GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)
WOOLEN AND WORSTED SPINNING
SUBJECT CODE: 21629010
B.E. 6th SEMESTER

Type of course: Engineering

Prerequisite: Basic knowledge of fibres and related processes.

Rationale: This course covers the basics of wool fibres, yarn formation, fabric formation and chemical processing techniques.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	• History and economical background of wool industries. • Breeds of sheep and Indian wool. Wool of other countries. • Morphological structure and properties of wool fibre. • Noils, soft wastes, hard wastes, finishing wastes, recovered wools, method of recovery, rag picking and garneting.	4	9.52
2	Woolen yarn manufacturing – • Willowing, blending, oiling, teasing, carding and spinning. • Yarn number and wool grade. • Wool blends with man-made fibres • Recent developments	10	23.81
3	Worsted yarn manufacturing – • Worsted carding, backwashing, oiling, gilling or preparing. • Worsted combing. • Tow-to-top conversion systems, worsted drawing, worsted yarn spinning, norms and modern developments. • Recent developments	10	23.81
4	Weaving of woolen / worsted fabrics – • Projectile, rapier and other weaving machines used for the production of woven fabrics. • Knitted and nonwoven woolen fabrics, use of FAST in worsted garment manufacturing. • Recent developments	8	19.05
5	Chemical processing – • Carbonizing of wool batch and continuous methods of scouring wool	10	23.81

	fibre, yarn and fabric. • Peroxide and per-acetic acid bleach of wool. • Production of anti-shrink wool, basic principle of treatment and parameters. • Different processes like dyeing, printing and finishing used for woollen / worsted materials. • Different methods of testing and quality control of woollen processing. • Recent developments		

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	20	20	5	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. Blended Textiles, Textile Association (India), 1981.
2. Wool Hand Book vol. I & II by, Warner Von Besgen.
3. Wool Spinning, Vol. 1and 2, 1st Ed., Lepenkov Y , Mir Publisher, Moscow, 1983.
4. Woolen Yarn Manufacturing Textile Progress Vol.15 No.12.
5. Wool Handbook, vol.1 and 2, 3rd Ed., Bergen W V, Interscience publisher, London.
6. The Wool Handbook, 4th Ed., Teasdale D C, 1996.
7. Dyeing and Chemical Technology of Textile Fibres, Trotman E R, Charles Griffin and Co. Ltd., London, 1975

Course Outcome:

After learning the course the students should be able to:

1. Grade wool fibres.
2. Select the wool fibres on the basis of their properties to be required for different properties.
3. Work with the woolen yarn manufacturing system satisfactorily.
4. Work with the worsted yarn manufacturing system satisfactorily.
5. Work with the chemical processes used for woolen materials satisfactorily.
6. Maintain the qualities of products at the time of production.

List of Experiments:

1. Identification of wool fibres and their grading.
2. Layout of sequence of machines used for woolen yarn manufacturing.
3. Passage of material through different parts of machines used for woolen yarn manufacturing.
4. Detailed studies of all the machines used for woolen yarn manufacturing.
5. Layout of sequence of machines used for worsted yarn manufacturing.

6. Passage of material through different parts of machines used for worsted yarn manufacturing.
7. Detailed studies of all the machines used for worsted yarn manufacturing.
8. Detailed studies of important mechanisms of weaving machines used for weaving of woolen / worsted fabrics.
9. Carbonization of wool fibres.
10. Scouring of woolen / worsted fibres / yarns / fabrics.
11. Dyeing of woolen / worsted fibres / yarns / fabrics.
12. Printing of woolen / worsted fabrics.
13. Finishing of woolen / worsted fabrics.

Design based Problems (DP)/Open Ended Problem: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. Develop a drafting system of Gill Box.
2. Develop a prototype of mechanical auto-leveller.
3. Develop a prototype of beat-up mechanism of weaving machine.

Major Equipment:

Woolen / Worsted Spinning Machines
Weaving Machines

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.