

OGUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

**PRINTING PROCESSES
(Course Code: 3335804)**

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

1. RATIONALE

Knowledge of printing processes in industry is must for the quality of the job to be printed. This course covers the features of major printing processes such as: Offset Printing, Letterpress printing, Screen Printing and Pad Printing. Thus this course is a key course for any printing technologist. Students should therefore learn this course very sincerely.

2. COMPETENCY (Programme Outcome according to NBA Terminology):

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

- **Plan appropriate printing process depending upon the nature of print job.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
L	T	P		Theory Marks		Practical Marks		Total Marks
			C	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 (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – 1 Lithographic Principle, Surfaces, Properties	1. Describe basic principles of offset printing.	1.1 Invention of Lithographic surfaces, and their properties and principles. 1.2 Machineries used in offset printing: Sheet fed and web fed offset machines. 1.3 Offset Printing Applications
Unit– 2 Feeder	2. Identify the working characteristics of paper feeder	2.1 Types of feeding with its parts 2.2 Sheet transport and control mechanism. 2.3 Side lay and Front lay 2.4 Register systems, setting and machine tripping
Unit– 3 Inking Unit and Dampening Unit	3a. Differentiate types of inking units.	3.1.1 Types of Inking Units- Pyramid and Drum type 3.1.2 Inking rollers, coverings, ink duct, agitator, roller setting and metering 3.1.3 Roller wash up and Ink supply system
	3b. Apply dampening system for sheet and web fed presses unit.	3.2.1 Types of Dampening Systems 3.2.2 Roller covering materials and setting 3.2.3 Dampening solution, pH, conductivity, water hardness and chilling tanks etc.
Unit – 4 Printing Unit	4. Illustrate and demonstrate printing unit configuration.	4.1 Types of printing units: Inline, blanket to blanket, common impression cylinder. 4.2. Plate cylinder – construction, under cut, plate clamps, Cylinder gap, Plate mounting, packing etc. 4.3 Blanket cylinder – construction, undercut, Blanket clamps, Cylinder gap, Blanket mounting 4.4 Impression cylinder – construction, clamps, nip pressure etc.
Unit – 5 Delivery Systems	5. Describe printed sheet delivery systems.	5.1 Transfer Cylinder, Delivery grippers, Chain delivery etc. 5.2 Drying systems and Anti set off sprays 5.3 Delivery systems and settings
Unit - 6 Problems and its Remedies in Offset Printing	6a. Identify remedies for offset printing problems.	6.1.1 Due to machine and setting 6.1.2 Due to Paper 6.1.3 Due to Ink 6.1.4 Due to Plate and Blanket
	6b. Describe working characteristics of quality control devices.	6.2.1 Dot gain indicator 6.2.2 Slur gauge 6.2.3 Star target 6.2.4 Test forms
Unit – 7 Screen Printing Process	7a. Describe working characteristics of screen printing process	7.1.1 Introduction to screen printing process 7.1.2 Materials and equipments used in Screen printing
	7b. Describe preparation process of various Screens.	7.2.1 Direct Stencil method 7.2.2 Indirect stencil method 7.1.3 Use of various screens for specialized effect
Unit – 8 Letterpress Printing Process	8. Describe working characteristics of letterpress printing process	8.1 Introduction to Letterpress printing. 8.2 Development stages, machines used for letterpress printing with their applications. 8.3 Suitability of print jobs for Letterpress printing process.

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

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1.	Lithographic Principle, Surfaces, Properties	04	02	02	02	06
2.	Feeder	08	02	02	02	06
3.	Inking Unit and Dampening Unit	08	02	04	04	10
4.	Printing Unit	10	06	04	08	18
5.	Delivery Systems	04	02	02	02	06
6.	Problems and its Remedies in Offset Printing	10	02	04	04	10
7.	Screen Printing Process	08	02	02	04	08
8.	Letterpress Printing Process	04	02	02	02	06
	Total	56	20	22	28	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. Hrs. Required
1	I.	Demonstrate Offset machine and its various parts	12
2	II.	Set-up feeder for various substrates/paper.	08
3	III.	1.Set Inking roller, duct, clean and wash Inking unit 2. Set Dampening roller, duct, clean and wash Dampening rollers	08

4	IV.	(1) Mount plate with packing (2) Mount Blanket with packing (3) Make-ready of a single colour print job. (4) Print a job in single color.	08
5	V.	Set delivery pile with required paper dimension.	04
6	VI.	(1) Identify various print defects and rectify. (2) Apply quality control devices in Offset printing process	04
7	VII.	(1) Select appropriate materials and equipments for given Screen printing process. (2) Prepare Stencil for both Direct and Indirect methods. (3) Print a single color job	08
8	VIII.	(1) Demonstrate letterpress printing process (2) Decide job suitability for letter press and identify methods for imparting impression	04
Total Hours (Approx)			56

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like: course/topic based seminars, internet based assignments, teacher guided self learning activities, course/library/internet/lab based mini-projects etc. These could be individual or group-based.

- i. Prepare File/Journal for the above mentioned Practical.
- ii. Collect various samples of printed work by different printing processes.
- iii. Prepare different Logo/Monogram, Symbol using Coral draw software.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

- i. Appropriate printing industries, such as: news paper press, packaging (flexo) printers, sign and specialty graphic (Banners) in the area should be identified.
- ii. Industry visit report formats and market survey formats should be developed for distributing to students.
- iii. Local suppliers of printing machineries and raw materials distributors may be contacted for product display and exhibition in the institute
- iv. Business plan could be made for starting a small scale printing press.

9. SUGGESTED LEARNING RESOURCES

A. List of Books:

Sr. No.	Author	Title of Books	Publication
1	Charles Shapiro	Lithographers Manual	GATF
2	Charles Shapiro	Lithographic Press Operations	GATF
3	Odham	Practical Printing and Binding	ABC Publication, London
4	Bishwanath	A Handbook of Printing and	Galgotia Publication

Sr. No.	Author	Title of Books	Publication
	Chakrawati	Packaging	
5	K. K. Agrawal	Complete Screen Printing	Dehati Pushtak Bhandar, Delhi
6	C. S. Mishra	Letterpress Printing Part – I & II	Anupam Prakashan, Allahabad
7	A.D. Hutding	A Survey of Printing processes	Earnest benn & Comp.
8	Kipphan, Helmut	Handbook of Print Media	Springler
9	NIIR Board	A complete book on Printing Technology	Asia Pacific Bussiness
10	Kaj, Peter Och, Robert	A guide to Graphic Print Production	John Villey & sons

B. List of Major Equipment/ Instrument

- a. Single colour sheet fed offset press.
- b. Two frame holder screen printing press.
- c. Desktop computer to plate device.
- d. Letter press Platen press.
- e. Densitometer.
- f. pH gauge.

B. List of Software/Learning Websites

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