GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3172918

Semester: VII
Subject Name: Advanced Spinning Technology

Type of course : Professional Elective Course

Prerequisite : Students should have knowledge of yarn manufacturing process.

Rationale : Spinning techniques other than Ring spinning is gaining popularity due to its unique yarn characteristics, performance properties and lower costs. The yarns so manufactured are being used for various applications hence making it important to understand the advanced spinning systems.

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)	
4	0	0	4	70	30	0	0	100

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Content	Total Hrs
1	**Rotor Spinning:** Introduction of rotor spinning, limitations of ring spinning, raw material requirement, operating principle of rotor spinning system, spinning box: sliver feed, opening unit, trash removal, fiber transport to the rotor, fiber transport to the fiber collecting groove in the rotor, yarn formation and twist insertion, rotor speed and diameter, rotor cleaning, rotor drive, yarn take off, package formation. Mechanism of yarn formation, the configuration and the properties of the different rotor and groove shape, range of application of draw off nozzles and draw off tubes, parameters influencing yarn structure and quality, structure and properties of rotor spun yarn, recent developments in rotor spinning, applications of rotor spun yarn, draft and production calculation.	10
2	**Friction Spinning:** Operating principle, raw material requirement, stages of the yarn formation, yarn structure of friction spun yarn, working principle of friction spinning systems like DREF-1, DREF-2, DREF-3, DREF-5 DREF-2000 and DREF-3000. advantage and disadvantage of friction spinning, application of friction spun yarn, recent developments in friction spinning.	8
3	**Air jet Spinning:** Introduction, raw material requirements, working principle of air jet spinning. working principle of Murata Air jet spinning system, MJS, MTS and MVS spinning systems. Influence of process parameters on yarn properties, yarn structure, yarn properties and end use	8

	applications of air jet spun yarn.	
4	**Condensed Yarn Spinning:** Operating principle and raw material requirement, advantages and disadvantages of this process, study of various compact spinning techniques like Comfor spinning, EliTe spinning system. yarn properties.	5
5	**Twistless Spinning or Adhesive Process:** Twilo process and Bobtex process operating Principle, raw material requirement, end use application of yarns.	5
6	**Spinning of Long Staple Fibers:** Introduction, spinning process, problems in processing of long staple fibers, Yarn quality and Production.	2
7	**Spinning of Dyed Fibers:** Introduction, fiber dyeing, requirements for spinning of dyed fibers, problems, waste, production and yarn quality.	2
8	**Other Spinning Systems:** Introduction of wrap spinning, siro yarn spinning, solo spun yarn spinning, production of core spun yarn, self twist spinning, electro-static spinning, raw material requirements, operating principles and properties of yarn produced by using this spinning process, end use application of yarn and some important advantages and disadvantages of these spinning system.	13
9	Comparison amongst various spinning systems in the aspects of count range, production speed, yarn tension, twist insertion rate, efficiency, flexibility and quality, yarn structure and yarn properties.	3

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	25	30	5	0	0

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. Manual of Textile Technology, Volume 5, 6, W. Klein, The Textile Institute, Manchester, 1993.
2. Advances in Yarn Spinning Technology, Edited by C A Lawrence, Woodhead Publishing Series in Textiles No.99.
3. Open End Spinning, V. Rohlena, Elsevier Scientific Publishing Company, 1975.
4. Open End Spinning, R. Nield, The Textile Institute, Manchester, 1975.
5. Rotor Spinning: Technical and Economical Aspects, Eric Dyson, The Textile Institute, 1975.
6. New Spinning Systems, R V Mahendra Gowda, NCUTE Publication, 2003.
7. Spinning of Manmades and Blends on Cotton System, By K. R. Salhotra, The Textile Association India, 2004.

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Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Describe the open end spinning techniques for the production of yarn and its operating principles.	35
CO-2	Describe the other spinning techniques used for the production of the yarn and their operating principles.	35
CO-3	State the various applications of yarns based of their manufacturing process and properties.	10
CO-4	Compare the various spinning systems and the properties of the yarns produces by using various techniques.	10
CO-5	State the latest developments in alternative Spinning processes.	10

List of Open Source Software/learning website : Any Search Engine, NPTEL, Swayam portal etc.