GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)
TEXTILE PROCESSING II
SUBJECT CODE: 2142903
B.E. SEMESTER IV

Type of course: Engineering

Prerequisite: Zeal to learn the subject

Rationale: This subject includes the study of printing and finishing of textile materials. Both these processes lead to increase the aesthetic of the fabric. Printing implies addition of value in form of beautiful designs on the fabric whereby finishing imparts the required final touch and other required properties specific to the end-use of the fabric.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Introduction to printing** General sequence of printing; Printing ingredients: thickeners, dyes, hygroscopic agents, reducing and oxidizing agents, etc. Different styles of printing: direct, discharge, resist, brasso, raised etc. Various methods of printing: flat-bed, screen printing, rotary screen printing, roller printing, block printing, stencil printing, transfer printing, etc.	05	14 %
2.	**Methods for print fixation** Steaming, curing, ageing, various steamers and agers	02	5 %
3.	**Printing of cotton fabric using different dyes** Direct, reactive, vat, azoic colours, etc. by different styles of printing	04	11 %
4.	**Printing of other natural fibres except cotton** Wool, silk, etc. and regenerated cellulosics i.e. viscose rayon, cuprammonium rayon, etc. by different styles of printing using suitable dyes	04	11 %
5.	**Printing of synthetic fibres** Polyester, nylon, acrylic, etc. by different styles of printing using suitable dyes	05	14 %
6.	**Printing of blended fabrics** Polyester/cotton, polyester/wool, cotton/viscose, polyester/viscose, etc. using suitable combination of dyes and style of printing	02	6 %

7.	**Introduction to finishing** Object and significance; classification	04	11 %
8.	**Chemical finishing of natural and synthetic textiles** **S**oftening, stiffening, durable press finish, weighing, milling etc.: principle, process, application and techno-chemical aspects	05	14 %
9.	**Mechanical finishing of natural and synthetic textile** Calendaring, sanforizing, beetling, raising, brushing, crabbing, potting, decatizing, etc.: principle, process, application and techno-physical aspects	05	14 %

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
15	23	22	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's 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

Reference Books:

1. Technology of Printing, Vol. IV, Dr. V. A. Shenai.
2. Technology of Finishing, Dr. V. A. Shenai.
3. Technology of Textile printing, R. S. Prayag
4. Textile Finishing, R. S. Prayag
5. Textile Finishing, Dr. Nalankilli

Course Outcome:

After learning the course the students should be able to

1. Know the object, significance and technical need of the textile printing; Different ingredients required to get print; various styles and methods of printing.
2. Know the process and methods of printing natural, regenerated as well as synthetic fibre fabrics by main three styles viz. direct, discharge and resist style of printing using suitable dyes.
3. Know the importance of fixation in printing and various fixation techniques i.e. steaming, ageing and curing.
4. Know the object, significance and technical need of the textile finishing; Classification of finishes applicable to textiles.
5. Know the principle, techno-chemical aspects and application process of different chemical finishes on natural, regenerated and synthetic textiles.
6. Know the principle, techno-physical aspects, machineries and application process of different mechanical finishes on natural, regenerated and synthetic textiles.

List of experiments:

1. To create "bandhani" effect using tie & die style of printing on cotton fabric using cold brand reactive dyes.
2. To create vein like effect on cotton fabric by batik style of printing using cold brand reactive dyes.
3. To produce tone in tone effect on cotton fabric using hot brand reactive dye.
4. To carry out direct style of printing on cotton fabric using cold brand reactive dye.
5. To carry out direct style of printing on cotton fabric using hot brand reactive dye.
6. To carry out printing of polyester fabric by direct style with disperse dyes.
7. To carry out white & colour discharge printing on polyester fabric.
8. To impart temporary and permanent stiff finish to the cotton fabric using suitable stiffening agents.
9. To carry out softening of cotton fabrics using various types of softeners.
10. To impart crease resistant and durable press finish to cotton fabrics.
11. To carry out delustering of lustrous material.
12. To impart water repellant finish on textiles using aluminum soap.

Open Ended Problems/Design Oriented Problems: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. To study the effect of twist on depth of shade in fabric printing.
2. To compare the colour yield achieved by different fixation methods in printing.
3. To study the impact of fabric construction on the final hand in fabric finishing.
4. To improve the water absorbency of woven and knitted fabrics.

Major equipments:
Water heating bath, padding mangle, oven, High temperature steamer, High pressure steamer, etc.

List of Open Source Software/learning website: http://nptel.iitm.ac.in, World Wide Web, Google Search Engine etc.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.