GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE ENGINEERING (25)
THEORY AND DESIGN OF TEXTILE MACHINE I
SUBJECT CODE: 2712502
SEMESTER: I

Type of course: Core

Prerequisite: Basic knowledge of Theory and Design of spinning machines at BE level

Rationale: Theory and Design of Textile Machine I cover all the stages involved in the design modification of spinning machines from raw cotton to final stage of spinning

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Cotton fibre selection through bale management- Importance of atomization, Fiber quality requirements for different spinning technologies, Blending of fibers, Evaluation of blending efficiency	6	15
2	Concepts of opening and cleaning, Aerodynamics and its role in blow room	6	15
3	Technological consideration in the design of high production card, card wire geometry	6	15
4	Development in comber, speed frame and ring frame, Significance of modern developments in spinning process, Modern high speed draft spinning system, Influence of high draft on yarn quality, Design of bottom drafting roller, Selection criteria for aprons, cots, top rollers, Optimization of production speed	12	30
5	Comparative study of new spinning technology, Introduction to core spinning, cover spinning, siro spinning and compact spinning, Non conventional methods of yarn manufacture – Air vortex yarn etc	10	25

Reference Books:
1. The Economics, Science and Technology of Yarn Production, P. R. Lord, School of Textiles, NC State University, USA, 1981
2. Advances in Yarn Spinning Technology – C.A.Lawrence
3. Yarn Production: Theoretical aspects, P Grosberg & C Iype, The Textile Institute International, Manchester, 1999
4. Advances in Technology of Yarn Production - R. Chattopadhyay, NCUTE Publication
5. Handbook of Yarn Production – Peter R. Lord
6. TRJ, JTI and other technical journal Papers

Course Outcome:

After learning the course the students should be able to:

1. Apply the basic concepts to design and translate the design into prototype / product and also to analyze and interpret data related to textile design, manufacturing and quality analysis.
2. Demonstrate their ability to solve technical problems via technical approaches, self study, team work and life-long learning approaches.
3. Understand how high production with better yarn quality achieved with zone wise machine design modifications in spinning.
4. Understand importance of automation at each stage of spinning line.

List of Experiments:
1. To study the objectives of dedusting device and understand the working of different separators.
2. To understand importance of chute feed system compared to conventional lap feed.
3. To study the objectives autoleveller at card and draw frame in latest spinning machines.
4. To understand automation in spinning zone.
5. To analyze design modification at card to achieve high production.
6. To analyze drafting arrangement design modifications at draw frame, speed frame and ring frame.
7. Modern developments in rotor spinning

Open Ended Problems:

1. Explore recent developments in high performance ring frame.
2. What are the latest design developments at drafting stages for better quality of yarn at high production rate?
3. What are the latest automations in modern blow room to enhance yarn realization?
4. Analyze the latest modifications at comber to upgrade the quality of yarn.

Major Equipments : Card, Draw frame, Speed frame, Ring frame, Rotor

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