GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)

MAN MADE FIBRE TECHNOLOGY

SUBJECT CODE: 2152907

B.E. 5th SEMESTER

Type of course: Engineering

Prerequisite: Students should have basic knowledge of man made fibres.

Rationale: Man made fibre technology covers the basics of different man made yarn formation techniques for speciality yarns and post spinning operations like texturising processes.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	0	3	70	20	10	0	0	0	100

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	Definition and classification of manufactured fibres. Introduction to fibre forming processes and products, properties and application areas.	1	2.38
2.	Structural principles of polymeric fibres, molecular size and interaction, polymers as fibres, plastics and rubbers, fibre morphology, thermal transition.	3	7.14
3.	Different tow-to-top conversion systems. Spin finish: - Properties and role of spin finish, components, and application techniques. Spin finish for staple fibre production and for filament yarn.	4	9.52
4.	Heat setting, nature of set- temporary and permanent. Heat setting of polyamide, polyester and cellulose acetate.	2	4.76
5.	Speciality polyamide and polyester like modified nylon and polyester. Antistatic nylon and polyester, flame retardant yarn, PET with microgrooves, microvoids and microcraters, super micro filament, fibres with non circular cross section and hollow fibre. high weight modulas yarn. Variant likes high performance crimp, inflated fibres – super absorbent, flame retardant, etc.	7	16.67
6.	Production of speciality fibres for technical textiles, Glass fibre & its manufacturing process, Aramid fibres, Metal fibres, Asbestos fibres – their types & properties, KYNOL fibres, Basofil fibres, Carbon fibres, Production and manufacturing of Tyre Cords	8	19.04
7.	Definition and concept of texturising, classification and characteristics of textured yarns	1	2.38

8.	**False Twist Texturising –** Classification of yarns, Methods of production of stretched(single heater) and modified stretched (double heater) yarns by conventional methods. Draw Texturising concept, sequential and simultaneous draw texturising, Study of simultaneous draw texturising process. Draw Texturising Machine Details: - Machine profiles, Twisting devices, Heaters, Cooling devices, Coning oil application, Process variables, Defects in draw textured yarns. Quality of draw textured yarns, technological developments in draw–texturising technology. Double density machine and multiple input shaft machines Advantages of draw textured yarns over conventional false twist textured yarns.	6	14.29
9.	**Air Jet Texturising -** Classification of yarns, Principle of loops formation, Air-jet texturising machine, air- jets, wetting systems, stabilizing devices, process variables in air texturising, Quality of air textured yarns, blending of filaments in air texturising.	4	9.52
10.	**Other methods of texturising -** Mechanisms and working of Edge crimping, Stuffer box crimping, Knit-de-knit, Gear Crimping, Chemical Texturising	4	9.52
11.	Recent developments in the fields of man made fibres and texturising	2	4.76

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	16	16	16	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Manufactured Fibre Technology, Edited by V. B. Gupta and V. K. Kothari (1997) Chapman and Hall, London.
2. Production of Synthetic Fibres, A.A.Vaidya, Prentice Hall of India Pvt. Ltd., New Delhi 1988.
3. Man-made Fibres Production,Processing Structure, Properties and Applications, Vol. I and II, V.B.Gupta and K.K.Kothari (Ed), Dept. of Textile Technology, IIT, New Delhi 1988
4. Production and Applications of Polypropylene Textiles – O. P. Rajgrat and F. Sevicik.
5. Man-Made Fibres, 6th ed. (1975); R.W. Moncrieff, J.J. Press
6. Textile Fibres - Vol.I, Dr. V. A. Shenai, Sevak Pub. 1990, Mumbai
7. NCUTE – Training Programme Book of Papers on Man Made Fibres.
8. Yarn Texturing Technology by J.W.S. Hearle, L. Hollick, D.K. Wilson Woodhead Publishing Ltd, England.
9. Textile Yarn, Technology, Structure and Application, Goswami B.C., Martindale, J.G., Scardino F.L., Wiley Interscience publication,1977, U.S.A.
10. Production of Textured Yarns by the False Twist Technique, Wilson D.K. and Kollu T., Textile Progress, Vol. 21, No.3, Textile Institute, Manchester, U.K.,1991.

11. Production of Textured Yarns by Methods Other than False Twist Technique, Wilson D.K.and Kollu T., Text. Prog., Vol. 16, No.3.Textile Institute, 1981.
12. Winter School on Man-made Fibers –Production, Processing, Structure, Properties and Applications, Gupta V.B. (Edr.), Vol.1, 1988.
13. Yarn Texturing Technology, Hes L. Ursiny P., Eurotex, U.K., 1994.
14. Yarn Texturising Technology – J. W. S. Hearle, Wilson, Woodhead Publishing Ltd., England.

Course Outcome:

After learning the course the students should be able to:

1. Know the structural properties of different fibres.
2. Set the tow-to-top converters for different staple lengths of fibres as per the requirements.
3. Produce the specialty yarns for different end use applications.
4. Control the quality of false twit textured yarns.
5. Control the quality of air-jet textured yarns.
6. Control the quality of different types of textured yarns.

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.