

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE ENGINEERING (25) ADVANCED PROCESSING: PROCESS & MACHINERY SUBJECT CODE: 2732505 M.E. 3rd SEMESTER

Type of course: Elective

Prerequisite: Basic knowledge of textile processing at BE level

Rationale: Chemical processing has now grown to such an extent that the fabric gets totally transformed. Newer chemical and newer methods of applying them and advanced knowledge of chemistry has made the chemical processing the most important step in the fabric manufacturing

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr. No	Content	Total Hrs	% Weightage
1	Pre-treatment machinery Shearing and Cropping machine, Various types of shearing machines for woven fabric, surface shearing for terry towels, carpets. Gas singeing machines for woven and knit goods, Scouring in open width form, CBR, J-Box.	6	10
2	Latest developments in mercerization, dyeing, printing and finishing machines. Advancements like, wet on wet application, auto dosing system, e-control, impregnators, washing units, extractors. High temperature garment dyeing machine. Machinery used for printing of garments & finishing of garments like fusing lamination. Advancements in machines for energy & water conservation	10	25
3	Factors to be considered in knit processing. Processing of Denim, chemistry and process of warp dyeing with indigo. Indigo dyeing equipments. Dyeing with mixture of indigo and other dyes. Finishing of Denim Fabrics and Garments.	10	25
4	Terry towel - Different stages of towel processing and finishing. Processing of Lyocell. Pretreatment, dyeing and finishing of lyocell. Concept of fibrillation, its causes and remedies. Processing of Fabric containing spandex. Wet processing of Cotton / Spandex, Viscose / Spandex, Nylon / Spandex, polyester / Spandex fabrics. Finishing of warp knits containing spandex fibres.	10	25
5	Carpet Processing - Different fibres suitable for carpets, types of carpets, essential properties of carpet fabric. Dyeing and printing of carpets. Mechanical and chemical finishing of carpets.	6	15

Reference Books:

1. Handbook of Textile processing machinery by R.S. Bhagwat

2. Engineering in Textile coloration by C. Duckworth
3. Processing of cotton knitted fabrics by M. Chakraborty, Amit Dayal and Prof. M. L. Gulrajani
4. Dyeing of polyester & its blends by Prof. M. L. Gulrajani
5. Denim a Fabric for All by dr. Parmar, NITRA
6. Journals: Textile Research Journal, Princeton, USA and Journal of Textile Institute, Manchester, UK.

Course Outcome:

After learning the course the students should be able to:

1. Become familiar with advanced fundamentals of processing machinery.
2. Apply the basic concepts to design and translate the design into prototype / product and also to analyze and interpret data related to various processing sequence
3. Understand the applications of various processing techniques for denim, knits carpet etc.
4. Understand the advances in chemical processing.

List of Experiments:

1. Pretreatment machinery
2. Mercerization and measurement of its efficiency
3. Various types modern dyeing machines
4. Various types modern printing machines
5. Knit processing
6. Denim dyeing and finishing
7. Processing of Lyocel
8. Processing of carpets
9. Processing terry towels
10. Processing of fabrics containing spandex

Design based Problems (DP)/Open Ended Problem:

- 1 Summarize various textile fabrics having special finishes
- 2 What are the latest developments towards water and energy conservation measures during wet processing?

Major Equipment:

As listed in list of experiment

List of Open Source Software/learning website:

<http://nptel.iitm.ac.in>, World Wide Web, Google Search Engine etc.

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.