

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: TEXTILE ENGINEERING

SUBJECT NAME: ADVANCED FABRIC MANUFACTURING

SUBJECT CODE: 3712511

M.E. 1st SEMESTER

Type of course : Core (II)

Prerequisite : Fabric manufacturing techniques at BE level

Rationale : Understanding of advanced methods of manufacturing fabric with newer application areas. The knowledge will help in identifying highly innovative areas for latest fabrics.

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)		
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Fabric manufacturing systems, Yarn quality and weavability, Yarn Preparation for High speed weaving, Preparation of high performance fibres/tows for weaving, Sizing of filament yarn	08	20
2	Shuttle less weaving systems: Advancements in each system with respect to productivity, yarn characteristics and fabric quality, energy requirement, design flexibility, applications and limitations	10	24
3	Specialty weaving: 3D weaving, Multilayer weaving, Spacer weaving, Circular Weaving, Honeycomb weaving, Denim manufacturing, Multiaxial weaving, Multiphase weaving, Leno Weaving, Properties and applications of fabrics produced in these systems.	10	24
4	Weft and warp knitted structures for technical applications, Braiding; biaxial and triaxial braids, 3D braiding, Structure, properties and applications of braided fabrics,	08	20
5	Developments in nonwoven technologies, Stitch bonding methods, Nonwoven composite fabrics, Electrospinning, 3D nonwovens.	06	12

Reference Books:

- 1 Advances in Modern Woven Fabrics Technology by Savvas Vassiliadis, InTech, 2011
- 2 Textile Technology, by Burkhard Wulforth, Thomas Gries and Dieter Veit, HANSER Publication, 2012

- 3 Handbook of weaving, by Sabit Adanur, Technomic publication, 2003
- 4 Handbook of Nonwoven, by S J Russel, Woodhead Publication, 2007
- 5 Advances in Knitting Technology by K F Au, Woodhead Publication, 2009

Course Outcome:

After learning the course the students should be able to:

1. Understand the principles and operations of various fabric manufacturing systems.
2. Apply knowledge to develop various products for technical applications.
3. Improve knowledge of manufacturing process of nonconventional fabrics for technical application.

List of Experiments:

1. To study latest development in shuttleless weaving machines.
2. To study Multilayer weaving.
3. To study 3D woven fabric.
4. To study multiaxial fabrics.
5. To study multiphase weaving.
6. To study 3D warp and weft knitted fabric.
7. To study Spacer fabric weaving.
8. To study 3D braiding.
9. To study Nonwoven composite fabric.
10. To study circular weaving.
11. To study leno weaving.

Major Equipment: Air jet loom, Rapier loom, Projectile loom, Water jet loom, 3 D fabric manufacturing, characterization lab for advanced fabric, handloom etc.

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