GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: TEXTILE ENGINEERING

SUBJECT NAME: NONWOVENS

SUBJECT CODE: 3712512

M.E. 1st SEMESTER

Type of course : Program Elective (I)

Prerequisite : Basic study of technical textile at BE level

Rationale : Nonwoven is becoming more and more in demand all over the world. In our country nonwoven industry is progressing at a much faster rate.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	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	Definitions of nonwoven and their scopes and limitations.	**1**	2
2	Staple fibre preparation processes. Staple fibre web formation processes: carding, air-laying, and wet-laying. Staple fibre web stacking processes: parallel-laying, cross-laying, and perpendicular-laying,	**3**	6
3	Mechanicalbonding processes: needle-punching and hydro entanglement. Thermal bonding processes: calendar, through-air, impingement, infra-red, and ultrasonic bonding. Chemical bonding process.Spunmelt processes: spunbonding and meltblowing,	**10**	28
4	Medical nonwovens: Product requirements, Technologicalprocesses, Material-process-structure-property correlation, Barrierproducts, Surgical gowns, Face mask, Absorbents, Recentdevelopments, Case studies.	**10**	26
5	Nonwoven filters: Product requirements, Technological processes, Material-process-structure-property correlation, Nonwoven air filters, Nonwoven liquid filters, Recent developments. Casestudies. Geononwovens: Functions and requirements, Technological processes, Material-process-structure-property correlation, Products made from geo non wovens, Recent developments. Casestudies. Automotive nonwovens: Requirements, Technological processes, Material-process-structure-property correlation, Automotive components made from nonwovens, Recent developments. Case studies.	**12**	26

6	Nonwoven wipes: Product requirements, Technological processes, Material-process-structure-property correlation, Products for foodservices, Automotive products, Medical products, Cleanroomproducts, Personal care products, Recent developments. Casestudies. Hygiene nonwovens: Product requirements, Technologicalprocesses, Material-process-structure-property correlation, Babycare products, Feminine hygiene products, Adult care products, Recent developments. Case studies.	**6**	10

Reference Books:

1. Handbook of Nonwoven, Ed. by S J Russel, Woodhead Publication, UK, 2007
2. S. Batra and B. Pourdeyhimi, Introduction to Nonwovens Technology, DEStech Publications,Inc., 2012.
3. W. Albrecht, H. Fuchs, and W. Kittelmann, Nonwoven Fabrics, Wiley-VCH,Germany, 2003.
4. V. R. Gowarikar, N. V. Viswanathan, and J. Sreedhar, Polymer Science, New AgeInternational (P) limited, New Delhi, 2006.
5. W. E. Morton and J. W. S. Hearle, Physical Properties of Textile Fibres, Fourth Edition,Woodhead Publishing Ltd., UK, , 2008.

Course Outcome:

After learning the course the students should be able to:

1. Understand advanced aspects of non-woven fabric manufacturing.
2. Apply the above knowledge for exploring applications.
3. Establish relationship between structure and properties of various types of non-woven fabric and their applications.

Open End Problems

1. Compare various techniques of manufacturing non-woven fabrics.
2. What are the latest developments on understanding structural aspects of non-woven fabric spun yarns made from other than Ring Spinning?
3. Establish relations between structure and properties of spun and filament yarns.

List of Experiments:

1. To study various types of laying methods
2. To study mechanical, thermal and chemical bonding methods
3. To study about medical textiles with their application areas.
4. To prepare a case study for use of textiles in multi-specialty hospital.
5. To prepare a case study for use of non-woven in filtration
6. To prepare a case study for use of non-woven in geo textile.

7. To prepare a case study for use of non-woven in automobile
8. To prepare a case study for use of non-woven in personal hygiene
9. To prepare a case study for use of non-woven in personal care products

Major Equipments: Blow room, Card, Needlepunching line, Mini extrusion plant, Thermal bonding,

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