

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE ENGINEERING (25)

TECHNICAL TEXTILE

SUBJECT CODE: 2732502

M.E. 3rd SEMESTER

Type of course: Elective

Prerequisite: Technical Textiles I and II at BE level

Rationale: Technical Textile has witnessed maximum growth rates in India and elsewhere. The application areas are widening every year due to efforts of research activity throughout the globe. Recent developments taken place in some of the important segments of technical textiles are covered in this course.

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	Introduction to technical textiles. Basic idea about various uses. Brief introduction to woven, knitted and nonwoven fabrics.	4	10
2	Introduction to nonwoven manufacturing. Various methods for web formation and bonding. Characteristics and properties of various nonwoven structures.	6	14
3	Textile and other filter media for dry and wet filtration. Mechanisms of separation. Requirements for good filter media and filtration and their performance assessment.	6	14
4	Selection of textile raw materials for various geotextiles applications. Design and development of various textile structures used for geotextiles applications.	6	14
5	Application of textile in medical. Quality assurance and compliances for different forms of medical textiles in line with international standards.	6	14
6	Design and development of textile reinforced plastics (Composites) for various applications in transportation.	4	10
7	Application of textile for protection. Intelligent textiles for protection. Sensor function, actuators, communication, wearable motherboards, data processing etc.	6	14
8	Design and development of coated textiles for different end use applications.	4	10

Reference Books:

1. Horrocks A.R. & Anand S. C., "Handbook of Technical Textile", The Textile Institute, 2000
2. Richard A. Scott, "Textiles for Protection", The Textile Institute, 2005
3. Sen A.K., "Coated Textiles: Principles and Applications", CRC Press, 2008

4. Journals: Textile Research Journal, Princeton, USA and Journal of Textile Institute, Manchester, UK.
5. Wellington Sears Handbook of Industrial Textiles, Ed. By S. Adanur

Course Outcome:

After learning the course the students should be able to:

1. Acquire more knowledge in fundamental concepts of production of nonwoven fabric manufacturing.
2. Acquire knowledge about various areas of application of technical textiles.
3. Learn advanced aspects of coating on technical textile materials.
4. Develop suitable model for experimental work.
5. Establish relationships amongst various fibre, yarn and fabric with the properties and product design of technical textiles.

List of Experiments:

1. Production methods of non woven fabrics
2. Characterization of non woven fabrics.
3. Fiber and fabric selection for filtration fabrics.
4. Mechanics of reinforcement, filtration and drainage by geotextiles
5. Application of textile in medical.
6. Study of various newer requirements of technical textiles for application in transportation.
7. Analyzing products for smart and intelligent textiles
8. Coating methods..

Design based Problems (DP)/Open Ended Problem:

1. Analyze critically fibre parameters affecting performance of nonwoven fabric for various applications.
2. What are the latest developments with respect to the application of technical textiles in medical field?
3. What are the recent developments in application of technical textiles in civil engineering area?

Major Equipment:

Nonwoven fabric production systems like needle punching, spun lacing, etc., Coating machine, Characterization equipment like air permeability tester, porosity etc

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.