

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)

TEXTILE PROCESSING I

SUBJECT CODE: 2132904

B.E. SEMESTER III

Type of course: Engineering and Science

Prerequisite: Zeal to learn the subject

Rationale: This subject covers fundamentals of the preparatory processes of textile wet processing as well as colouration of textiles i.e. dyeing. The preparatory processes are indispensable part of wet processing to carry out further colouration and finishing of textiles

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
				PA	ALA	ESE	OEP			
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	General Idea About wet processing, function of each department. Flow of fabric from one department to another department.	02	4 %
2.	Object and technological aspects Various preparatory processes for cellulosic textiles such as grey inspection, stitching, shearing & cropping, singeing, desizing, scouring, bleaching, optical brightening, etc.	12	25 %
3.	Scouring & bleaching Natural fibres other than cellulose i.e. wool, silk, etc. and various synthetic fibres i.e. polyester, nylon, acrylic, etc.	05	11 %
4.	Machines used for pretreatment processes e.g. kier, jigger, J-box, Continuous range, etc.	04	8 %
5.	Scouring and Bleaching of blends e.g. cotton/polyester, cotton/viscose, polyester/wool, etc.	01	2 %
6.	Introduction to Dyeing Classification of colouring matters and their suitability to various fibres. Various terminologies and definitions related to dyeing process.	02	4 %
7.	Dyeing machines for loose fibres, yarns and fabric i.e. package dyeing machines, Jigger, Winch dyeing machine, padding mangles, beam dyeing machine, continuous dyeing machine, etc.	05	11 %
8.	Dyeing of cotton fabric with different classes of dyes viz. direct dyes, reactive dyes, vat dyes, sulphur dyes, etc.	05	11 %
9.	Dyeing of wool, silk, nylon and acrylic fabrics With acid, basic, metal complex and acid chrome dyes	05	11 %
10.	Dyeing of polyester fabric	03	6 %

	With disperse dyes by different methods		
11.	Dyeing of blended fabrics i.e. polyester/cellulosic, polyester/wool, cellulosic/wool, polyester/viscose, etc.	03	6 %
12.	New developments in preparatory processes and dyeing	01	1 %

Reference Books:

1. Technology of bleaching and mercerizing, Vol. III, V. A. Shenai
2. Textile scouring and bleaching, E. R. Trotman
3. Technology of Dyeing, Vol. IV, V. A. Shenai
4. Bleaching, Mercerizing and dyeing of cotton materials, R. S. Prayag

Course Outcome:

After learning the course the students should be able to

1. Understand the need, significance and detailed process of dry preparatory processes like Grey inspection, stitching, shearing & cropping, singeing, etc.
2. Understand the need, significance and detailed process of wet preparatory processes like desizing, scouring, bleaching, optical brightening, etc.
3. Analyze and Compare different methods for the said preparatory processes from techno-commercial point of view.
4. Know about various machineries used for various wet processes.
5. Get the knowledge of importance and technology of dyeing for textiles.
6. Learn different methods and processes for dyeing of various fibrous materials and their comparative aspects.

List of Experiments:

1. To carry out Acid and enzymatic Desizing of cotton fabric.
2. To carry out Oxidative Desizing of cotton fabric.
3. To carry out scouring of desized cotton fabric. (Open Bath)
4. To carry out scouring of desized cotton fabric. (Kier Scouring)
5. To carry out bleaching of scoured cotton fabric using sodium hypochlorite.
6. To carry out bleaching of scoured cotton fabric using hydrogen peroxide.
7. To carry out dyeing of cotton fabric using direct dye.
8. To carry out dyeing of cotton fabric using reactive dye.
9. To carry out dyeing of cotton fabric using vat dye.
10. To carry out dyeing of Nylon fabric using acid dye.
11. To carry out dyeing of polyester fabric using disperse dye.
12. To carry out dyeing of acrylic yarn using basic dye.

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. Optimization of caustic soda concentration in scouring of cotton fabric.
2. To study the effect of Sodium hypo chlorite concentration on strength of material in hypochlorite bleaching of cotton textiles.
3. Optimization of exhausting agent as regards depth of shade in reactive dyeing of cotton fabric.
4. Effect of denier on depth of shade in polyester dyeing with disperse dyes.

Major Equipments:

Water heating bath, kier, padding mangle, HTHP beaker dyeing machine, 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.