GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

PRINTING TECHNOLOGY FOR NATURAL TEXTILE (Code:3332803)

Diploma Programmes in which this course is offered	Semester in which offered
Textile Processing Technology	3rd Semester

1. RATIONALE

The polytechnic graduates are required to supervise operations on fibre, 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 for Natural Textile" has been designed to provide basic knowledge and skills as well as recent technological developments in the area of dyeing & printing. This course provides 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 achieve different types of skills so that students are able to acquire following competency:

- **Plan and supervise printing of natural fibers and fabrics using knowledge and skills of dyes, thickeners other ingredients, equipment and processes.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	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.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – I **Introduction**	1a. Describe different stages of textile printing. 1b. Differentiate between Textile dyeing & Textile Printing.	1.1 Nature, role and scope of textile printing. 1.2 Principle of Textile Printing 1.3 Role of each stage of Textile Printing 1.4 Difference between Textile Dyeing & Textile Printing.
Unit– II **Methods of Textile Printing**	2a. Explain different method printing 2b. Differentiate between various printing methods.	2.1 Classification of Textile Printing methods 2.2 Working principle, equipments details and application of various methods (Block, Stencil, Spray, Roller Printing) 2.3 Preparation of Screen for screen printing methods 2.4 Working principle and mechanism of Semi automatic and fully automatic flat bed screen printing machines. 2.5 Comparison of textile printing methods with their merits and demerits
Unit– III **Textile Printing Thickeners**	3a. Describe characteristics of various thickeners. 3b. Explain applications of various thickeners used for various dyes.	3.1 Principle of Thickeners 3.2 Classification of Thickeners 3.3 Properties of Thickeners 3.4 Selection of thickeners for various dyes fibres & fabrics.
Unit– IV **Styles of Printing**	4a. Explain various styles of printing. 4b. Describe various ingredients used for printing paste formulation.	4.1. Classification of Styles of Textile Printing 4.2. Principle and chemical operation involved in executing each styles of printing 4.3. Various ingredients used for preparation of printing paste. 4.4. Relevance of above styles with cloth structure and its end uses.
Unit – V **Printing of Natural Fibre, Fabrics & Fixation**	5a. Explain printing process on natural fibers & fabrics. 5b. Explain fixation machines for various printing process.	5.1 Printing of Cotton/Viscose rayon with Direct dye, Reactive dye, Vat dye, Solublised vat dye, Azoic dye and Pigment. 5.2 Printing of Wool and Silk with Acid dye, Basic dye, Reactive dye and Metal complex dye. 5.3 Star ager, Curing machine, Rapid ager.

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.	Introduction	04	2	2	4	08
2.	Methods of Textile Printing	16	4	8	6	18
3.	Textile Printing Thickeners	08	2	6	4	12
4.	Styles of Printing	14	4	8	6	18
5.	Printing of Natural Fibre, Fabrics & Fixation	14	4	6	4	14
	Total	**56**	**16**	**30**	**24**	**70**

Legends: R = Remember; U = Understands A = Apply and above levels (Bloom's revise 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 EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills **(Course Outcomes in psychomotor 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.

S. No.	Unit No.	**Practical/Exercise (**Course Outcomes in Psychomotor Domain according to NBA Terminology)	Hours
1	III	Prepare a Thickening Paste for printing	02
2	IV	Prepare crimp style on cotton fabric	02
3	IV	Prepare crimp style on viscose rayon fabric	02
4	IV	Carry out khadi print on cotton fabric	02
5	IV	Carry out khadi print on viscose rayon fabric	02
6	V	Print given design on cotton with direct dyes.	02
7	V	Print given design on cotton reactive dyes.	02
8	V	Print given design on cotton with azoic dyes.	02
9	V	Print given design on cotton with Vat dyes.	02
10	V	Print given design on cotton with solublised vat dyes.	02
11	V	Print given design on cotton with pigments dyes.	02
12	V	Print given design on viscose rayon with direct dyes.	02
13	V	Print given design on viscose rayon with reactive dyes.	02
14	V	Print given design on viscose rayon with azoic dyes.	02
15	V	Print given design on viscose rayon with vat dyes.	02

16	V	Print given design on viscose rayon with Solublised vat dyes.	02
17	V	Print given design on viscose rayon with pigments dyes.	02
18	V	Create mechanical resist on cotton fabric	02
19	V	Create mechanical resist on viscose rayon fabric	02
20	V	Create chemical resist on cotton fabric	02
21	V	Create chemical resist on viscose rayon fabric	02
22	V	Create white discharge on cotton fabric	02
23	V	Create colour discharge on cotton fabric	02
24	V	Create white discharge on viscose rayon fabric	02
25	V	Create colour discharge on viscose rayon fabric	02
26	V	Print given design on wool/silk fabric with acid dyes	02
27	V	Print given design on wool/silk fabric with basic dyes	02
28	V	Print given design on wool/silk fabric with reactive dyes	02
29	V	Print given design on wool/silk fabric with metal complex dyes	02
30	V	Prepare screen for screen printing	02
		Total	**60 Hours**

6. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the proposed list of students activities like:

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

7. 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

B. List of Major Equipment/ Instrument

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

C. List of Software/Learning Websites

i. en.wikipedia.org/wiki/Textile_printing
ii. http://textilefashionstudy.com
iii. http://textilelearner.blogspot.in
iv. http://www.niir.org

9. INSTRUCTIONAL STRATEGY

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

8. CONTRIBUTORS

Faculty Members from Polytechnics

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