL/NATIONAL ORGANIZATION OR PLATFORMS OF REPUTE
5.	COURSES CONDUCTED BY AICTE-ELIS AND CENTRALLY FUNDED TECHNICAL INSTITUTES
6.	COURSES CONDUCTED BY C-DAC
7.	COURSES CONDUCTED BY NEILIT

OPEN ELECTIVE -2

SR.NO.	(Q) THEORY COURSES NAME
1.	DIRECT SELLING
2.	RIGID PACKAGING
**********	
SR.NO.	***CERTIFICATE COURSES**
1.	COURSES CONDUCTED BY CENTRE OF EXCELLENCE (ESTABLISHED BY THIRD PARTY AS: - TATA TECHNOLOGIES. etc)
2.	COURSES CONDUCTED BY INFOSYS PRINGBOARD
3.	COURSES CONDUCTED BY TCS ION
4.	COURSES CONDUCTED BY OTHER RELEVANT GOVERNMENT, INTERNATIONAL/NATIONAL ORGANIZATION OR PLATFORMS OF REPUTE
5.	COURSES CONDUCTED BY AICTE-ELIS AND CENTRALLY FUNDED TECHNICAL INSTITUTES
6.	COURSES CONDUCTED BY C-DAC
7.	COURSES CONDUCTED BY NEILIT

5. GUIDELINES FOR ASSESMENTS OF STUDENT CENTERED ACTIVITIES (SCA)

It was discussed and decided that the maximum marks for SCA should be 50 as it involves a lot of subjectivity in the evaluation. The marks may be distributed as follows:

i. 15 Marks for general behaviour and discipline
(by HODs in consultation with all the teachers of the department)

ii. 10 Marks for attendance as per following:
(by HODs in consultation with all the teachers of the department)

a) 75 - 80% 6 Marks
b) 80 - 85% 8 Marks
c) Above 85% 10 Marks

iii. * Even Semester:
25 Marks maximum for Sports/NCC/Cultural/Co-curricular/NSSactivities as per following: (by In-charge Sports/NCC/Cultural/Co-curricular/NSS)

a) State/National Level participation
b) Participation in two of above activities
c) Inter-Polytechnic level participation
d)

****Odd Semester:**
25 Marks maximum

a) Language Lab Practices
b) Group Discussion and Personality Development
c) Industrial Visits/Industrial Talks
d) Power Point Presentations and Resume Making
e) Development of Aptitude and Reasoning Skills
f) Participation in the technical Exhibitions, Symposiums, Seminars, Workshops at the Institute /District/State/National Level.

3.1	INTRODUCTION TO PRINTING PROCESSES (Theory)	L T P
		3 0 0

1. COURSE OBJECTIVES

This is a core subject of printing technology. It is essential for students to learn about the basics of various printing process and printing machines. Printing is a process for reproducing text and images by transferring an image from a master from onto a substrate like paper or fabric. It involves applying pressure and ink or toner to create an impression and can be done through various techniques like wood block printing, letterpress, lithography and digital printing.

2. COURSE OUTCOMES (CO)

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following COURSE OUTCOMES.

Students will be able to

CO1 • Different Printing Process and their Modern uses.
CO2 • Carry out various printing process.
CO3 • Classify various types of printing substrates.
CO4 • Explain properties and applications of printing plates.
CO5 • Select suitable material to be used for various printing applications.

3. CONTENTS

UNIT 1- INTRODUCTION TO PRINTING PROCESSES: (08 Periods)

1.1 Basic Principles of Letterpress, Offset, Flexography, Gravure, Screen Printing and Digital Printing.
1.2 Applications of Printing Processes – Offset, Intaglio, Gravure, Flexography, Screen printing and Digital printing.

UNIT 2- PRINT RECOGNITION: (08 Periods)

2.1 Print recognition of Printing Processes – Letterpress, Offset, Flexography, Gravure and Screen Printing.
2.2 Advantages and Limitations of Printing Processes – Letterpress, Offset, Flexography, Gravure and Screen Printing.

UNIT 3- OFFSET PRINTING. (08 Periods)

1.1 Basic configuration of offset printing.
1.2 Single color sheet-fed offset press, Multi color sheet-fed press, Offset perfecting press and Small offset press.

UNIT 4- FLEXOGRAPHY PRINTING. (08 Periods)

5.1 Basic configuration of flexography printing.

5.2 Types of flexography machine - In-line type flexography press, Stack type flexography press and Satellite type flexography press.

UNIT 5- GRAVURE, SCREEN & DIGITAL PRINTING. (10 Periods)

5.1 Parts of Gravure machine – Gravure printing unit, printing cylinder, Doctor blade and Impression cylinder.

5.2 Parts of Screen printing – Frame, Mesh, Squeegee, Table.

5.3 Basic knowledge of digital printing.

4. TEXT BOOKS / REFERENCE BOOKS:

1. Letter press printing part I-II, C.S. Misra, Anupam Prakashan, Prayagraj.

2. Akshar Mudran Shastra, C.S. Misra, Anupam Prakashan, Prayagraj..

3. Technology of offset printing, C.S. Misra, Anupam prakashan, Prayagraj.

4. Offset Mudran Shastra, C.S. Misra, Anupam prakashan, Prayagraj.

5. Commercial Screen Printing, Bhamare, Adorn Publication Naupada, Thane.

6. Printing Technology, Adam Fox.

5. INSTRUCTIONAL STRATEGY

While imparting instructions, teacher should show various types of printing materials to the students. Students should be asked to collect samples of various materials available in the market. Visits to industry should be planned to demonstrate use of various types of materials or Printing Process in the industry.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**8**	**15**
2	**8**	**15**
3	**8**	**15**
4	**8**	**15**
5	**10**	**40**
Total	**42**	**100**

3.2	GRAPHIC DESIGN & TYPOGRAPHY (Theory)	L	T	P
		2	0	0

1. COURSE OBJECTIVES

Printing production is based on proper designing and typographic planning. Introduction of Graphic Design & Typography subject is essential to impart basic knowledge and skills in graphic design principles, layouts, typographic principles and methods etc. This subject is essential as prerequisite for studying printing design and letter assembly subjects in the Diploma Curriculum.

2. COURSE OUTCOMES (CO)

After undergoing this subject, the student will be able to;

CO1 • Design is a daily part of our lives, enticing us to buy a product or helping with an everyday task like using an app on your phone.

CO2 • Develop a thorough understanding of the form and function of typography and methodologies for successfully communicating ideas, narratives, concepts and identities through various media.

CO3 • Combine typographical elements and the other visual elements. Gather typographical elements with graphic design products.

CO4 • Understanding to prepare a layout as well as types of page structure and dummy preparation.

CO5 • Brief description about typefaces and different typesetting methods. Designing of different types of display materials. Understanding about proofing and proof reading procedure.

3. CONTENTS

UNIT 1- PRINTED PRODUCTS: (04 Periods)

1.1 Introduction to format and design factors for printed products, photography and illustrations.

1.2 Embellishment: Leaflets, Pamphlets, Booklets, Folders, Catalogues, Brochures, Manuals, Books, Magazines and Newspapers, Business-forms and Commercial Stationery, Labels, Cartons, Point of Sale - Display Materials, etc.

UNIT 2- GRAPHIC DESIGN PRINCIPLES, VISUAL INGREDIENTS AND LAYOUTS: (04 Periods)

2.1 Graphic Design Principles: Balance, Geometrical and Optical Centres, White Space, Optical Space, Harmony, Contrast, Unity, Proportion, Rhythm, Emphasis, Simplicity, etc.

2.2 Visual ingredients: Point, Line, Shape, Mass, Size, Scale, Colour, Tone, Texture, Pattern, etc.

UNIT 3- COLOUR ELEMENTS: (06 Periods)

3.1 Colour theory: terms used to describe colour; warm and cold colours; hue, shade and tint.

3.2 Colour wheel: terms used to describe relationship between colours - monochromatic, complementary, analogues, split complimentary.

UNIT 4- TYPOGRAPHY: (08 Periods)

4.1 Introduction to Printing Type, X-height, Ascender and descender, baseline and body width. Parts of type face.

4.2 Selecting type face suitable to the subject or purpose. Relationship between Type Face and Printing Processes, between Type Face and Paper Surfaces. Legibility and readability.

UNIT 5- TYPESETTING TECHNIQUES: (06 Periods)

5.1 Different methods of Typesetting: Introduction to Hand setting and Mechanical setting, Photo setting, Digital setting.

5.2 Proof reading: Proof reader and Copy holder, Proof Reading marks, Kinds of Proofs, Proof Reading procedure - correction and page make up.

4. TEXT BOOKS / REFERENCE BOOKS:

1. Art & Production, N.N. Sarkar, Sagar Publication, New Delhi.
2. A Hand Book of Typography, Kailas, Anupam Prakashan, Prayagraj.
3. Theory & Practical of composition, A.C. Goel, Saroj Prakashan, Prayagraj.
4. Adhunik Sanyojan Shastra, C.S. Misra, Anupam prakashan, Allahabad.
5. Elements & Design & Typography, B.D. Mendiratta, Asian Books Private Limited, New Delhi.

5. INSTRUCTIONAL STRATEGY

Graphic Design and Typography is a graphical and typographical designing subject. Teacher should show various types designed printed materials to the students. Students should be asked to collect samples of various printed material available in the market.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**04**	**15**
2	**04**	**15**
3	**06**	**20**
4	**08**	**30**
5	**06**	**20**

	Total	28	100

3.3	DESKTOP PUBLISHING FOR PRINT PRODUCTION (Practicum)	L T P 1 0 4

1. COURSE OBJECTIVES:

The objective of this course is to enable the students to:

- Develop proficiency in utilizing graphic design software tools for layout creation and manipulation.
- Apply branding guidelines effectively to design professional letterheads, ensuring consistency with company identity.
- Learn to create visually appealing and well-organized layouts for tabloid publications.
- Gain skills in designing informative and visually engaging brochures that effectively communicate messages.
- Understand and apply the principles of the golden rule to create balanced and visually pleasing layouts for books.

2. COURSE OUTCOMES(CO):

On successful completion of this course, the student will be able to:

CO1 • Attain proficiency in using software tools for graphic design and a thorough understanding of basic typographic principles, enabling effective visual communication.

CO2 • Apply branding guidelines to design professional letterheads that accurately represent the company's identity and convey key brand elements.

CO3 • Attain competence in creating visually compelling tabloid layouts that organize content effectively and engage the target audience.

CO4 • Attain skill in designing informative and visually appealing brochures that effectively communicate key messages and showcase products or services.

CO5 • Attain mastery of the golden rule in book layout design, resulting in balanced and aesthetically pleasing compositions that enhance readability and user experience.

3. CONTENTS:

UNIT 1- VARIOUS SOFTWARE USED FOR DESIGNING (03 Periods)

Graphic Design Software, Digital Painting and Illustration Software, Desktop Publishing Software, 3D Modelling & Animation Software and Other Designing Software.

Ex. No.	Name of Experiment	Periods
1	Designing a Brochure	4
2	Designing a Mark sheet / Certificate	4

UNIT 2- INTRODUCTION TO LOGO, TYPOGRAPHY AND PAGE LAYOUT FOR A BOOK (03 Periods)

Ex. No.	Name of Experiment	Periods
1	Design a letterhead that incorporates the company's branding guidelines, including the logo, colour scheme, and typography	6
2	Create a layout for tabloids	4

UNIT 3- INTRODUCTION TO TABLE OF CONTENT AND COMMON DESIGNING CONCEPT (02 Periods)

Ex. No.	Name of Experiment	Periods
1	Create a layout of book cover	6
2	Creating a master page and Table of Content for a book	4

UNIT 4- PRE-FLIGHTING, PROOFING & IMPOSITION (03 Periods)

Ex. No.	Name of Experiment	Periods
1	Create a layout for tabloids	6
2	Designing a Voucher	6

UNIT 5- RASTER IMAGE PROCESSORS, ARCHIVING, VERSIONING (03 Periods)

Ex. No.	Name of Experiment	Periods
1	Designing an Advertisement	4
2	Designing a Business Card.	4
3	Creating Magazine Cover page.	4
4	Creating parts of a Newspaper	4

4. TEXT BOOKS/REFERENCE BOOKS:

1. Desktop Publishing for Dummies by Nancy C. Muir.
2. Practical tips for creating perfect print jobs for all , 1st edition, 2023, Creative Publishers, Mumbai.
3. The Design of Everyday Things by Don Norman.
4. Adobe In Design CC Classroom in a Book by Kelly Kordes Anton.
5. Robin Williams , The Non-Designer's Design Book, 2015, Peachpit Press, 4th Edition

5. INSTRUCTIONAL STRATEGY

- Begin with comprehensive software tutorials to familiarize students with desktop publishing tools and functionalities.
- Provide hands-on exercises and guided projects covering layout design, typography, and image manipulation.
- Foster peer collaboration through group projects and critique sessions to encourage feedback and learning from peers.
- Offer opportunities for independent exploration and experimentation to encourage creativity and problem-solving skills.

3.4	PRINTING MATERIALS (Theory)	L T P
		3 0 0

1. COURSE OBJECTIVES

The Student will learn the scientific approach to the different printing materials. He will also learn about the testing of materials for quality control. The subject will make the student to learn about the chemical reactions involved in the various stages of Reproduction Photography, Surface Preparation, Press work etc.

2. COURSE OUTCOMES (CO)

After undergoing the subject, the student will be able to:

CO1 • Basic knowledge of different materials.

CO2 • Basic knowledge of photographic emulsion.

CO3 • Knowledge of different substrates.

CO4 • Knowledge of different inks and different ink drying method.

CO5 • Knowledge of different kinds of testing methods.

3. CONTENTS

UNIT 1- PHOTOGRAPHIC MATERIALS: (10 Periods)

1.1 Basic ingredients of emulsion and their functions.
1.2 Developer's constituents and their functions.
1.3 Chemicals used for after treatment.
1.4 Introduction to non-silver material.

UNIT 2- POLYMERS: (08 Periods)

2.1 Monomers and Polymers.
2.2 Homo-polymers and Co-polymers.
2.3 Types of polymerization reactions: Addition polymerization and condensation polymerization.
2.4 Types of Polymers: Plastics, rubber and Fibers.

UNIT 3- SUBSTRATES: (08 Periods)

3.1 Fibrous and non-fibrous raw materials used in paper and board manufacture.
3.2 Varieties of papers and boards: Characteristics, classification, identification etc.
3.3 Dimensional stability of paper: Effect of humidity on paper.
3.4 Other substrates: Metal foil, plastic, poly, pet, BOPP, CPP, etc.

UNIT 4- PRINTING INKS: (10 Periods)

4.1 Constituents of printing ink, general characteristics and requirements of printing inks for various printing processes.

4.2 Basic drying methods and their suitability for printing processes.
4.3 Different inks: heat set, quick set inks, metallic inks, flexography and gravure ink etc, their suitability to different applications.
4.4 Digital inks; solvent type and powder type.

UNIT 5- RAW MATERIAL TESTING METHOD: (06 Periods)

GSM, Tensile strength, bursting strength, folding strength, stiffness test (Grain direction and cross direction), Cobb test, etc.

4. TEXT BOOKS/REFERENCE BOOKS:

1 Printing inks and papers, C.S. Misra, Anupam Prakashan, Allahabad.

2. Mudran Syahiyan Tatha Kagaj, C.S. Misra, Anupam Prakashan, Allahabad.

3. Materials in printing process by L.C. Young

4. The complete technology book on Printing inks,NIIR Board.

5. Materials Science, Dr. M. Arumugam .

6. Science and technology of Printing Materials , by Prakash Setty

5. INSTRUCTIONAL STRATEGY

Printing material subject is the scientific approach to the different printing substrates. Teacher should show the different test of material for quality control. Student should learn about the different types of Paper, Ink and testing methods.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**10**	**25**
2	**8**	**20**
3	**8**	**20**
4	**10**	**25**
5	**6**	**10**
Total	**42**	**100**

3.5	DIGITAL PREPRESS (Practicum)	L T P
		1 0 4

1. COURSE OBJECTIVES:

The objective of this course is to enable the students to:

- Understand the fundamental elements and processes of digital prepress; including text, images, and graphics, and apply them effectively.
- Learn prepress checklist protocols and screening techniques for optimizing digital output quality.
- Gain proficiency in digital input methods such as digital cameras, scanners, and OCR, and their role in digital proofing.
- Master digital image assembly techniques, imposition plans, and the operation of raster image processors (RIPs) for efficient workflow management.
- Develop a comprehensive understanding of color management principles, including color perception, CIE Lab values, and practical color measurement techniques.

2. COURSE OUTCOMES(CO):

On successful completion of this course, the student will be able to:

CO1 • Gain proficiency in using industry-standard prepress software such as Adobe InDesign, Illustrator, and Photoshop.

CO2 • Understand the principles of color management in digital prepress, including color spaces, calibration, and color correction techniques.

CO3 • Learn about various file formats used in digital prepress, such as PDF, TIFF, and EPS, and their appropriate usage for different printing applications.

CO4 • Develop skills in optimizing prepress workflows for efficiency and quality.

CO5 • Identify and troubleshoot common prepress issues, such as image resolution problems, font embedding issues, and color mismatches.

3. CONTENTS:

UNIT 1- DIGITAL PREPRESS – INTRODUCTION (02 Periods)

1.1 Elements of Digital Page – Text, Images, Graphics

1.2 Prepress checklist. AM and FM screening, Digital Proof

Ex. No.	Name of Experiment	Periods
1	Create a Logo using Adobe InDesign / Corel Draw	6
2	Create a multicolor invitation / certificate using image editing software	6

UNIT 2-DIGITAL PHOTOGRAPHY & DIGITAL PROOFING (03 Periods)

2.1 Digital input processes - Digital camera, Scanner and OCR.

2.2 Types of Scanners – Flat bed and Drum Scanner.

Ex. No.	Name of Experiment	Periods
1	Image capturing by digital camera & editing.	4
2	Image scanning by scanner & image editing	4

UNIT 3- DIGITAL IMAGE ASSEMBLY (03 Periods)

3.1 Page Assembly and Imposition - Digital assembly techniques.

3.2 Imposition plans - sheet work and half sheet work.

3.3 Raster Image Processor (RIP)

3.4 Data Formats – Bitmap & Vector, Data storage, distribution, backup or transport.

Ex. No.	Name of Experiment	Periods
1	Preparation of imposition scheme for sheet work using Imposing Software.	4
2	Preparation of imposition scheme for half sheet work using Imposing Software.	4
3	Apply UCR, GCR and color separate the scanned image using image editing software	4

UNIT 4- COLOUR MANAGEMENT (03 Periods)

4.1 Purpose of Colour Management

4.2 CIE Chromaticity Diagram - CIE Lab Values.

4.3 Colour perception - colorimetric description of colour – 3 c's of colour management

Ex. No.	Name of Experiment	Periods
1	Measuring CIE Lab values using Spectrophotometer	6
2	Identify and troubleshoot common prepress issues and quality control	6

UNIT 5- WORKFLOW OF PRINT PRODUCTION SYSTEM (03 Periods)

5.1 Workflows – PDF, Pre-flighting techniques

5.2 CIP 3, CIP 4

Ex. No.	Name of Experiment	Periods
1	Perform Pre-Flighting operations for a given Text image and	12

	graphics files	

4. TEXT BOOKS/REFERENCE BOOKS:

1. Helmut Kipphan, Handbook of Print Media: Technologies and Production Methods, 1st Edition, 2001, Springer-Verlag Berlin Heidelberg, ISBN: 978-3540673264
2. S.K. Jain, Digital Printing and Publishing Technology, Tata McGraw-Hill Education
3. Gaurav Gupta, Color Management, Focal Press
4. Sonka, Hlavac, and Boyle , Image Processing and Analysis, Chapman & Hall/CRC

5. INSTRUCTIONAL STRATEGY:

- The instructional strategy for teaching strength of materials in polytechnic colleges emphasizes practical application and industry relevance.
- Through a curriculum aligned with the state technical education board, the syllabus is broken down into manageable units, prioritizing topics pertinent to Indian engineering contexts.
- Visual aids, bilingual explanations, and hands-on demonstrations are utilized to accommodate linguistic diversity and enhance understanding.
- Incorporating industry examples and field visit to construction sites and manufacturing facilities fosters experiential learning.
- Assessment methods include practical assessment, written exams, and peer learning initiatives, complemented by career guidance to inform students about opportunities in printing technology.
- Continuous feedback mechanisms ensure the refinement and effectiveness of the instructional approach.

3.6	SCREEN PRINTING (Practical)	L T P 0 0 4

1. COURSE OBJECTIVES:

The objective of this course is to enable the students to:

- Attain knowledge and skills to prepare image carriers for Screen Printing.
- Master Screen Printing concepts, including screen mesh and squeegee functions.
- Selection of screen-printing inks and the application of screen printing on flat and curved surfaces.
- Trouble shoot common issues in screen printing including print defects and ink problems.
- Screen preparation by direct and indirect method.

2. COURSE OUTCOMES(CO):

On successful completion of this course, the student will be able to:

CO1 • Basic knowledge of screen printing, screen fabrics and squeegee.
CO2 • Screen pre treatment / screen stretching / tensioning.
CO3 • Screen printing on different types of substrates.
CO4 • Knowledge about screen printing ink and their specific applications.
CO5 • Understanding different types of screen printing machines.

3. LIST OF EXPERIMENT:

Ex. No.	Name of Experiment	Hours
1	Introduction to Screen Printing	04
2	Frame Preparation, tensioning, stretching the screen fabric	08
3	Stencil preparation by Direct method.	12
4	Stencil preparation by Indirect method.	12
5	Screen Printing ink selection	04
6	Printing on different substrates by single colour	04
7	Printing on different substrates by multi colour	08
8	Printing on uneven surfaces.	04

4. INSTRUCTIONAL STRATEGY

- Start with introductory lectures to provide an overview of Screen Printing process and their significance in the printing industry.
- Incorporate practical demonstrations and simulations to illustrate image carrier preparation techniques, emphasizing hands-on learning.
- Organize interactive workshops focusing on Screen Printing inking systems, substrates, encouraging active participation and problem-solving.
- Facilitate guided tours to printing facilities or guest lectures from industry experts to offer real-world insights into Screen printing and its equipment.

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3.7 (a)	LIBRARY AUTOMATION AND DIGITALISATION (Theory)	L T P
		2 0 0

1. COURSE OBJECTIVES

- To introduce students to the basic concepts of Library automation.
- Explaining different automation software and their uses.
- Provide information on digitization processes, tools, and standards.
- Develop skills in digital library creation and management.

2. COURSE OUTCOMES (CO):

CO1: Understand the concept and need of library automation.
CO2: Operate various library automation software like E-Granthalaya, KOHA SOUL.
CO3: Understand and apply digitization tools and standards.
CO4: Create and manage a basic digital library.
CO5: Handle issues related to data protection and copyright.

3. CONTENT

UNIT 1- Introduction to Library Automation Definition, objectives, manual vs automated system, History and development of automation in libraries, Benefits of automation
(4 Periods)

UNIT 2- Library Automation Systems Area of automation: Acquisition, cataloguing, circulation, semi control. Popular software: KOHA, E-Granthalaya , SOUL . OPAC(Online public acces catalogue) (06Periods)

UNIT 3- Digitization Tools and Benefits of Digitization File formats (PDF, TIFF, JPEG), and OCR (optical character recognition) (06Periods)

UNIT 4- Digital Library Features & types of digital libraries, Digital Repositories and institutional repositories Introduction to Digital Library software (E- Granthalaya,
(06Periods)

UNIT 5- Data Protection and Copyright Copyright Licensing and IPR. Security of digital documents Open access & creative commons. (06Periods)

4. INSTRUCTIONAL STRATEGY

- Lecture-cum-demonstration method.
- Hands-on practicals using KOHA, SOUL and E-Granthalaya.

- Mini project-based learning for digital library creation.

5. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**4**	**12**
2	**6**	**22**
3	**6**	**22**
4	**6**	**22**
5	**6**	**22**
Total	**28**	**100**

3.7(b)	TYPE FACE DESIGNING (Theory)	L T P 1 0 3

1. COURSE OBJECTIVES

The objective of this course is to enable the students to

- Develop the skill of type face designing.
- Knowledge of type family and their characteristics
- Learn to type size measurement.
- Understand different latest software using in type face designing.
- Understand about Type font and type colour psycology.

2. COURSE OUTCOMES(CO):

On successful completion of this course, the student will be able to

- Attain proficiency in using software tools for type face designing thorough understanding of basic typographic principles, enabling effective visual communication.
- Apply branding guidelines to design type faces and charectristics of type faces..
- Attain knowledge of different type measurement techniques and their applications.
- Attain skill in type face Anotomy and styles of typefaces. .
- Attain mastery of the golden rule of type design principles and type design variables.

3. CONTENTS

UNIT 1- INTRODUCTION OF TYPE FACES (04 Periods)

1.1 Introduction of different type faces eg. Metallic, wooden and digital type faces.

UNIT 2- DESIGNING OF DIFFERENT TYPE FACES (08 periods)

2.1 Introduction of different latest software for type face designing

2.2 Application of different latest software for type face designing

UNIT 3- INTRODUCTION OF TYPE FACE ANATOMY (04Periods)

3.1 Different type face Anatomy such as Serif, Sen serif, Proportion, Font metrics, Optical sizing etc.

UNIT 4- DIFFERENT PARTS OF TYPE FACE (06 Periods)

4.1 Different parts of type e.g. strokes, counter, bevel etc.

UNIT 5- TOOLS AND TECHNIQUES OF TYPE FACE DESIGNING (06 Periods)

5.1 Different software tools using for type face designing

5.2 Scope of type face designing.

4. TEXT BOOKS/REFERENCE BOOKS:

1. The Visual history of Types by Paul McNiel.
2. The Elements of Typographic Style by Robert Bringhurst.
3. The Anotomy of Type by Stephen Coles.
4. Akshar Mudran Shastra by C S Mishra.
5. Designing with Type by James Craig.

5. INSTRUCTIONAL STRATEGY

- Begin with comprehensive software tutorials to familiarize students with Typeface Designing.
- Provide hands-on exercises and guided projects covering Typeface design, Type Style and psychology of Types.
- Foster peer collaboration through group projects and critique sessions to encourage feedback and learning from peers.
- Offer opportunities for independent exploration and experimentation to encourage creativity and problem-solving skills.

5. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	4	15
2	8	30
3	4	15
4	6	20
5	6	20
Total	28	100

4.1	TEXT & IMAGE SETTING (Practicum)	L T P
		1 0 4

1. COURSE OBJECTIVES

- Every printed product consists of text portion and illustrations, with the former occupying a predominant portion. Knowledge of text setting methods and equipment.
- used for setting text, which is broadly termed 'Letter Assembly' is 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 judgement about the aspect of printing, particularly in relation to the requirements of designing the printed products.
- This will cover development of typesetting method, preparation for typesetting, typesetting inputs and outputs, page assembly, proofing, imposition and planning.
- The aim is to further develop the students 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.

2. COURSE OUTCOMES(CO):

After undergoing the subject, the students will be able to:

- Knowledge of Mechanical Typesetting techniques.
- Knowledge of Digital Typesetting systems.
- Knowledge of typographic measurement system.
- Knowledge of Digital imaging.

3. CONTENTS

UNIT 1-TYPESETTING TECHNIQUES: (02 Periods)

1.1 Introduction to Mechanical and Digital typesetting system.

Ex. No.	Name of Experiment	Periods
1	Demonstration of different typesetting machine.	8

UNIT 2-TYPOGRAPHIC MEASUREMENT SYSTEM: (04 Periods)

2.1 Units of Measurement, Point system, Units.

2.2 Computerized Measurement by different latest system.

Ex. No.	Name of Experiment	Periods
1	Setting of text, table and tabular setting on Desk Top Publishing system.	12

UNIT 3- IMAGE SETTING SYSTEMS: (03 Periods)

3.1 Suitability & limitations of different image setting systems.

3.2 Basic components of modern image setter and their functions

Ex. No	Name of Experiment	Periods
1	Demonstration on modern image setter	12

UNIT 4- STORAGE DEVICES (03 Periods)

4.1 Different input and output devices for text and image setting

Ex. No.	Name of Experiment	Periods
1	Demonstration on different input and output devices eg; scanner, work station, auto backup devices, Printers etc.	12

UNIT 5- PRODUCTION ROUTINE: (02 Periods)

5.1 Steps in Text Processing, Scanning operations for illustrations outputting and quality control.

5.2 Editing corrections and page make up for commercial jobs

Ex. No.	Name of Experiment	Periods
1.	Editing correction and page makeup on the latest software	12

4. TEXT BOOKS/REFERENCE BOOKS:

- Elements of Design & Typography. By BD Mendiratta.
- Art and Print Production. By NN Sarkar

5. INSTRUCTIONAL STRATEGY

While imparting instructions, teacher should show various types of printed products and their process to applying for printing. Students should be asked to collect samples of various paper samples and card sheets available in the market.

4.2	PACKAGING TECHNOLOGY (Theory)	L T P
		3 0 0

1. COURSE OBJECTIVES

Packaging is an important tool in modern business. A bulk printing is done for packaging in the printing industry. Printing for packaging has emerged as an area of specialization. Hence this course has been included in the curriculum to impart basic knowledge of packaging technology to enable the student to apply the same in his professional career.

2. COURSE OUTCOMES (CO)

After undergoing this subject, the student will be able to;

- Explain the basics of Packaging.
- Brief description about packaging design.
- Explain different types of packaging.
- Classify various types of packaging materials.
- Select suitable ancillary materials to be used for ease of protect, inform and transportation.
- Explain properties and applications of special packages.

3. CONTENTS

UNIT 1- BASICS OF PACKAGING (08Periods)

1.1 Definition, purpose and functions of packaging.

1.2 Mechanical, chemical and biological protective functions of packaging.

1.3 Odour and flavour contamination, shelf life.

1.4 Type of packaging.

UNIT 2- PACKAGING DESIGN (06 Periods)

2.1 Consumer research and sales promotion through package design.

2.2 Factors influencing design of a package.

2.3 Surface design to suit production limitations.

UNIT 3- APPLICATION OF PACKAGING (06 Periods)

3.1 Paper based packaging**;** applications, advantage and limitations.

3.2 Glass and plastic based packaging; applications; advantages and limitations.

3.3 Wood, jute and textile based packaging; applications, advantages and limitations.

UNIT 4- PACKAGING MATERIAL (12 Periods)

4.1 Different kinds of fiber boards: Solid boards, corrugated boards, conversion properties, advantages and limitations.

4.2 Plastic based packaging materials: kinds, properties, applications and limitations.

4.3 Flexible packaging materials: Different materials used, flexible laminates, various combinations and applications, characteristics and limitations.

4.4 Metal based packaging materials: kinds applications, advantages and limitations.

UNIT 5- ANCILLARY MATERIALS AND SPECIAL PACKAGES (10 Periods)

5.1 Cushioning materials; functions, kinds and selection factors.

5.2 Sealing tapes: Kinds, applications, storage and compatibility.

5.3 Caps and Closures: functions, materials, metal caps, plastic molded caps, liners and materials used.

4. TEXT BOOKS/REFERENCE BOOKS

1 Fundamentals of Packaging Technology – S. Natarajan, M. Govindarajan.

2 Packaging Technology – Volume I – IIP

3 Packaging Technology – Volume II – IIP

4 Hand Book of Packaging Technology, Eiri Board

5 Complete Hand Book on Packaging Technology & Industries, Eiri Board

5. INSTRUCTIONAL STRATEGY

Packaging Technology is a packaging subject which increasing life of product and selling. Teacher should show various types of packaging materials to the students. Students should be asked to collect samples of various packaging material available in the market for better understanding about package designing and different packing procedure.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**8**	**15**
2	**8**	**15**
3	**8**	**15**
4	**8**	**15**

5	**10**	**40**
Total	**42**	**100**

4.3	**BINDING AND FINISHING (Practicum)**	**L T P**
		1 0 4

1. COURSE OBJECTIVES

- 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, register, etc. For this, knowledge of various methods and techniques of binding and finishing is very essential.
- Aspect of printing, particularly in relation to the requirements of designing the printed products.

2. COURSE OUTCOMES(CO):

After undergoing this course student will be able to

- Basic knowledge of binding tools and equipment and ware house.
- Knowledge of binding materials.
- Knowledge of different securing methods
- Know about the role of end papers.
- Knowledge of forwarding operations.
- Knowledge of finishing operations and edge decoration.
- Knowledge of different binding machines.
- How to repair and rebinding of books.

3. CONTENTS

UNIT 1- BINDING OPERATIONS AND WAREHOUSE: (03 Periods)

Unprinted paper warehouse and printed paper warehouse, storing, temperature, humidity

1.1 Definition of binding, different kind of binding, basic tools & equipment used in binding.

1.2 Binding Operations: Jogging, knocking, counting, folding, gathering, collating, stitching, sewing, cutting and trimming operations, Treatment of plates and maps, tipping and guarding

1.3 Unprinted paper warehouse and printed paper warehouse, storing, temperature, humidity

Ex. No.	**Name of Experiment**	**Periods**
1	Study of tools and machinery, their uses and types of binding.	4
2	Jogging, counting and folding. Side and saddle - Odd and even number stitching.	4

UNIT 2- BINDING MATERIALS (02 Periods)

2.1 Paper, boards, adhesive, binding cloths rexine, leather and other materials.

Ex. No.	Name of Experiment	Periods
1	Materials and supplies essential for a book binding department	4

UNIT 3- END PAPERS (03 Periods)

3.1 End papers: requirements of end paper, purpose & functions of end paper, kinds of end paper: self, single, double, made end paper, cloth joint end paper, zig-zag end paper and cloth joint zig-zag end paper

Ex. No	Name of Experiment	Periods
1	Preparation of different types of End papers.	6

UNIT 4- SECURING OPERATIONS (3 Periods)

4.1 Different kinds of wire stitching: side, centre and saddle stitching.

4.2 Different kinds of sewing: Sewing with thread only, sewing on tapes, sewing on cords (flexible & sawn-in sewing), sewing two sections on, overcasting.

Ex. No.	Name of Experiment	Periods
1	Preparation of Tear-off pad/Writing pad with gild corners.	4
2	Styles of binding: Quarter- bound cut flush, Quarter- bound turned in (Library Style Binding).	8
3	Exercise on sewing machine, stitching m/c, single clamp perfect binding m/c, cutting & trimming m/c etc.	6
4	Manifold book (Carbon duplicate book)	2
5	Rebinding and case making, overcast sewing.	4
6	Mechanical and loose leaf binding machines used.	4

UNIT 5- COVERING & FINISHING OPERATIONS (03 Periods)

5.1 Measuring and cutting to sizing and shape, applying adhesive and turning-in, pressing, setting the groove or joints, setting the head, setting the band, polishing, pressing and pasting down

Ex. No.	Name of Experiment	Periods
1	Printing and decorating cover- stamping with ink, with foil, blind.	4
2	Finishing processes: Operation of ruling machine, operation of blocking machine, numbering machines: hand numbering and type-high numbering machine, operations care and maintenance. Planning a job for hand numbering, finishing leather, calico cover	6

	with gold foil embossing, hand tooling and blind tooling methods, bronzing, varnishing and other surface treatments.	

4. TEXT BOOKS/REFERENCE BOOKS

1. Martin, A.G., Finishing Process in Printing, Focal, 1972.
2. Johnson, A.W., Manual of Book Binding, Thames and Hudson.
3. Alex J. Vaughan, Modern Book binding
4. Doeglas Cockerell, Bookbinding and the Care of Books.
5. Introduction to printing and finishing- by Hugh M. Spiers.

5. INSTRUCTIONAL STRATEGY

Student should learn how the printed or unprinted sheets are required to be put in a proper shape such as books, magazine, register, etc. Teacher should elaborate the different binding & finishing operations as well as different types of machines involved in the binding & finishing department.

4.4	OFFSET PRINTING (Practicum)	L T P
		1 0 4

1. COURSE OBJECTIVES:

The objective of this course is to enable the students to:

- Understand the basics of offset printing, including the offset process, ink transfer, and image formation.
- Identify the different stages of the offset printing process, including pre-press, press operations, and post-press.
- Recognize the different types of offset printing presses, including sheet-fed, web-fed, and perfecting presses.
- Identify the different types of offset printing inks, including process inks, spot colors, and specialty inks.
- Understand the importance of color management in offset printing, including color separation, proofing, and color correction.
- Recognize the different types of paper and substrates used in offset printing, including coated, uncoated, and specialty papers.
- Understand the importance of quality control in offset printing, including inspection, testing, and quality assurance.

2. COURSE OUTCOMES(CO):

On successful completion of this course, the student will be able to:

- Understand the principles, processes, and practices of offset printing.
- Develop hands-on skills in operating offset printing presses, performing pre-press and post-press operations, and troubleshooting common printing problems.
- Appreciate the importance of quality control, safety, and sustainability in offset printing.

3. CONTENTS:

UNIT 1- INTRODUCTION TO SHEETFED OFFSET PRESSES (03 Periods)

Principles of offset printing, offset machine units – Feeding, Printing and Delivery units. Configuration and Structure of Sheet fed Presses: Single colour, Multi colour. Different type of Presses: Inline Press, Stack Press, Blanket to Blanket (Perfecting) Press and CIC (Common Impression cylinder) Press.

Ex. No.	Name of Experiment	Periods
1	Safety precautions while working on machines.	2
2	Introduction to tools, equipment and material used in offset lab.	2

UNIT 2- SHEET CONTROL AND DELIVERY IN OFFSET PRESS (02 Periods)

Types of Feeders – Friction feeders and Suction feeders, Sheet Registering Devices – Front lay and Side lay, Sheet detectors, Sheet Insertions Devices, Delivery Section.

Ex. No.	Name of Experiment	Periods
1	Adjustment of automatic feeders for single sheet feeding	4
2	Setting of Front lay and Side lay	2
3	Adjustment of sheet control devices and delivery sections	4

UNIT 3- PRINTING UNIT IN OFFSET PRESS (03 Periods)

Pre Make ready and Make ready operations, Construction and functions of Plate Cylinder, Blanket Cylinder, Impression Cylinder, Transfer Cylinder and Delivery Cylinder, Types of Blankets, Inking and Dampening System, Roller setting method.

Ex. No.	Name of Experiment	Periods
1	Pre-make-ready operations of offset printing machines.	3
2	Make-ready operations of offset printing machines.	3
3	Preparation and fitting of offset blanket	2
4	Preparation of fountain solution.	2
5	Adjustment of inking and dampening rollers	2
6	Print a Single colour Job	4
7	Print a Multi-colour Job	4

UNIT 4- WEBFED OFFSET PRESSES – INFEED AND WEB CONTROL (03 Periods)

Development of web fed offset presses. Types of Reel Stands, Automatic Splicers – Zero Speed Splicer and Flying Splicer, Web Control.

Ex. No.	Name of Experiment	Periods
1	Web feeding and adjustment of web tension control	4
2	Adjustment of manual and automatic splicer	4

UNIT 5- WEBFED OFFSET PRESSES – DELIVERY UNIT (03 Periods)

Types of Dryers, Chilled Rollers, Types of Folders – Former, Double Former, Jaw, Chopper, Combination and Ribbon Folder, Auxiliary Equipment.

Ex. No.	Name of Experiment	Periods
1	Preparation of machine for printing and folder setting	4
2	Adjustment of Driers and Chillers	2
3	Multi-colour printing operation	4
4	Colour sequence alteration and their results	4

4.TEXT BOOKS/REFERENCE BOOKS:

1. Technology of offset printing, C.S. Mishra, Anupam Prakashan Prayagraj.
2. Sheet Fed Offset Technology, Anjan Kumar Baral, Arahant Prakashan.
3. Offset Printing and trouble shooting practical guide, K. Goswami, Anupam Prakashan Prayagraj.
4. Offset Mudran Shastra (Hindi), C.S. Misra, Anupam Prakashan Prayagraj.
5. Web Offset Printing Technology by R. K. Gupta.
6. Web Offset Printing Technology by R. K. Gupta.
7. Web Offset Printing by S. K. Ghosh

5. INSTRUCTIONAL STRATEGY

- Deliver lectures on the principles, processes, and practices of offset printing.
- Demonstrate hands-on techniques for operating offset printing presses, performing pre-press and post-press operations, and troubleshooting common printing problems.
- Provide students with hands-on training in operating offset printing presses, performing pre-press and post-press operations, and troubleshooting common printing problems.

4.5	IMAGE CARRIER TECHNOLOGY (Theory)	L T P
		3 0 0

1. COURSE OBJECTIVES:

The objective of this course is to enable the students to:

- This course covers the fundamentals of image carrier technology, including the principles, materials, and processes involved in creating and using image carriers such as plates, cylinders, and screens.
- Understand the basics of image carrier technology, including the types of image carriers, their applications, and the processes involved in creating and using them.
- Identify the different materials used in image carrier technology, including metals, plastics, and ceramics, and explain their properties and applications.
- Describe the different processes involved in creating image carriers, including etching, engraving, and electroplating.
- Understand the role of image carriers in printing, including their use in offset lithography, flexography, and screen printing.
- Compare and contrast the different image carrier technologies, including their advantages and disadvantages.

2. COURSE OUTCOMES (CO):

On successful completion of this course, the student will be able to:

- Demonstrate an understanding of the principles of image carrier technology.
- Analyse the properties and applications of different image carrier materials.
- Design and create image carriers using various techniques.
- Evaluate the performance of different image carrier technologies.
- Apply image carrier technology to real-world printing applications.
- Communicate technical information related to image carrier technology.

3. CONTENTS:

UNIT 1- INTRODUCTION TO IMAGE CARRIER TECHNOLOGY (06 Periods)

1.1 Definition and importance of image carrier technology
1.2 History and evolution of image carrier technology
1.3 Types of image carriers (plates, cylinders, screens)
1.4 Applications of image carrier technology (printing, packaging, textiles)

UNIT 2- PRINCIPLES OF IMAGE CARRIER TECHNOLOGY (08 Periods)

5.1 Image formation and transfer
5.2 Image carrier materials (metals, plastics, ceramics)

5.3 Surface treatment and preparation
5.4 Image carrier coating and drying

UNIT 3- IMAGE CARRIER MATERIALS AND PROPERTIES (06 Periods)

3.1 Metal image carriers (aluminum, steel, copper, etc.)
3.2 Plastic image carriers (photopolymer, etc.)
3.3 Properties of image carrier materials (strength, durability, thermal resistance)

UNIT 4- IMAGE CARRIER CREATION TECHNIQUES (08 Periods)

4.1 Etching and engraving
4.2 Electroplating and electroforming
4.3 Photo polymerization and laser imaging
4.4 Computer to Plate (CTP)
4.5 Screen printing and screen coating

UNIT 5- APPLICATIONS OF IMAGE CARRIER TECHNOLOGY AND QUALITY EVALUATION (14 Periods)

5.1 Relief plates for Letterpress and Flexography
5.2 Offset plates processes – Paper Plate, Surface Plate, PS Plate, Wipe on Plate, Multi Metal Plate, Deep Etch Plate, Thermal Plate, etc.
5.3 Gravure Surface Preparation
5.4 Quality Control Aids – Star Target, GATF Registration Mark, Dot Gain Scale, Colour Control Bar, Grey Scale, Plate Punching & Bending, Densitometer, etc.

4. TEXT BOOKS/REFERENCE BOOKS:

1. Gatehouse & roper, film assembley & plate making, gatf, usa.
2. Offset plate making, gatf, usa.
3. Mertle & others, photo mechanics & printing, vnr, usa.
4. Karch & buber, graphic arts procedures, american technical society, chicago, usa.
5. Machine printing, focal press, london
6. Lithographic image carriers, cs mishra, anupam prakashan
7. The image carrier technology handbook by j. m. adams
8. Image carrier technology by r. j. g. baldwin
9. Printing technology by j. m. adams
10. The coatings technology handbook by d. r. randell

5. INSTRUCTIONAL STRATEGY:

Understand the principles, materials, and applications of image carrier technology. Deliver lectures on the principles, materials, and applications of image carrier technology. Demonstrate hands-on techniques for creating and processing image carriers. Use industry-standard equipment and software to simulate real-world scenarios.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	6	10
2	8	20
3	6	15
4	8	20
5	14	35
Total	42	100

4.6	FLEXOGRAPHY PRINTING (Theory)	L T P 3 0 0

1. COURSE OBJECTIVES

This is a technology subject flexography process and technology. Technicians working printing industry are required to deal with different printing machines of various processes. These machines have different operational unit. The diploma holders are required good knowledge of these machines. This subject deals with the printing machines of all the process and their operational unites.

2. COURSE OUTCOMES (CO)

After undergoing the subject, the student will be able to:

- Basic knowledge of flexography printing.
- Future development of flexography printing.
- Flexography image carrier preparation, Doctor blade and anilox roller.
- Flexography machine configuration their scope.
- Knowledge various type of ink substrate and solvent.
- Explain the health and safety in the flexo printing industry.

3. CONTENTS

UNIT 1- HISTORY OF FLEXOGRAPHY: (06Periods)

1.1 Introduction of flexography printing press.
1.2 Types of flexography printing press.
1.3 Future development of flexography plate.
1.4 Advantage, Limitations and characteristics of flexography process.

UNIT 2- FLEXOGRAPHY IMAGE CARRIER PREPARTION: (12 Periods)

2.1 Structure of flexography plate metal backed plate magnetic plates.
2.2 Rubber plate making and their process.
2.3 Sheet polymer plate making and their process.
2.4 Liquid polymer plate making and their process.
2.5 Making multiple plates computer flexography plate, computer rubber making plate laser engraved rubber plate.

UNIT 3- MECHANICS OF FLEXOGRAPHY MACHINE: (08 Periods)

3.1 Main section of flexo machine unwind section, printing section, drying section, rewind section.
3.2 Printing machines, operating mechanics, lubrication method.
3.3 Automatic web control, automatic machine running technique setting of pressure.
3.4 Doctor blade assembly, cleaning of ink tank

UNIT 4- INKING SYSTEM OF FLEXOGRAPHY MACHINE: (10 Periods)

4.1 Composition classification of flexography inks and solvents types of ink metering system.
4.2 Types of substrate use in flexography printing.
4.3 Anilox Roller and its type, types of anilox cells, cleaning system, specification, selection of suitable anilox roller.
4.5 Plate mounting system on flexography machine.
4.6 Corona treatment of flexo substrate.

UNIT 5- FLEXOGRAPHY PRODUCT AND MARKET (06 Periods)

5.1 Other commercial flexography printing flexography packaging and converting.
4.5 flexography flexible packaging, labels, wrapper, decorative laminates and other products.

4. TEXT BOOKS/REFRENCE BOOKS

1 Flexography printing, C.S. Misra, Anupam Prakashan, Allahabad.
2. Asia Pacific Business press.
3. NIIR Board of Consultant and engineers

5. INSTRUCTIONAL STRATEGY

While imparting instructions teacher should show flexography printing machine and its parts and various type packaging materials print in flexography printing machine to the student. student should be asked flexography printing machine configuration and various parts. visit to industry should be planned to demonstrate use of various types of flexography printing processes in the industry.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**06**	**20**
2	**12**	**25**
3	**08**	**20**
4	**10**	**25**
5	**6**	**10**
Total	**42**	**100**

4.7 (a)	DIRECT SELLING (Theory)	L T P 2 0 0

1. COURSE OBJECTIVES

The objective of this course is to enable the students to

- Develop the skill of direct selling of goods and services.
- Knowledge of establishing and nurturing long -term customer relationships.
- Learn to increasing brand awareness.
- To pursue the highest level of ethical conduct in the Indian as well as global marketplace.
- To provide many situations in which new and developing sellers can practice their skills.

2. COURSE OUTCOMES(CO):

On successful completion of this course, the student will be able to

- Attain proficiency in building relationships with customers.
- Attain knowledge of networking with other business and market professionals.
- Attain knowledge of how to increase the income.
- Attain mastery of the golden rule of direct selling.

3. CONTENTS

UNIT 1- Introduction of Direct Selling (04 Periods)

Introduction and definition of direct selling.

UNIT 2- Types of Direct Selling (06 periods)

Different types of direct selling e. g. single level selling, door to door selling, multi-level selling, party plan selling, online shopping, venue sales etc.

UNIT 3- Benefits of Direct Selling (06 Periods)

3.1 Different benefits of Direct Selling.
3.2 Development of business skills, use of multiple business strategies.

UNIT 4- Scope and Importance of Direct Selling (06 Periods)

4.1 Scope of direct selling in Indian market as well as International market.
4.2 Importance of Direct Selling and Empowerment of Entrepreneurs.

UNIT 5- Advantages and Disadvantages of Direct Selling (06 Periods)

5.1 Different advantages of direct selling.
5.2 Different disadvantages of direct selling.

4. TEXT BOOKS/REFERENCE BOOKS:

- Direct Selling Kya kyo aur kaise by Kamal Narayan Sahu.
- How to sell anything to anybody by Joe Girard.
- Way of the Wolf by Jordan Belfort .
- Direct Selling :beginning of a viral Era by Sanjeev Prajapati

5. INSTRUCTIONAL STRATEGY

- Begin with selling product information to familiarize students with Direct Selling.
- Provide hands-on exercises and guided projects covering direct selling and network marketing.
- Foster peer collaboration through group projects and critique sessions to encourage feedback and learning from peers.
- Offer opportunities for independent exploration and experimentation to encourage creativity and problem-solving skills.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	**4**	**12**
2	**6**	**22**
3	**6**	**22**
4	**6**	**22**
5	**6**	**22**
Total	**28**	**100**

4.7(b)	RIGID PACKAGING (Theory)	L T P 1 0 3

1. COURSE OBJECTIVES

- Understanding the properties and characteristics of different rigid packaging materials like plastics, metals, glass, and paperboard.
- Exploring the advantages and disadvantages of each material in terms of barrier properties, strength, sustainability, and cost.
- Developing a solid understanding of design principles for rigid packaging, including ergonomics, aesthetics, and functionality.
- Learning how to design packaging that protects products, meets regulatory requirements, and enhances brand identity.
- Exploring sustainable packaging practices, including the use of recycled materials, renewable resources, and biodegradable packaging.

2. COURSE OUTCOMES(CO):

After undergoing this course student will be able to:

- Ability to select appropriate rigid packaging materials for various products.
- Understanding of the manufacturing processes used to produce rigid packaging.
- Knowledge of design principles for effective and sustainable rigid packaging.
- Familiarity with relevant regulations and standards for rigid packaging.
- Ability to identify and utilize methods, materials, and production considerations in package design.
- Understanding of sustainable packaging industry terminology.
- Ability to design and create various types of packages, utilizing traditional and computer-based techniques.

3. CONTENTS

UNIT 1- INTRODUCTION TO PACKAGING TECHNOLOGY (04 Period)

1.1 Definition and scope of packaging, functions of packaging, Classification: Primary, secondary, tertiary, introduction to rigid vs. flexible packaging, trends in packaging industry.

UNIT 2- RIGID PACKAGING MATERIALS: (06 Period)

2.1 Overview of rigid materials, plastics: HDPE, PET, PP, PS – properties and uses, Glass: Types of glass, advantages, limitations • Metals: Tinplate, aluminium, steel – properties and packaging applications

UNIT 3- MANUFACTURING PROCESSES FOR RIGID PACKAGES (06Period)

3.1 Plastic Containers: Injection moulding, blow moulding (extrusion and injection stretch), glass Containers: Glass blowing, forming techniques, metal containers: Can making, welding, seaming ,Quality control during manufacturing.

UNIT 4- DESIGN AND TESTING OF RIGID PACKAGING (06Period)

4.1 Structural and graphic design principles, Ergonomics and consumer usability, Standard tests: Drop test, compression, leak test, burst strength, etc., Compatibility testing with contents, Case studies.

UNIT 5- SUSTAINABILITY AND REGULATIONS (06 Period)

5.1 Environmental impact of rigid packaging, Recyclability and biodegradability, Food and pharmaceutical packaging regulations, ISO, ASTM, BIS standards relevant to rigid packaging, Packaging waste management rules

4. TEXT BOOKS

1 Rigid Plastics Packaging: Materials, Processes and Applications by F. Hannay
2. Food Packaging Technology Handbook (3rd Revised Edition).
3. Hand Book of Packaging Technology by Engineers India Research Institute (EIRI)
4. Fundamentals of Packaging Technology – S. Natarajan, M. Govindarajan.
5. Packaging Technology – Volume I – IIP
6. Packaging Technology – Volume II – IIP

5. INSTRUCTIONAL STRATEGY

An instructional strategy for rigid packaging should emphasize the design considerations for recyclability, ease of disposal, and consumer education. This includes minimizing components, providing clear disposal instructions, and choosing inks that are safe and easily removed during the recycling process.

6. SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)

1	**4**	**12**
2	**6**	**22**
3	**6**	**22**
4	**6**	**22**
5	**6**	**22**
Total	**28**	**100**

4.8	**ESSENCE OF INDIAN KNOWLEDGE AND TRADITION**	**L T P**
		2 0 0

1. COURSE OBJECTIVE:

Understand the fundamental aspects of the Indian Knowledge System, its integration with modern science, principles of Yoga and holistic healthcare, and practical applications in contemporary contexts.

2. COURSE OUTCOMES:

Upon completion of the course, the student will be able to demonstrate knowledge of the following topics:

- Overview, importance, and relevance of the Indian Knowledge System, including Vedas, Upavedas, Vedangas, and Upangas.
- Relevance of science and spirituality, and contributions of ancient Indian science and technology.
- Basic principles of Yoga, benefits of holistic healthcare, and integration with modern healthcare.
- Practical applications and case studies of the Indian Knowledge System's relevance today.

3. COURSE CONTENTS

UNIT 1: Introduction to Indian Knowledge System (16 Periods)

Overview of Indian Knowledge System

- Importance and relevance
- Introduction to the Vedas
- Upavedas
- Vedangas
- Upangas

UNIT 2: Modern Science and Indian Knowledge System (06 Periods)

- Relevance of Science and Spirituality,
- Science and Technology in Ancient India,

UNIT 3: Yoga and Holistic Healthcare (04 Periods)

- Basic principles of Yoga
- Benefits of holistic healthcare practices
- Integration with modern healthcare

UNIT 4: Case Studies / Assignment (02 Periods)

- Practical Applications / Case studies demonstrating the relevance of Indian Knowledge System in modern times

4. Assessment

Viva -Voce Exam

EVALUATION METHODOLOGY

1. EVALUATION METHOD for THEORY

	Internal Assessment (40 marks)				External Assessment (60 marks)
	IA 1	**IA 2**	**IA 3**	**IA 4**	
Mode	**Written Test**	**Written Test**	**Attendance and Assignments**	**Pre – Semester Examination**	**End Semester Examination**
Portion	2 units	2 units	Regularly	All units	All units
Duration1hr	1hr	1hr	1hr	3hrs	3hrs
Exam Marks	20	20	20	60	60
Converted to	10	10	15	15	60
Tentative Schedule	5^{th} Week	10^{th} Week	Regularly	12^{th} -13^{th} Week	

IA1 and IA2: A written assessment test worth 20 marks should be conducted for two units. The marks earned (20 marks) will be converted to 10 marks. The best of the two assessments will be evaluated for an internal 10-mark assessment.

IA3: Assignments given after the completion of each unit, along with attendance throughout the semester, will be assessed for a total of 15 marks.

IA4: The pre-semester examination should follow the end-semester examination question pattern. The marks should be adjusted to 15 for internal assessment.

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1		
2		
3		
4		
5		
Total		**100**

2. EVALUATION METHOD for PRACTICAL

	Internal Assessment (60 marks)				External Assessment (40 marks)
	IA 1	**IA 2**	**IA 3**	**IA 4**	
Mode	**Practical Test**	**Practical Test**	**Attendance and Practical Documentation**	**Practical Test and Quiz – Viva Voce**	**Practical Examination**
Portion	50% Practical	50% practical	All practical	All practical	All practical
Duration	3hrs	3 hrs	Regularly	Regularly	3hrs
Exam Marks	20	20	20	20	40
Tentative Schedule	5th Week	10th Week	Regularly	12th -13th Week	

IA1 and IA2: Complete all exercises and experiments as outlined and retain them for the practical test. The test should be conducted in accordance with the evaluation scheme. The best of the two practical tests will be internally evaluated for a total of 20 marks.

IA3: Maintain a practical file for each exercise while ensuring attendance throughout the semester. Submit the required documents for the practical file, quiz, and practical test along with a valid certificate (Progress Card). This will be assessed for 20 marks.

IA4: The pre-semester practical examination, quiz, and viva-voce should follow the end-semester practical examination pattern, with marks adjusted to 20 for internal assessment.

SUGGESTED DISTRIBUTION OF MARKS FOR **INTERNAL** EVALUATION

Part	Description	Marks Allotted
A.	Objective	**5**
B.	Circuit Diagram	**5**
C.	Procedure and Connections	**10**
D.	Observation Table and Calculation	**10**
E.	Result and its Discussion, Conclusion	**10**
F.	Practical Test	**20**
	Total	**60**

SUGGESTED DISTRIBUTION OF MARKS FOR **EXTERNAL** EVALUATION

Part	Description	Marks Allotted
A.	Objective	**5**
B.	Circuit Diagram	**5**
C.	Procedure and Connections	**5**
D.	Observation Table and Calculation	**5**
E.	Result and its Discussion, Conclusion	**10**
F.	Viva-Voce	**10**
	Total	**40**

3. EVALUATION METHOD for <u>PRACTICUM (Practical External)</u>

	Internal Assessment (60 marks)				**External Assessment (40 marks)**
	IA 1	**IA 2**	**IA 3**	**IA 4**	
Mode	**Practical Test**	**Practical Test**	**Attendance and Practical Documentation**	**Micro Project**	**Practical Examination**
Portion	50% practical	50% practical	All practical	All practical	All practical
Duration	3hrs	3 hrs	Regularly	Regularly	3hrs
Exam Marks	20	20	20	20	40
Tentative Schedule	5th Week	10th Week	Regularly	12th -13th Week	

- **IA1 and IA2:** Complete all exercises and experiments as instructed and retain them for the practical test. The test should be conducted according to the evaluation scheme. The best of the two practical tests will be internally assessed for a total of 20 marks.
- **IA3:** Maintain a practical file for each exercise, ensuring attendance throughout the semester. Submit the required documents for the practical file, quiz, practical test, and end-semester examination, along with a valid certificate (Progress Card). This will be evaluated by 20 marks.
- **IA4:** Submit a micro-project report along with a fabrication model or analysis report. The performance of each student in the group will be assessed by both the laboratory supervisor and an internal examiner. This evaluation will contribute 20 marks.

SUGGESTED DISTRIBUTION OF MARKS FOR **INTERNAL** EVALUATION

Part	Description	Marks Allotted
A.	Objective	**5**
B.	Circuit Diagram	**5**
C.	Procedure and Connections	**10**
D.	Observation Table and Calculation	**10**
E.	Result and its Discussion, Conclusion	**10**
F.	Mini Project	**20**
	Total	**60**

SUGGESTED DISTRIBUTION OF MARKS FOR **EXTERNAL** EVALUATION

Part	Description	Marks Allotted
A.	Objective	**5**
B.	Circuit Diagram	**5**
C.	Procedure and Connections	**5**
D.	Observation Table and Calculation	**5**
E.	Result and its Discussion, Conclusion	**10**
F.	Viva-Voce	**10**
	Total	**40**

	Internal Assessment (40 marks)						**External Assessment (60marks)**
	IA 1		**IA 2**		**IA 3**	**IA 4**	
Mode	**Written Test**	**Practical Test**	**Written Test**	**Practical Test**	**Attendance and Pre Semester Examination**	**Practical Documentation and Micro Project**	**End Semester Examination**
Portion	2 units	50% Practical	2 units	50% Practical	All units	All Practical	All units
Duration	1hr	3hrs	1hr	3 hrs	3hrs	Regularly	3hrs
Exam Marks	10	20	10	20	60	60	60
	30		30				
Converted to	10		10		15	15	60
Tentative Schedule	5^{th} Week		10^{th} Week		Regularly	12^{th} -13^{th} Week	

4. EVALUATION METHOD for <u>PRACTICUM (Theory External)</u>

IA1 and IA2: A written assessment test worth 10 marks should be conducted for two units. Complete all exercises and experiments as outlined and retain them for the practical test worth 20 marks. The practical test should be conducted in accordance with the evaluation scheme. The total marks earned (30 marks) will be converted to 10 marks. The best of the two assessments will be internally evaluated for a total of 10 marks.

IA3: Attendance and the pre-semester examination should follow the end-semester examination question paper pattern. The marks should be adjusted to 15 for internal assessment.

IA4: Maintain a practical file for each exercise. Submit the required documents for the practical file, quiz/viva-voice, practical test, and end-semester examination, along with a valid certificate (Progress Card). This will be assessed for 40 marks. Additionally, submit a micro-project report along with a fabrication model or analysis report. The performance of each student in the group will be evaluated by both the laboratory supervisor and an internal examiner. The total of 60 marks will be converted to 15 marks.

SUGGESTED DISTRIBUTION OF MARKS FOR **INTERNAL** EVALUATION FOR IA4

Part	Description	Marks Allotted
A.	Objective	**5**
B.	Circuit Diagram	**5**
C.	Procedure and Connections	**5**
D.	Observation Table and Calculation	**5**
E.	Result and its Discussion, Conclusion	**10**
F.	Attendance & Mini Project	**10**
	Total	**40**