

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE ENGINEERING (25) THEORY OF YARN MANUFACTURE SUBJECT CODE: 2722502 SEMESTER: II

Type of course: Elective

Prerequisite: Theory of Yarn Manufacture at BE level

Rationale: Understanding of yarn manufacturing processes is required to enhance overall functioning of various spinning processes.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (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	Forces on fibers during opening and cleaning processes and its effect	4	10
2	Analysis of cylinder load and transfer efficiency, Fibre configuration in card	8	20
3	Analysis of Fibre configuration in draw frame sliver, Hook removal and its significance, Sliver irregularity, Fibre movement in drafting field, Suppression of drafting wave, Drafting force, Roller slip, Roller eccentricity and vibration	10	25
4	Fibre fraction in comber, Combing performance	4	10
5	Analysis of forces on yarn and traveler, Spinning tension in ring and rotor spinning, Spinning geometry, Twist flow in ring and rotor spinning, Balloon theory in spinning, property relationship of rotor, yarn formation in rotor spinning	10	25
6	Air jet and friction spun yarns, Classification of rotor and air jet yarn. Developments in compact spun yarns.	4	10

Reference Books:

1. Yarn Production: Theoretical aspects, P Grosberg & C Iype, The Textile Institute International, Manchester, 1999
2. The Economics, Science and Technology of Yarn Production, P. R. Lord, School of Textiles, NC State University, USA, 1981
3. Advances in Yarn Spinning Technology – C.A.Lawrence
4. Handbook of Yarn Production – Peter R. Lord
5. Journals: Textile Research Journal, Princeton, USA and Journal of Textile Institute, Manchester, UK.

Course Outcome:

After learning the course the students should be able to:

1. Understand basics of yarn manufacturing of spun yarns.
2. Apply the yarn manufacturing knowledge for understanding behavior during and after spinning.
3. Establish relationship between manufacturing processes and properties of yarn.
4. Develop suitable design for experimental work.
5. Demonstrate their ability to solve technical problems via technical approaches, self study, team work and life-long learning approaches.

List of Experiments:

1. Analyze the importance of each stage draft in rotor spinning related to yarn quality.
2. To study effect of drafting force at draw frame.
3. Study zone wise yarn tension at ring spinning.
4. To find different cases of fibre integration into yarn at rotor spinning
5. To find forces involved in ring, rotor and friction spinning process.
6. To study assembly of fibres in rotor groove.

Open End Problems

1. Explore high performance yarn manufacturing process.
2. What are the latest drafting roller modifications for desired drafting force to produce better quality of yarn at high production rate?
3. Analyze various ways to optimize rotor spinning process parameters for economic yarn production.

Major Equipments: Card, Draw frame, Ring frame, Rotor, Friction Spinning, Air jet Spinning, yarn tension tester, Microscope - optical and projection

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

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.