

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

**Course Curriculum
IMAGE CARRIER
(Course Code: 3335803)**

Diploma Programs in which this course is offered	Semester in which offered
Printing Technology	3 rd Semester

1. RATIONALE

This subject familiarizes students with various raw materials used in image carrier, preparation techniques, correction of image and quality control. Study of this course enables the students to prepare various image carriers for various Printing processes. This is a basic or foundation course for printing technology and skills and competency developed by this course are must for becoming good printing engineer.

2. LIST OF COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency

- Prepare Image Carriers for various printing processes.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P) C	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE	PA	ESE	PA	
4	0	2	6	70	30	20	30	150

Legends: L-Lecture; T – Tutorial/Teacher Guided Student Activity; P -Practical; C – Credit;; ESE -End Semester Examination; PA - Progressive Assessment.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – 1 Metals, Surface Treatment and Dark Room	1a. Identify major materials for Image Carriers	1.1 Zinc 1.2 Aluminum 1.3 Copper 1.4 Chromium 1.5 Stainless Steel
	1 b. Explain process of graining for surface treatment of image carrier.	1.2 .1 Graining machine 1.2.2 Graining materials and their application 1.2.3 Various processes for graining – Mechanical graining, Chemical graining 1.2.4 Requirements and importance of grain structure for lithographic print production.
	1c. Evaluate environmental aspect of dark room.	1.3.1 Room layout, ventilation, air conditioning, temperature, and humidity, color, waste disposal 1.3.2 Storing methods for sensitive materials, dark reaction
Unit– 2 Equipments and Materials	2a. Describe features and functioning of different equipments for offset plate making.	2.1.1 Whirler 2.1.2 Printing down frame 2.1.3 Imposition Table 2.1.4 Step and Repeat machine 2.1.5 Exposing Table 2.1.6 Developing Sink 2.1.7 Different types light sources for exposing 2.1.8 Auto Plate Processors
	2b. Identify materials for offset plate making.	2.2.1 Colloids and their suitability 2.2.2 Sensitizing materials and their suitability 2.2.3 Desensitizing materials and their suitability
Unit– 3 Imposition	3a. Describe and execute various imposition schemes.	3.1.1 Definition, Page layout, - Portrait, Landscape 3.1.2 Various layout scheme according to binding styles 3.1.3 Terms related with imposition scheme – gripper margin, folding margin, gutter margin, cutting marks, plate clamping, Paste up materials, astrolon sheet, plastic grid (Graph) etc. 3.1.4 Need of using positive working and negative working plates and their applications 3.1.5 Introduction of software used for Imposition.
Unit– 4 Image Carriers	4a. Explain the process of preparation of various Image Carriers for different types of printing.	4.1.1 Engraving Block 4.1.2 Gravure Cylinders 4.1.3 Flexo Plates 4.1.4 Offset Plates (Classification) 4.1.5 Screen Preparation
Unit – 5 Offset Plates	5a. Select appropriate type of Offset Plates for given printing task.	5.1.1 Egg Albumen Plate Process 5.1.2 Wipe – On Plate Process 5.1.3 Deep etch Plate Process

Unit	Major Learning Outcomes	Topics and Sub-topics
		5.1.4 Water Deep etch Plate Process 5.1.5 Pre sensitized Plate Process
	5b. Explain process for image corrections	5.2.1 Image Removal 5.2.2 Image Addition

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks (Duration – 2.5 Hours)			
			R Level	U Level	A Level	Total
1.	Metals, Surface Treatment and Dark Room	08	08	02	04	14
2.	Equipments and Materials	08	02	02	06	10
3.	Imposition	16	06	02	08	16
4.	Image Carriers	12	06	02	08	16
5.	Offset Plates	12	04	04	06	14
	Total	56	26	12	32	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

6. SUGGESTED LIST OF PRACTICAL/EXERCISES:

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (**Course Outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

Sr. No.	Unit No.	Practical/Exercises (Course Outcomes in Psychomotor Domain according to NBA terminology)	Approx. Hours Required
1	I	Analyse various metals for Image Carriers and surface treatments for such metal.	04
2	II	Select various equipments and machines in plate making departments and their uses.	04
3	III	Identify various imposition schemes for various printing job requirements.	04
4	IV	Differentiate various Image Carriers for printing processes such as: Engraving Block, Gravure Cylinders, Flexo Plates, Offset Plates, (Classification), Screen Preparation	08
5	V	(1) Prepare various types of Offset Plates. (2) Perform Image removal technique.	08
Total			28

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

1. Students will prepare Journal for the above mentioned practical.
2. Students will prepare drawings of all working methods of image carriers.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

- i. Appropriate printing industries should be identified and visits should be planned.
- ii. Industry visit report formats should be developed for distributing to students.
- iii. Samples of different image carrier should be demonstrated in the institute.

9. SUGGESTED LEARNING RESOURCES

A. List of Books:

Sr. No.	Author	Title of Books	Publication
1	F. M. F. Ltd. London	Printing Metals	
2	F. M. F. Ltd. London	Printing Metals (Their production nature and uses)	
3	W. P. Spencer	Graphic Reproduction	Bennet Publishing, Illionis
4	Biswanath Chakravarty	A Handbook of printing and Packaging	Galgotia
5	Charles Shepiro	Lithographers Manual	GATF
6	Catehouse & Roper	Film assembling and Plate making	GATF

B. List of Major Equipment/ Instrument

Computer System with Internet, LCD Projector with Screen

C. List of Software/Learning Websites

- i. Adobe Illustrator software
- ii. Adobe In design Software

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE**Faculty Members from Polytechnics**

- **Prof. B. A. Patel**, HOD Printing Technology, R C technical Institute Ahmedabad
- **Prof. B L Patel** Lecturer in Printing Technology, R C technical Institute Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. Nishith Dubey**, Professor, Department of Vocational and Entrepreneurship Education
- **Dr. Haji Naik Dharavath**, Associate Professor, Department of Vocational and Entrepreneurship Education