

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

**COURSE TITLE: PRINTING TECHNOLOGY OF SYNTHETIC TEXTILE
(Code: 3342803)**

Diploma Program in which this course is offered	Semester in which offered
Textile Processing Technology	4 th Semester

1. RATIONALE

The polytechnic graduates are required to supervise operations of fiber, yarn and fabric dyeing & printing processes in industry. They should have basic knowledge and skills to handle dyeing and printing processes. The course on Printing Technology of Synthetic Textiles has been designed to provide basic knowledge and skills as well as recent technological developments in the area of dyeing & printing. This course also provides concepts of various thickeners and auxiliaries used for printing as well as methods and styles of textile printing technology.

2. LIST OF COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- **Plan and supervise printing of synthetic textile fabrics with different styles and methods using knowledge and skills of printing materials such as dyes, thickeners and ingredients.**

3. COURSE OUTCOMES

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

- Identify the various synthetic fabrics and their printing technology.
- Explain various printing methods, machines and styles using different dyes on synthetics and their blends.
- Demonstrate various methods of textile printing using different printing pastes and fixation methods.
- Describe different techniques of Garment Printing for varieties of garments.
- Discuss the innovations created in the field of printing of synthetics and their blends.

4. 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	-	4	8	70	30	40	60	200

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

5.DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Fundamental of printing of Synthetic textiles	1a. Describe Nature of various synthetic textiles to be printed 1b. Describe selection of different thickeners used for printing. 1c. Describe selection of dyes used for printing of synthetic thickener.	1.1. Nature of various synthetic textiles to be Printed 2.1. Selection of thickeners for the printing of various synthetic textiles 3.1. Selection of dyes for the printing of Various synthetic textiles
Unit– II Methods of Textile Printing	2a. List methods of textile printing Explain working principle and mechanism different methods of printing 2a2. List & explain Various techniques of transfer printing technology 2b. Differentiate between various printing methods. 2c. Describe inkjet printing technology	2.1. Working principle and mechanism of Conventional and wider width rotary screen printing machines 2.2. Various techniques of transfer printing technology 2.3. Digital inkjet printing technology 2.4. Merits & demerits of above textile printing methods
Unit– III Printing of synthetic textiles and fixation techniques	3a. List Printing of synthetic textiles (Polyester, Nylon, Acrylic, acetate rayon, cationic dyeable polyester (CDPET), polypropylene) with various dyes 3a1. Explain various styles of Printing of synthetic textiles (Polyester, Nylon, Acrylic, acetate rayon, cationic dyeable polyester (CDPET), polypropylene) with various dyes 3b. Explain Various post treatments applied to printed synthetic textiles after fixation 3c. Explain printing process on Blended textiles & fabrics. 3d. Explain fixation machines for various printing process 3e. Describe various post treatments given to printed fabrics	3.1. Printing of synthetic textiles (Polyester, Nylon, Acrylic, acetate rayon, cationic dyeable polyester (CDPET), polypropylene) with various dyes. 3.2. Printing of various blend of synthetic/natural and synthetic/synthetic 3.3. Various methods of fixations (Pressure ager, Loop ager, Thermo fixation) 3.4. Various post treatments applied to printed synthetic textiles after fixation 3.5. Brasso style of printing on polyester/ cotton, polyester/viscose, nylon/cotton and nylon/viscose blend fabrics, Crimp style of printing
Unit– IV Garment printing techniques	4a. Explain various inks used for garment printing 4b. Describe various printing methods used for garments 4c. Explain various fixation Machines used for various printing methods	4.1. Introduction 4.2. Types of different prints & inks for printing 4.3. Garment printing methods & machines. 4.4. Fixation methods of printed portion on Garment 4.5. Garment printing defects

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – V Innovations in textile printing of synthetic textiles	5a. Describe developments in printing of synthetic textile viz. transfer printing, garment printing, inkjet printing 5b. Explain innovations in thickeners used for printing.	5.1 Techniques to print garments with high production rate 5.2 Preparation of rotary screen by modern Laser technology 5.3 Synthetic thickener 5.4 Development in ink – jet printing technology

6. 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.	Fundamental of printing of Synthetic textiles	04	2	2	2	06
2.	Methods of Textile Printing	12	4	6	6	16
3.	Printing of synthetic textiles and fixation techniques	18	4	10	10	24
4.	Garment printing techniques	12	4	6	4	14
5.	Innovations in textile printing of synthetic textiles	10	2	4	4	10
	Total	56	16	28	26	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.

7. SUGGESTED LIST OF EXPERIMENTS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (**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 outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical/Exercise (Outcomes' in Psychomotor Domain)	Approx Hours Reqd
1	II	Print polyester by transfer printing method	02
2	II	Print polyester by inkjet printing method	02

3	III	Print Polyester with Disperse dye	02
4	III	Print Polyester with Pigment colours	02
5	III	Print Nylon with Acid dye	02
6	III	Print Nylon with metal complex dyes	02
7	III	Print Nylon with Reactive dye	02
8	III	Print Nylon with Disperse dye	02
9	III	Print Acrylic with Basic/cationic dye	02
10	III	Print CDPET with Basic/cationic dye	02
11	III	Print polyester/cotton blend with disperse/reactive system	02
12	III	Print polyester/cotton blend with disperse/vat system	02
13	III	Print polyester/cotton blend with disperse/pigment system	02
14	III	Obtain brasso style on polyester/cotton blend fabric	02
15	III	Obtain brasso style on polyester/viscose rayon blend fabric	02
16	III	Create white discharge printing on polyester fabric	02
17	III	Create colour discharge printing on polyester fabric	02
18	III	Create white discharge printing on nylon fabric	02
19	III	Create colour discharge printing on nylon fabric	02
20	III	Create white resist printing on polyester fabric	02
21	III	Create colour resist printing on polyester fabric	02
22	III	Create white resist printing on nylon fabric	02
23	III	Create colour resist printing on nylon fabric	02
24	III	Print polyester fabric using combination of three colours such as Disperse + Pigment + Khadi	02
25	III	Create Crimp effect on nylon fabric to get crimping effect	02
26	IV	Produce glitter print on garment	02
27	IV	Produce foil print on garment	02
28	IV	Produce metallic print on garment	02
29	IV	Produce Swarovski crystal print on garment	02
30	V	Print various synthetic fabric using synthetic thickener in printing paste	02
Total Hrs			60

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the proposed list of student's activities such as:

- i. Literature survey of Basic and innovative textile printing.
- ii. Collection and Study of various thickeners used for textile printing.
- iii. Group discussion on recent developed thickeners and auxiliaries.
- iv. Collection of data of various Textile Printing Methods & Power point Presentation.
- v. Seminar/Quiz/Presentation on recent developments in the field of Textile printing.
- vi. Visit to various dyeing and printing industries to observe and report.

9. SPECIAL INSTRUCTIONAL STRATEGY (If Any)

- i. Industrial Demonstration for Printing process & Machineries as per unit II
- ii. Visual demonstration of Printing Machineries process
- iii. Sample book preparation
- iv. Guest lecturers from industry experts for contemporary practices of industries.

10. SUGGESTED LEARNING RESOURCES

A. List of Books

Sr.No.	Author	Title of Books	Publication
1	Dr. V. A. Shenai	Technology of Printing (Vol-IV)	Sevak Publication, Mumbai, 1984
2	R. S. Prayag	Technology of Printing	Shree J. Printers, Pune
3	L. W. C. Miles	Textile Printing	Amer Assn of Textile
4	D. G. Kale	Principles of Cotton Printing	Mahajan Brothers
5	Hitoshi Ujiie	Digital Printing of Textiles	Woodhead Publishing Ltd.
6	Colourage	Colourage, ITB International bulletin on dyeing printing and finishing.	Colour Publication PVT. LTD., Mumbai
7	W. Clarke	An Introduction to Textile Printing	Newne-Butterworths, London

B. List of Major Equipment/ Instrument

- i. Laboratory Oven/steamer
- ii. Padding Mangle
- iii. Screen Printing Table & Screens

C. List of Software/Learning Websites

- i. [en.wikipedia.org/wiki/Textile printing](http://en.wikipedia.org/wiki/Textile_printing)
- ii. <http://textilefashionstudy.com>
- iii. <http://textilelearner.blogspot.in>
- iv. <http://www.niir.org>

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. C R Madhu**, Adhoc Lecturer, Textile Processing Department, R C Technical Institute, Ahmedabad.
- **Prof. J N Shah**, Assistant Lecturer, Textile Processing Department, R C Technical Institute, Ahmedabad.
- **Prof. R M Pandya**, Lecturer, Textile Processing Department, Dr. S & S S Gandhi College of Engineering & Technology.

- **Prof. D D Vyas**, Adhoc Lecturer, Textile Processing Department, Dr. S & S S Gandhi College of Engineering & Technology.

Coordinator & Faculty Members from NITTTR Bhopal

- **Dr. C. K. Chugh**, Professor Department of Mechanical Engineering
- **Dr. S.K. Gupta**, Professor and Coordinator for State of Gujarat.