ANNEXURE –I

Syllabus of III and IV Semester Courses for Four-Year Multidisciplinary Undergraduate B.Tech. Degree Programme in Textile Engineering

(In view of NEP-2020)

For students admitted in academic session 2025-26 and onwards



03/09/2026

SHRI JAWAHARLAL DARDA EDUCATION SOCIETY'S
JAWAHARLAL DARDA
INSTITUTE OF ENGINEERING AND TECHNOLOGY, YAVATMAL
AN AUTONOMOUS INSTITUTE
Affiliated to Sant Gadge Baba Amravati University, Approved by AICTE, New Delhi and DTE Maharashtra
93VP+PWF: P6, MIDC Area, Lohara, Yavatmal - 445 001, Maharashtra (www.jdiet.ac.in)

1. Department Vision:

To achieve regional and national recognition for excellence in textile engineering education through quality teaching, research and industry collaboration, contributing to employment, entrepreneurship, societal and sustainable development.

2. Department Mission

1. To adopt contemporary teaching–learning methods for developing competent and skilled textile engineers.
2. To promote multidisciplinary approach, research and industry collaborations for enhancing employability and entrepreneurship.
3. To practice inclusive and ethical learning environment fostering lifelong learning and sustainability awareness.
4. To provide experiential and outreach activities benefiting industry and society.

3. Programme Education Objectives

PEO 1: Graduate will achieve professional excellence as competent engineers and entrepreneurs in textile and allied sectors through strong technical knowledge and problem solving skills.

PEO 2: Graduate will pursue higher education, research or continuous professional development for lifelong learning, innovation, and industry advancement.

PEO 3: Graduate will demonstrate ethical behaviour, leadership qualities and effective teamwork while contributing to industrial, entrepreneurial and societal development.

PEO 4: Graduate will adapt to evolving technologies, sustainability practices and global challenges in textile and allied sectors.

4. SDG of United Nation

1. **No Poverty:** End poverty in all its forms everywhere.
2. **Zero Hunger:** End hunger, achieve food security, improve nutrition, and promote sustainable agriculture.
3. **Good Health and Well-being:** Ensure healthy lives and promote well-being for all at all ages.
4. **Quality Education:** Ensure inclusive and equitable quality education and promote lifelong learning opportunities.
5. **Gender Equality:** Achieve gender equality and empower all women and girls.
6. **Clean Water and Sanitation:** Ensure availability and sustainable management of water and sanitation for all.
7. **Affordable and Clean Energy:** Ensure access to affordable, reliable, sustainable, and modern energy.

8. **Decent Work and Economic Growth:** Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work.
9. **Industry, Innovation, and Infrastructure:** Build resilient infrastructure, promote sustainable industrialization, and foster innovation.
10. **Reduced Inequalities:** Reduce inequality within and among countries.
11. **Sustainable Cities and Communities:** Make cities and human settlements inclusive, safe, resilient, and sustainable.
12. **Responsible Consumption and Production:** Ensure sustainable consumption and production patterns.
13. **Climate Action:** Take urgent action to combat climate change and its impacts.
14. **Life Below Water:** Conserve and sustainably use oceans, seas, and marine resources.
15. **Life on Land:** Protect, restore, and promote sustainable use of terrestrial ecosystems, forests, and biodiversity.
16. **Peace, Justice, and Strong Institutions:** Promote peaceful and inclusive societies, provide access to justice, and build effective, accountable institutions.
17. **Partnerships for the Goals:** Strengthen the means of implementation and revitalize the global partnership for sustainable development.

5. WK: Washington Accord Knowledge Profile-Attributes for engineering program

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.

WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.

WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

WK9: Ethics, inclusive behaviour and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

6. Programme Outcomes (NBA, Jan 2025)

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development.

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required.

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions.

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems.

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment.

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws.

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic

decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change.

7. Programme Specific Indicators

Manmade Fibre & Yarn Industry

1. Knowledge and Understanding of fibre and yarn processes.
2. Familiarity with fibre and yarn machineries operation and settings.
3. Knowledge of fibre types, yarn properties, and fabric behaviour in manmade fibre and yarn industry.
4. Knowledge and Use of textile testing equipment for fibre and yarn.
5. Knowledge of quality control and assurance protocols regarding fibre and yarn.
6. Understanding of academic/lab procedures and curriculum of fibre and yarn.
7. Fabric behaviour knowledge, design compatibility, sustainability factors for Fashion & Fabric Consultancy awareness.
8. Sampling process, costing basics, buyer communication, BOM/tech pack handling for Apparel Merchandising Skills.
9. Knowledge of Concepts of productivity (efficiency, utilization, waste reduction).
10. Knowledge of basic troubleshooting and preventive maintenance of spinning, weaving, knitting, and dyeing machines.
11. Knowledge of Basic dyeing, printing, finishing processes.
12. Knowledge of Chemical handling, effluent treatment, colourfastness testing.
13. Knowledge of Weave structures, knitting types, fabric density, defects identification for Fabric Construction and Analysis.
14. Knowledge of Natural, synthetic, blends, recycled and technical fibres.

Spinning Industry

15. Knowledge and Understanding of spinning processes.
16. Familiarity with spinning machineries operation and settings.
17. Knowledge of fibre types, yarn properties, and its behaviour for spinning.
18. Knowledge and Use of textile testing equipment for yarn
19. Knowledge of quality control and assurance protocols of spinning department.

Weaving Industry

20. Knowledge and Understanding of weaving processes.
21. Familiarity with weaving machinery operation and settings.
22. Knowledge of fibre types, yarn properties, and fabric behaviour for preparation of fabric.

23. Ability to maintain machine logs, quality records, and compliance documents for weaving department.
24. Coordination across departments like QA, production, design, sourcing for fabric.

Knitting Industry

25. Knowledge and Understanding of knitting processes.
26. Familiarity with knitting machinery operation and settings.
27. Knowledge of fibre types, yarn properties, and fabric behaviour for knitted fabric.
28. Knowledge and Use of textile testing equipment for knitted fabric.
29. Knowledge of quality control and assurance protocols for knitted fabric.
30. Ability to maintain machine logs, quality records and compliance documents in knitting department.
31. Coordination across departments like QA, production, design, sourcing for knitted fabric.

Nonwoven Industry

32. Knowledge and Understanding of non-woven processes.
33. Familiarity with non-woven fabric manufacturing machinery operation and settings.
34. Knowledge of fibre types, yarn properties, and fabric behaviour for making non-woven fabric.
35. Ability to maintain machine logs, quality records and compliance documents in non-woven production department.
36. Coordination across departments like QA, production, design, sourcing for non-woven fabric.

Textile Wet Processing Industry

37. Knowledge and Understanding of textile wet processes.
38. Familiarity with chemical processing machinery operation and settings.
39. Knowledge of fibre types, yarn properties and fabric behaviour for processed fabric.
40. Awareness of lean manufacturing and cost reduction strategies in chemical processing department.
41. Basic knowledge of Excel, ERP systems and production reports.

Technical Textiles Industry

42. Awareness of national/international standards (ISO, BIS, OEKO- TEX, GOTS) for technical textile product.
43. Ability to support production planning and line balancing for technical textile.
44. Skills in process monitoring and troubleshooting.
45. Exposure to technical textiles, functional finishes, smart textiles.

Garment Manufacturing Industry

46. Basic garment manufacturing techniques (cutting, stitching, finishing).
47. Understanding of eco-friendly materials, water/waste

management.

48. Familiarity with environmental and safety standards in garment industry.

Home Textiles

49. Skills in process monitoring and troubleshooting in home textile industries.
50. Awareness of lean manufacturing and cost reduction strategies in home textile industries.
51. Basic knowledge of Excel, ERP systems and production reports in home textile industries.

Apparel Merchandising

52. Basic garment manufacturing techniques (cutting, stitching, finishing) for marketing and merchandising.
53. Exposure to tech pack preparation and BOM (Bill of Materials) for marketing and merchandising.
54. Ability to communicate with buyers, vendors, designers and teams for apparel.
55. Basic knowledge of Excel, ERP systems, and production reports for merchandising.
56. Ability to support production planning and line balancing in merchandising.

Textile Machine Manufacturing

57. Ability to support production planning and line balancing in Textile Machine manufacturing industries.
58. Exposure to technical textiles, functional finishes, smart textiles for making machines.

Textile Products Sales, Servicing and Marketing

59. Awareness of national/international standards (ISO, BIS, OEKO- TEX, GOTS) for textile product, sales, servicing and marketing
60. Ability to support production planning and line balancing for textile product, sales, servicing and marketing.

Textile Education & Research Institutes

61. Knowledge and Use of textile testing equipment in Textile Education and research institutes.
62. Participation in R&D, prototyping, and new product development.
63. Knowledge of quality control and assurance protocols in Textile Education

Government and Public Sectors

64. Skills in process monitoring and troubleshooting in Government sectors like Ministry of textiles, DRDO
65. Participation in R&D, prototyping, and new product development in challenging area of government schemes

Textile Certifications

66. Knowledge and Use of textile testing equipment for certification.

67. Awareness of national/international standards (ISO, BIS, OEKO- TEX, GOTS) for certification.
68. Knowledge of quality control and assurance protocols for certification

Fashion and Apparel Designing/Consultants

69. Basic garment manufacturing techniques (cutting, stitching, finishing) for making garment.
70. Exposure to tech pack preparation and BOM (Bill of Materials) for competing complete order.
71. Knowledge of Fashion design/CAD softwares for fashion designing and ERP systems for automatic operations in garment industry.
72. Proficiency in MS Office, Excel, for preparation of reports.
73. Basic knowledge of Excel, ERP systems and production reports for garment production.

Basic Science

74. Apply mathematical techniques such as algebra, trigonometry, calculus, differential equations, linear algebra, probability and statistics to solve problems.
75. Apply physical principles such as motion, forces, energy and materials to solve problems.
76. Apply knowledge of chemical properties and reactions for construction material and environment (Corrosion, polymer, electrochemistry etc.).

Engineering Science Courses

77. Demonstrate proficiency in basic workshop operations (fitting, carpentry, welding, sheet metal, plumbing and machining etc.).
78. Apply the principles of engineering mechanics to analyse and solve problems involving forces, moment, equilibrium, friction, centred and MOI etc.
79. Apply the principles electrical engineering to analyse and maintain electrical systems, circuits, machines and power systems.
80. Demonstrate ability to interpreted and created draw ings using geometric constructions, orthographic projections, isometric projections and CAD tools.
81. Demonstrate ability to apply fundamental principles of algorithms, programming, data structures and computing system to solve conceptual problems.

Generic Competencies (Textile Engineering)

A. Problem-Solving Skills

82. Analytical Thinking: Ability to analyze complex problems, break them down into smaller components, and find effective solutions.
83. Critical Thinking: Ability to evaluate multiple solutions to a problem and choose the best course of action based on available data, safety, and cost-efficiency.

B. Communication Skills

84. Oral Communication: Ability to communicate complex technical information clearly to a variety of audiences, including clients, stakeholders, contractors, and team members.
85. Written Communication: Proficiency in drafting reports, proposals, technical specifications, and documentation that are clear, concise, and accurate.
86. Interpersonal Communication: Ability to collaborate effectively with multidisciplinary teams, clients, and project stakeholders.

C. Project Management

87. Time Management: Efficiently managing time and prioritizing tasks to meet deadlines in a dynamic project environment.
88. Resource Management: Ability to plan, allocate, and manage resources such as labour, materials, and equipment to ensure project efficiency.
89. Budgeting and Cost Control: Skills in estimating project costs, monitoring budgets, and ensuring projects are completed within financial constraints.
90. Risk Management: Ability to identify, assess, and mitigate risks during the planning and execution of engineering projects.

D. Teamwork and Leadership

91. Team Collaboration: Working effectively as part of a team, contributing to the success of the project through collaboration, open communication, and respect for others' expertise.
92. Leadership Skills: Leading and motivating a team of engineers, contractors, and other stakeholders to meet project goals and deadlines.
93. Conflict Resolution: Ability to resolve conflicts between team members, clients, or contractors, ensuring that project objectives are still achieved.

E. Attention to Detail

94. Accuracy: Ensuring all engineering calculations, designs, and project plans are accurate and align with weave and design og fabric, regulations, and standards.
95. Quality Assurance: Ensuring that the materials and processes used in construction adhere to high standards of quality and safety.

F. Ethical and Professional Integrity

96. Ethical Decision Making: Adhering to a strict code of ethics, ensuring public safety, environmental protection, and transparency in all dealings.
97. Accountability: Taking responsibility for the success or failure of a project, being proactive in addressing issues, and delivering results.

G. Adaptability and Flexibility

98. Openness to Change: Being able to adapt to new technologies, tools, and methods, as well as evolving project requirements or environmental conditions.
99. Learning and Development: Actively seeking opportunities for professional growth, staying current with industry trends, and acquiring new skills to remain competitive.

H. Creativity and Innovation

100. Creative Problem Solving: Thinking outside the box and coming up with novel solutions to engineering challenges.
101. Innovative Design: Contributing new ideas for designs and processes that can improve efficiency, reduce costs, or make better use of resources.

I. Cultural and Environmental Awareness

102. Sustainability Awareness: Knowledge of sustainable construction methods, green building practices and the importance of reducing the environmental impact of engineering projects.
103. Cultural Sensitivity: Understanding and respecting cultural differences when working in diverse teams or international projects.
104. Environmental Impact Understanding: Considering the environmental consequences of engineering decisions and striving to minimize negative impacts through design and construction methods.

J. Decision-Making Skills

105. Data-Driven Decisions: Using available data, facts, and technical analysis to make informed decisions about the design, execution, and management of projects.
106. Prioritizing Decisions: Knowing which decisions need immediate attention and which can be deferred, especially in a high-pressure environment.

K. Regulatory and Legal Knowledge

107. Familiarity with Building Codes and Standards: Understanding and ensuring compliance with local, national, and international building codes, safety regulations, and legal standards.
108. Health and Safety: Knowledge of safety regulations and best practices for ensuring the health and safety of workers, the public, and the environment throughout the project lifecycle.

L. Client-Focused Mindset

109. Client Management: Building and maintaining strong relationships with clients, understanding their needs, and ensuring their expectations are met throughout the project.
110. Customer Service Orientation: Ensuring that client concerns are addressed promptly, and working toward providing value-added solutions that meet their goals.

8. Scheme of Textile Engineering Department

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - I (First Year) [Group - A/B]

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Mathematics - I	BSC	1SH101BS1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Applied Physics	BSC	1SH102BS1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
3	Programming for Problem Solving	ESC	1CS103ES1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
4	Engineering Mechanics	ESC	1CE104ES1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
5	Applied Physics Lab	BSC	1SH105BS1	0	0	2	0	2	1					25	25	50	25	50	
6	Programming for Problem Solving Lab	ESC	1CS106ES1	0	0	2	0	2	1					25	25	50	25	50	
7	Engineering Mechanics Lab	ESC	1CE107ES1	0	0	2	0	2	1					25	25	50	25	50	
8	Workshop	ESC	1ME108ES1	0	0	2	0	2	1					25	25	50	25	50	
9	Fashion Designing	VSC	1TX109VS1	1	0	2	1	4	2						50	50	25	50	
10	English Communication	AEC	1SH110AE1	1	0	2	1	4	2					25	25	50	25	50	
11	Sports & Yoga	CC	1SH111CC1	0	0	4	0	4	2						50	50	25	50	
Total				**14**	**0**	**16**	**14**	**44**	**22**			**400**				**350**		**750**	

Notional Learning Hours: [Workload (teaching/guidance/practicum) 30x15 = 450 Hrs] + [Learner-engaged time 14x15 = 210 Hrs]

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - II (First Year) [Group - A/B]

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Mathematics - II	BSC	2SH112BS1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Applied Chemistry	BSC	2SH113BS1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
3	Basic Electrical Engineering	ESC	2EE114ES1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
4	Engineering Graphics	ESC	2ME115ES1	2	0	0	2	4	2	60	40	100	40					100	4 Hrs.
5	Textile Materials and products	PCC	2TX116PC1	1	0	2	1	4	2						50	50	25	50	
6	Cultural Aesthetics in Indian Textile Design	IKS	2TX117IK1	1	0	2	1	4	2						50	50	25	50	
7	Applied Chemistry - Lab	BSC	2SH118BS1	0	0	2	0	2	1					25	25	50	25	50	
8	Basic Electrical Engineering - Lab	ESC	2EE119ES1	0	0	2	0	2	1					25	25	50	25	50	
9	Engineering Graphics/CAD Lab	ESC	2ME120ES1	0	0	2	0	2	1					25	25	50	25	50	
10	Universal Human values	SEC	2SH121VS1	1	0	2	1	4	2						50	50	25	50	
11	Digital Wellness	CC	2SH122CC1	1	0	2	1	4	2						50	50	25	50	
Total				**15**	**0**	**14**	**15**	**44**	**22**			**400**				**350**		**750**	

Notional Learning Hours: [Workload (teaching/guidance/practicum) 29x15 = 435 Hrs] + [Learner-engaged time 15x15 = 225 Hrs]

Exit Option (Level 4.5) for Undergraduate Certificate in Odd Semester of next Academic Year as approved by BOS																			
12	Testing of Textile Materials	EC	3TX123EC1	2	0	4	2	8	4	30	20	50	20	25	25	50	25	100	2 Hrs.
13	Fabric and Garment Inspection	EC	3TX124EC1	2	0	4	2	8	4	30	20	50	20	25	25	50	25	100	2 Hrs.
OR																			
14	Internship / Apprenticeship in Industry	EI	3TX125EI1	0	0	16	0	288	8					100	100	200	100	200	
OR																			
15	Two MOOC/NPTEL Courses	EC	3TX126OC1_	8	0	0	8	16	8										

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - III (Second Year)

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Yarn Manufacturing-I	PCC	3TX201PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Textile Fibre-I	PCC	3TX202PC1	2	0	0	2	4	2	60	40	100	40					100	3 Hrs.
3	Fabric Manufacturing -I	PCC	3TX203PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
4	Multidisciplinary Minor - I	MDM	3TX204MD1	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
5	Open Elective - I	OE-I	3SH205OE1/2	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
6	Yarn Manufacturing-I Lab	PCC	3TX206PC1	0	0	2	0	2	1					25	25	50	25	50	
7	Textile Fibre-I Lab	PCC	3TX207PC1	0	0	2	0	2	1					25	25	50	25	50	
8	Fabric Manufacturing -I Lab	PCC	3TX208PC1	0	0	2	0	2	1					25	25	50	25	50	
9	Principles of Managements	EEM	3TX209EM1	2	0	0	2	4	2						50	50	25	50	
10	Constitutional Values and Fundamental Duties	VEC	3SH210VE1	2	0	0	2	4	2						50	50	25	50	
11	Field Project	FP	3TX400FP1	0	0	4	0	4	2					25	25	50	25	50	
12	Disaster Management and Preparedness	NC	3ALE001NC1	2	0	0	0	2	-						50	50	25	50	
Total				**19**	**0**	**10**	**17**	**46**	**22**			**450**				**300**		**750**	
Notional Learning Hours : [Workload (teaching/guidance/practicum) 29x15 = 435 Hrs] + [Learner-engaged time 17x15 = 255 Hrs]																			
Optional Course for Double Minor / Honours Degree																			
13	Double Minor / Honours Course - I	DH	3TX211DH1/DH2	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - IV (Second Year)

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Textile Fiber-II	PCC	4TX212PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Yarn Manufacturing-II	PCC	4TX213PC1	2	0	0	2	4	2	60	40	100	40					100	3 Hrs.
3	Fabric Manufacturing -II	PCC	4TX214PC1	2	0	0	2	4	2	60	40	100	40					100	3 Hrs.
4	Multidisciplinary Minor - II	MDM	4TX215MD1	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
5	Open Elective - II	OE	4SH216OE1/2	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
6	Yarn Manufacturing-II Lab	PCC	4TX217PC1	0	0	2	0	2	1					25	25	50	25	50	
7	Fabric Manufacturing -II Lab	PCC	4TX218PC1	0	0	2	0	2	1					25	25	50	25	50	
8	Garment Manufacturing Technology	VSC	4TX219VS1	0	0	4	0	4	2						50	50	25	50	
9	Technical Writing	AEC	4SH220AE1	1	0	2	1	4	2						50	50	25	50	
10	Elements of Costing and Economics	EEM	4SH221EM1	1	0	2	1	4	2						50	50	25	50	
11	Environmental Science	VEC	4CE222VE1	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
Total				**16**	**0**	**12**	**16**	**44**	**22**			**500**				**250**		**750**	
Notional Learning Hours: [Workload (teaching/guidance/practicum) 28x15 = 420 Hrs] + [Learner-engaged time 16x15 = 240 Hrs]																			
Optional Course for Double Minor / Honours Degree																			
12	Double Minor / Honours Course - II	DH	4TX223DH_	4	0	0	4	8	4	60	40	100	40					100	3 Hrs.
Exit Option (Level 5) for Undergraduate Diploma in Odd Semester of next Academic Year as approved by BOS																			
13	Chemical Processing of Textile materials	EC	5TX224EC1	2	0	4	2	8	4	30	20	50	20	25	25	50	25	100	2 Hrs.
14	Modern Yarn and Fabric Manufacturing Technology	EC	5TX225EC1	2	0	4	2	8	4	30	20	50	20	25	25	50	25	100	2 Hrs.
OR																			
15	Internship / Apprenticeship in Industry	EI	5TX226EI1	0	0	16	0	288	8					100	100	200	100	200	
OR																			
16	Two MOOC/NPTEL Courses	EC	5TX227OC_	8	0	0	8	16	8										

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - V (Third Year)

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Fabric Structure and Design	PCC	5TX228PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Textile Testing- I	PCC	5TX229PC1	3	1	0	4	8	4	60	40	100	40					100	3 Hrs.
3	Advance Yarn Manufacturing Technology	PCC	5TX230PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
4	Programme Elective Course - I	PEC	5TX231PE_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
5	Multidisciplinary Minor - III	MDM	5TX232MD_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
6	Open Elective - III	OE	5SH233OE1/2	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
7	Fabric structure and design - Lab	PCC	5TX234PC1	0	0	2	0	2	1					25	25	50	25	50	
8	Textile Testing- I - Lab	PCC	5TX235PC1	0	0	2	0	2	1					25	25	50	25	50	
9	Programme Elective Course - I - Lab	PEC	5TX236PE_	0	0	2	0	2	1					25	25	50	25	50	
10	Multidisciplinary Minor - III - Lab	MDM	5TX237MD_	0	0	2	0	2	1					25	25	50	25	50	
Total				**17**	**1**	**8**	**18**	**44**	**22**			**550**				**200**		**750**	

Notional Learning Hours: [Workload (teaching/guidance/practicum) 26x15 = 390 Hrs] + [Learner-engaged time 18x15 = 270 Hrs]

Optional Course for Double Minor / Honours Degree																			
11	Double Minor / Honours Course - III	DH	5TX238DH_	4	0	0	4	8	4	60	40	100	40					100	3 Hrs.

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)
Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme
Semester - VI (Third Year)

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Textile Testing- II	PCC	6TX239PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Advance Fabric Manufacturing Technology	PCC	6TX240PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
3	Fundamentals & Applications of Technical Textiles	PCC	6TX241PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
4	Programme Elective Course - II	PEC	6TX242PE_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
5	Programme Elective Course - III	PEC	6TX243PE_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
6	Multidisciplinary Minor - IV	MDM	6TX244MD_	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
7	Textile Testing- II Lab	PCC	6TX245PC1	0	0	2	0	2	1					25	25	50	25	50	
8	Advance Fabric Manufacturing Technology - Lab	PCC	6TX246PC1	0	0	2	0	2	1					25	25	50	25	50	
9	Programme Elective Course - II - Lab	PEC	6TX247PE_	0	0	2	0	2	1					25	25	50	25	50	
10	Personal Skills (GD& PI)	SEC	6SH248VS1	1	0	2	1	4	2						50	50	25	50	
Total				**18**	**0**	**8**	**18**	**44**	**22**			**550**				**200**		**750**	
Notional Learning Hours: [Workload (teaching/guidance/practicum) 26x15 = 390 Hrs] + [Learner-engaged time 18x15 = 270 Hrs]																			
Optional Course for Double Minor / Honours Degree																			
11	Double Minor / Honours Course - IV	DH	6TX249DH_	4	0	0	4	8	4	60	40	100	40					100	3 Hrs.
Exit Option (Level 5.5) for B. Voc in Odd Semester of next Academic Year as approved by BOS																			
12	Knitting	EC	7TX250EC1	2	0	4	2	8	4	30	20	50	20	25	25	50	25	100	2 Hrs.
13	Nonwovens and Technical Textiles	EC	7TX251EC1	2	0	4	2	8	4	30	20	50	20	25	25	50	25	100	2 Hrs.
OR																			
14	Internship / Apprenticeship in Industry	EI	7TX252EI1	0	0	16	0	288	8					100	100	200	100	200	
OR																			
15	Two MOOC/NPTEL Courses	EC	7TX253OC_	8	0	0	8	16	8										

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - VII (Final Year)

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Textile Mathematics	PCC	7TX301PC1	2	0	0	2	4	2	60	40	100	40					100	3 Hrs.
2	Technical Textiles Manufacturing & Evaluation	PCC	7TX302PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
3	Programme Elective Course - IV	PEC	7TX303PE_	2	0	0	2	4	2	60	40	100	40					100	3 Hrs.
4	Programme Elective Course - V	PEC	7TX304PE_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
5	Multidisciplinary Minor - V	MDM	7TX305MD_	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
6	Technical Textiles Manufacturing & Evaluation Lab	PEC	7TX306PC1	0	0	2	0	2	1					25	25	50	25	50	
7	Programme Elective Course - IV - Lab	PCC	7TX307PE_	0	0	2	0	2	1					25	25	50	25	50	
8	Research Methodology	RM	7TX401RM1	2	0	4	2	8	4	30	20	50	20		50	50	25	100	2 Hrs.
9	Project	PR	7TX402PR1	0	0	8	0	8	4					50	100	150	75	150	
Total				**14**	**0**	**16**	**14**	**44**	**22**			**500**				**300**		**800**	

Notional Learning Hours: [Workload (teaching/guidance/practicum) 30x15 = 450 Hrs] + [Learner-engaged time 14x15 = 210 Hrs]

Optional Course for Double Minor / Honours Degree																			
10	Double Minor / Honours Course - V	DH	7TX308DH_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
Optional Course for Honours with Research Degree																			
11	Research Project	RP	7TX403RP1	0	0	18	0	18	9	0	0	0	0	100	100	200	100	200	

Jawaharlal Darda Institute of Engineering & Technology, Yavatmal (Autonomous Institute)

Curriculum Structure (Scheme) for Four Year Multidisciplinary B. Tech in Textile Engineering Degree Programme

Semester - VIII (Final Year)

Sr. No.	Course Name	Course Category	Course Code	Course Plan per Week (Hrs.)					Credits	Theory Evaluation		Theory (Total)		Practical/Term Work Evaluation		Practical/Term Work Evaluation (Total)		Total Max Marks	Theory Exam Time (Hrs.)
										SEE	CIA			EE	PA				
				L	T	P	SL	Total		Max Marks	Max Marks	Max Marks	Min Marks	Max Marks	Max Marks	Max Marks	Min Marks		
1	Process Control in Textile Manufacturing (Online)	PCC	8TX309PC1	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
2	Programme Elective Course - VI (Online)*	PEC	8TX310PE_	3	0	0	3	6	3	60	40	100	40					100	3 Hrs.
3	Multidisciplinary Minor - VI (Online)	MDM	8TX311MD_	2	0	0	2	4	2	30	20	50	20					50	2 Hrs.
4	On Job Training (Internship/Apprenticeship)	OJT	8TX404IN1	0	0	24	0	24	12					100	100	200	100	200	
Total				**8**	**0**	**24**	**8**	**40**	**20**			**250**				**200**		**450**	

Notional Learning Hours: [Workload (teaching/guidance/practicum) 32x15 = 480 Hrs] + [Learner-engaged time 8x15 = 120 Hrs]

Optional Course for Honours with Research Degree																			
5	Research Project	RP	8TX405RP1	0	0	18	0	18	9	0	0	0	0	100	100	200	100	200	

9. List of Programme Elective Courses

Students will have an option to choose the PEC offered by their respective Major Discipline offered during semester V to VIII Programme Elective Courses offered by Textile Engineering

Sr No.	Semester	Programme Elective Course/Subjects Name	Course Code
1	V	Chemical Processing-I (PEC-I)	5TX231PE1
2		Chemical Processing-I-Lab (PEC-I Lab)	5TX236PE1
		OR	
3		Specialty Textile Materials (PEC-I)	5TX231PE2
4		Specialty Textile Materials-Lab (PEC-I Lab)	5TX236PE2
5	VI	Chemical Processing-II (PEC-II)	6TX242PE1
6		Chemical Processing-II-Lab (PEC-II Lab)	6TX246PE1
		OR	
7		Textile Composites (PEC-II)	6TX242PE2
8		Textile Composites-Lab (PEC-II Lab)	6TX246PE2
9		High Performance Fibers (PEC-III)	6TX243PE1
		OR	
10		Nano Technology (PEC-III)	6TX243PE2
11	VII	Knitting Technology (PEC-IV)	7TX303PE1
12		Knitting Technology-Lab (PEC-IV Lab)	7TX307PE1
		OR	
13		3D Fabrics (PEC-IV)	7TX303PE2
14		3D Fabrics-Lab (PEC-IV Lab)	7TX307PE2
15		Fibre Manufacturing Technologies (PEC-V)	7TX304PE1
		OR	
16		Textured Yarn Technology (PEC-V)	7TX304PE2
17	VIII	Textile product and development (PEC-VI)	8TX310PE1
		OR	
18		Sustainability and Circularity in Textiles (PEC-VI)	8TX310PE2

10. Syllabus for Semester III & IV

Level: **5**	Course Code: **3TX201PC1**		Course Category: **PCC**		
Course Name	**Yarn Manufacturing-I**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**03 hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:
Subject Code 3TX201PC1 Yarn Manufacturing-I is a compulsory Program Core Course for Second Year B. Tech Textile Engineering.

Course Objectives:
The objective of this course is to provide students with a foundational understanding of the key concepts, terminology, and processes involved in yarn production. It focuses on the basic principles of yarn manufacturing.

Course Outcomes:
After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX201PC1.1	Illustrate the process concepts, constructional details, and operational principles of blowroom machines involved in fibre opening, cleaning, and blending.	C-3
3TX201PC1.2	Demonstrate the constructional features and working principles of carding machines for fibre individualization and web formation.	C-3
3TX201PC1.3	Explain the principles, machine components, and operational sequence of draw frame machines used for fibre straightening and drafting.	C-2
3TX201PC1.4	Describe the construction, functions, and process flow of combing preparatory machines essential for lap formation and uniform feed to the comber.	C-2
3TX201PC1.5	Demonstrate the working principles and technical features of comber machines for removal of short fibres, and improvement in sliver quality.	C-3
3TX201PC1.6	Determine the key process parameters related to blowroom, carding, drawing, and combing to assess their influence on fibre behavior and sliver quality.	C-3

Course Contents:

Unit 1	**Ginning & Blowroom Process:** Objectives, principle and working details of ginning machines, importance and objectives of baling and pressing; baling and pressing machines. Process flow chart of spinning process. Blowroom: Objectives, principle, degree of opening, cleaning, and factors affecting cleaning efficiency. Machines: Automatic bale openers, cleaners, multi-roll systems, and multifunction separators. Calculations: Cleaning efficiency.	9 Hrs
Unit 2	**Mixing & Blending Process:** Objectives, importance of mixing, methods of mixing, principle and working details of mixing machines, integrated mixers etc. Blending- objectives, selection of blend constituents, blend ratio**,** blending techniques, compatibility, principle and working details of blending machines.	6 Hrs
Unit 3	**Carding Process** Objectives, principle, constructional details of new generation cards, operating regions of the card, transfer efficiency, factors affecting transfer efficiency. Auto-levelers-type, principle and working details of autolevellers. Different settings of carding machine, recent developments in carding machine, calculations related to production and cleaning efficiency.	8 Hrs
Unit 4	**Drawing Process** Objectives, constructional details of draw frame machine, principle of drafting, types of drafting system, types of draft, roller setting, drafting irregularities, process parameters affecting drawing performance, recent developments in drawframe machine.	7 Hrs
Unit 5	**Combing Preparatory Process** Objectives, importance of combing preparatory, methods of comber lap preparation, hook reversal process, process parameters- pre-comb draft, lap weight etc. Effect of lap preparation on combing performance, recent developments in combing preparatory machines.	6 Hrs
Unit 6	**Combing Process** Objectives, principle, constructional details of combing machine, stages of combing cycle, settings of combing machine, fractionating efficiency, comber noil and its influence on combing performance. recent developments in combing machine.	9 Hrs

Text Books

1. Klein W, Manual of Textile Technology, Vol. I – III, the Textile Institute, UK, 1987.
2. Oxtoby E, Spun Yarn Technology, Butterworth and Co. Ltd. Publication, 1987.
3. Lord P R, Handbook of Yarn Production, the Textile Institute, Woodhead Publication Limited.

Reference Books

1. Dr. Zoltan S. Szaloki, Opening Cleaning and Picking, Institute of Textile Technology, Virginia.
2. T. K. Pattabhiraman, Essential calculations of practical cotton spinning.
3. Dr. A. R. Khare, Elements of Blowroom and Carding.

E- Resources

1. Spinning https://nptel.ac.in/courses/116/102/116102058/
2. Blowroom in Spinning https://www.textileschool.com/361/blowroom-in-spinning
3. Mixing and Blending https://textilelearner.net/mixing-and-blending-in-spinning-industry
4. Blending Process https://textilestudycenter.com/blending-process-in-yarn manufacturing
5. Carding Process https://www.textileschool.com/323/carding-process-and-itsimportance
6. Textile World https://www.textileworld.com
7. Textile Today https://www.textiletoday.com.bd

Mapping of COs with Pos & PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3TX201PC1.1	3	2	2	-	2	-	-	2	2	-	-	2	2	-
3TX201PC1.2	3	2	2	-	3	-	-	2	-	-	-	2	2	-
3TX201PC1.3	2	2	2	-	2	-	-	2	3	-	-	2	2	-
3TX201PC1.4	3	3	2	-	2	-	-	2	2	-	-	2	2	-
3TX201PC1.5	3	2	3	-	3	-	-	2	2	-	-	2	2	-
3TX201PC1.6	3	3	2	3	3	-	-	2	2	-	2	2	2	-
3TX201PC.CO	3	2	2	1	3	-	-	2	2	-	1	2	2	-

Correlation levels – 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX202PC1**		Course Category: **PCC**		
Course Name	**Textile Fiber-I**				
Credits	**02**	Total L:T:P Hours	2:0:0 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 3TX202PC1 Textile Fiber-I is a compulsory Programme Core Course for Second Year B. Tech. Textile Engineering.

Course Objectives:

The objective of this course is to introduce the basics of natural textile fibers, including their classifications, methods of extraction, morphological structures, fiber properties in relation to their end-use performance in textiles.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX202PC1.1	Describe the essential and desirable properties of textile fibers and the requirements of fiber-forming polymers.	C-2
3TX202PC1.2	Explain the structure, properties, and applications of cotton fibers for their significance in the textile industry.	C-2
3TX202PC1.3	Illustrate the extraction process, structure, and characteristics of bast fibers such as jute, flax, hemp, and ramie.	C-3
3TX202PC1.4	Analyze the morphological structure, polymer system, and chemical composition of wool fibers.	C-4
3TX202PC1.5	Explain the life cycle of the silkworm and the production process of silk, including cocoon formation and reeling and polymer system of silk for determining fiber properties.	C-2
3TX202PC1.6	Explain emerging unconventional natural fibers, their distinctive features, and potential applications.	C-2

Course Contents:

Unit 1	**Introduction to Textile Fiber:** Definition of fibre, Staple fiber, Filament, Classification of Textile fibres, Essential and desirable properties of Textile fibres, Definition of Polymers, Types of polymers, Requirements of fibre forming polymers.	5 Hrs
Unit 2	**Cotton Fiber**: Introduction to cotton fiber, Chemical structure of cotton fiber, Morphological structure, Physical, chemical and biological properties, Applications.	5 Hrs
Unit 3	**Bast Fiber:** Jute: Cultivation and Extraction of jute fiber, Morphological structure, Physical, chemical and biological Properties, Applications. Flax: Retting and extraction process, morphological structure of flax fibre, physical, chemical and biological properties, Applications, Introduction to hemp and Ramie and its distinctive features	5 Hrs
Unit 4	**Wool Fiber:** Types of wool fiber, Morphological structure of wool fiber, Chemical composition, polymer system of wool, physical, Chemical properties.	5 Hrs
Unit 5	**Silk Fiber:** Types of silk, Production of silk (life cycle, reeling), Morphological structure, Chemical composition, polymer system of silk, Physical and Chemical properties and Applications.	5 Hrs
Unit 6	**Emerging Unconventional Natural Fibers:** Introduction to Banana, Pinaaaple and their distinctive features, Introduction to fibers like mohair, camel and spider silk and their distinctive features and applications, BT Cotton.	5 Hrs

Text Books

1. S. P. Mishra Fiber Science and Technology, New age International Publications.
2. V. K. Kothari Textile Fibers: Developments and Innovations, IAFL Publications.
3. V. A. Shenai, Textile Fibers-Vol.-I, Sevak Publications.

Reference Books

1. C. Santulli, Pineapple fibers, their composites and applications.
2. M. J. John, Natural Polymers-Volume 1: Composites.
3. N. Shreenivasan, BT Cotton in India, an Introduction, ICFAI University Press Publications.

4. H. V. Sreenivasa, Introduction to Textile Fibers,

E- Resources

1. Classification of fibers and their general properties Link:https://nptel.ac.in/courses/116102026
2. Introduction to Textile Fibers Link : https://gphisar.ac.in/wp-content/uploads/2022/09/TEXTILE-FUNDAMENTALS.pdf
3. Recent Advances in Sustainable Natural Fiber Composites Link :https://www.researchgate.net/publication/381923803
4. Classification of Textile Fibers Link:https://textilelearner.net/classification-of-textile-fibers/

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3TX202PC1.1	3	2	-	2	1	-	-	-	-	-	2	3	2	-
3TX202PC1.2	3	2	2	2	1	-	-	-	-	-	2	3	2	-
3TX202PC1.3	3	2	2	2	1	2	-	-	-	-	2	3	2	-
3TX202PC1.4	3	3	2	2	1	-	-	-	-	-	2	3	2	-
3TX202PC1.5	3	2	2	2	1	2	-	-	-	-	2	3	2	-
3TX202PC1.6	3	3	2	2	1	2	-	-	-	-	2	3	2	-
3TX202PC1.CO	3	2	2	2	1	1	-	-	-	-	2	3	2	-

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX203PC1**		Course Category: **PCC**		
Course Name	**Fabric Manufacturing - I**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hr**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 3TX203PC1 Fabric Manufacturing-I is a compulsory Program Core Course for Second Year B.Tech. Textile Engineering.

Course Objectives:

The objective of this course is the basic knowledge about conventional and modern aspects of winding, warping and sizing process and their applications in Textile Engineering with practical skills.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX203PC1.1	Demonstrate the concept and principle of winding and high speed winding machines.	C-3
3TX203PC1.2	Describe the technical features and operating principles of automatic winding machines.	C-2
3TX203PC1.3	Explain the concept and principles of warping and high speed warping machines.	C-2
3TX203PC1.4	Describe the technical features and operating principles of automatic warping machines	C-2
3TX203PC1.5	Describe the concepts and description of sizing process and machines.	C-2
3TX203PC1.6	Distinguish the sizing ingredients and various control systems, size paste ingredients used in sizing process.	C-5

Course Contents:

Unit 1	**Introduction to Winding Process:** Brief outline of the process involve in weaving, Yarn quality attributes, objectionable faults & its classification as per Uster calssimate. Winding: Objectives and construction details of High speed winding process, Concept of cone angle, angle of wind, wind per traverse, production calculation.	7 Hrs
Unit 2	**Automatic Winding Machines:** Automatic cone and cheese winding machines, methods of yarn joining. Concept and constructional details of automatic winding machines. Types of splicers, Splice quality assessment. Internal and between machine material flow with respect to weft winding, brief description about pirn winding process.	8 Hrs
Unit 3	**Introduction to Warping Process:** Objectives and classification of warping process, construction details about beam warping. Modern developments in warping: viz. modern types of creel, pre tensioner, automatic tension regulation system.	7 Hrs
Unit 4	**Automatic Warping Machines:** Modern developments with respect to beam warping. Sectional warping: objective, constructional details of sectional warping process, cone angle adjustment and beam traverse. Production Calculation.	8 Hrs
Unit 5	**Introduction to Sizing Process and machines:** Concept of yarn weaveability, Sizing: Necessity and objectives, constructional details and calculations regarding slasher sizing and multi-cylinder sizing. Modern developments in sizing machine elements viz. creels, unwinding tension control, saw box, yarn drying methods, head stock weavers beam pressing and doffing.	7 Hrs
Unit 6	**Introduction to Sizing ingredients and its recipes:** Introduction to various sizing ingredients, concept of sizing control systems viz. size paste level, temperature, stretch, moisture control of sizing machines, production calculation. Concept of optimum size pick-up and add-on, Description about size paste cooking. Types of sizing: Heavy, medium, light and pure. Sizing recipe of polyester, PV, PC blends.	8 Hrs

Text Books

1. R.Sengupta, Yarn Preparation (Vol-1 and 2) Published by Popular Prakashan in Bombay in 1963
2. D.B.Ajgaokar And talukdar, Sizing Method, Material and Mechanism Published by Textile Trade Press, 1982.
3. R. Sengupta, Weaving Calcutions Published by D.B. Taraporevala Sons and Company, spanning , 1961.
4. J.E.Booth, Textile Mathematics (Vol-3) Published by The Textile Institute in 1977.

Reference Books

1. Allan Armored And walter S Sondhel, Weaving Technology and Operation Published by The Textile Institute in 1995.
2. N.M.Kulkarni, Weaving Technology.

E- Resources

1. Winding and Winding Machine: Types, Features, Efficiency, Functions and Driving Methods
   Link: https://textilelearner.net/winding-and-winding-machine/
2. Introduction to Fabric Manufacturing
   Link: https://nptel.ac.in/courses/116102005
3. Textile Warping
   Link: https://www.slideshare.net/slideshow/textile-warping/53197340
4. Introduction to Warping
   Link: https://www.scribd.com/document/609537513/8-9-Warping
5. Textile Sizing Techniques Guide
   Link: https://www.scribd.com/presentation/615734195/Presentation-SIZING-3-1
6. Techniques of Warp Yarn Sizing in Weaving Preparatory Process
   Link: https://textilelearner.net/techniques-of-warp-yarn-sizing/

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3TX203PC1.1	3	2	2	-	2	-	-	2	2	-	-	3	2	1
3TX203PC1.2	3	2	2	-	3	-	-	2	-	-	-	2	2	1
3TX203PC1.3	2	2	2	-	2	-	-	2	3	-	-	3	2	1
3TX203PC1.4	3	3	2	-	2	-	-	2	2	-	-	2	2	1
3TX203PC1.5	2	2	3	-	3	-	-	2	2	-	-	2	1	1
3TX203PC1.6	3	2	2	-	2	-	-	2	2	-	-	3	2	1
3TX203PC1CO	3	2	2	-	2	-	-	2	2	-	-	3	2	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX204MD1**		Course Category: **MDM**		
Course Name	**Introduction to Fashion Designing**				
Credits	**02**	Total L:T:P etc. Hours	2:0:0 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**30**	SEE Time	**2 Hrs**	CIA Marks	**20**
EE Marks		PA Marks		Total Marks	**50**

Course Description:
Subject 3TX204MD1 Introduction to Fashion Designing is a compulsory Multi-Disciplinary Minor Courses for Second year B. Tech Textile Engineering.

Course Objective
The objective of this course is to prepare students with the essential knowledge and skills needed in the field of fashion and apparel design which ensures a holistic understanding of the fashion industry, from concept development to market execution.

Course Outcomes
After completing the course students will be able to:

CO	**Course Outcomes**	**Domain Level**
3TX204MD1.1	Illustrate fundamental research and design techniques to explore historical, contemporary and client-based fashion concepts for holistic understanding of the fashion industry.	C-4
3TX204MD1.2	Demonstrate technical skills in fashion visualization, mood/storyboard creation and flat garment drawing to communicate design ideas.	C-3
3TX204MD1.3	Apply and executive foundational skills in drawing fashion figures, color theory to prepare flats	C-3

Course Contents:

Unit 1	**Fundamentals of Fashion & Fashion Designing** Meaning & Definition of Fashion. Evolution & History of Fashion. Fashion Cycle. Role and Responsibilities of Fashion Designer. Fashion Terminology. Structure of Fashion Industry.	10 hrs

Unit 2	**Elements & Principles of Fashion Design** Elements of Design: Line, Shape, Texture, Colour, Pattern Principles of Design: Balance, Harmony, Rhythm, Emphasis, Proportion Application of principles in Apparel Fashion Figure Proportions.	10 hrs
Unit 3	**Fashion Design Process, Research & Boards** Fashion Design Process, Research in Fashion, Mood Board, Story Board, Concept Board, Collection Development, Portfolio Preparation	10 hrs

Text Books:

1. Malcolm Barnard, Fashion Theory A Reader.
2. Roland Barthes, The Fashion System.
3. Kathryn McKinley & Janine Munslow, Fashion Design: A Process of
4. Bina Abling, Fashion Sketchbook.

Reference Books:

1. Anna Kiper, Fashion Illustration: Inspiration and Technique
2. Joen Wolfrom,Color for Fashion
3. Michele Wesen Bryant, Fashion Drawing: A Visual Guide to Drawing Fashion
4. Connie Amaden-Crawford, The Art of Fashion Draping.

E- Resources:

1. Apparel Designing (Swayam)
   https://onlinecourses.swayam2.ac.in/cec21_hs14/preview
   (Basics of fashion design, color theory, garment drawing, flats, mood boards, and portfolio preparation.)
2. Colour in Design (NPTEL – IIT Kanpur)
   https://archive.nptel.ac.in/courses/109/104/109104075/
   (Intro to color perception, harmony, and application in design.)
3. Design Fundamentals (NPTEL – IIT Guwahati)
   https://nptel.ac.in/courses/107/103/107103002/
   (Basics of design principles, visual elements, and communication.)

Mapping of COs with Pos

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3TX204MD1.1	1	-	-	-	2	-	-		2	-	-	2	3	2
3TX204MD1.2	-	-	-	-	2	-	-	-	3	-	-	1	3	3
3TX204MD1.3	3	-	-	-	3	-	-	-	-	-	-	1	2	3
3TX204MD1	2	-	-	-	2	-	-	-	2	-	-	1	3	3

orrelation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**3SH205OE1**	Course Category:	**OE**
Course Name	**Soft Skills & Profile Building**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 3SH205OE1Soft Skills & Profile Building is a compulsory Open Elective Course for Second Year B. Tech All Branch Students.

Course Objectives:

The objective of this course is to focus on developing advanced communication skills, leadership qualities and professional etiquette among engineering graduates. The course emphasizes workplace communication, interview preparedness, personal branding, and employability skills aligned with industry expectations. It integrates emotional intelligence, digital professional identity, and strategic career planning for holistic professional development.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3SH205OE1.1	Apply advanced interpersonal, analytical, and persuasive communication techniques in professional contexts for effective professional interactions.	C-3
3SH205OE1.2	Demonstrate professional workplace etiquette, business communication, and group discussion skills to enhance employability.	C-3 A-3
3SH205OE1.3	Analyze leadership styles, emotional intelligence, and team dynamics for effective collaboration.	C-4 A-3
3SH205OE1.4	Design a structured and realistic career plan aligned with industry expectations and personal goals for professional growth.	C-6
3SH205OE1.5	Create ATS-friendly résumés, professional portfolios, and digital profiles for personal branding.	C-6 P-4
3SH205OE1.6	Perform effectively in interviews, workplace	C-3

	simulations, and job-search processes with professional confidence for enhanced employability.	P-3 A-3

Course Contents:

Unit 1	**Advanced Communication Dynamics:** Advanced interpersonal communication strategies; speech articulation; structuring thoughts and fluency techniques; analytical and critical communication; storytelling techniques for impactful presentations; persuasive communication models.	7Hrs
Unit 2	**Global Workplace Etiquettes, Email Writing & GD–PI Perspective:** Professional greetings and workplace conduct; giving and receiving feedback; handling criticism and adaptability issues; professional values such as punctuality and attire; types of handshakes and significance; effective business email writing; types of Group Discussions, purpose of GDs; mock GDs (video-based); interview strategies and techniques.	8Hrs
Unit 3	**Leadership, Team Dynamics & Corporate Skills:** Personality types using 9/9 matrix; leadership styles; emotional intelligence and leadership relationship; conflict resolution and negotiation techniques; team-building skills (Johari Window perspective); cross-cultural communication; creativity and design thinking; structured problem-solving and decision-making**.**	7 Hrs
Unit 4	**Strategizing Career Planning:** SMART goal setting; mapping skills to career paths; understanding industry expectations; emerging futuristic soft and hard skills (domain-wise); personalized career roadmap; certification planning (technical and non-technical); networking skills and participation in professional communities	7 Hrs
Unit 5	**Profile Building, Portfolio & Personal Branding :** ATS-friendly résumé preparation and common mistakes; video résumé creation and self-marketing pitch; LinkedIn profile optimization and networking strategies; developing online portfolios using platforms such as GitHub, Behance, Google Sites, and Toastmasters	8 Hrs
Unit 6	**Employment Readiness & Industry Integration:** Workplace simulation activities (mock emails, meetings,	8 Hrs

	discussions); mock personal interviews; understanding sector-specific industry dynamics; unconventional career opportunities after engineering; job-hunting strategies and popular job platforms	

Text Books:

1. Alex K., Soft Skills, S. Chand Publishing
2. Meenakshi Raman & Prakash Singh, Business Communication, Oxford University Press

Reference Books:

1. Stephen R. Covey,The 7 Habits of Highly Effective People,Free Press Publication
2. Daniel Goleman, Emotional Intelligence,published by Bantam Books.
3. Shiv Khera, You Can Win,published by Bloomsbury Publishing
4. Richard N. Bolles, What Color Is Your Parachute? Published by Ten Speed Press, Crown Publishing Group

E Resources:

1. NPTEL: Soft Skills and Personality Development
2. LinkedIn Learning – Communication & Career Development Courses
3. Harvard Business Review – Communication & Leadership Articles
4. Coursera /edX – Career Development & Employability Skills Modules

Mapping of COs with POs & PSO

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3SH205OE1.1	2	3	2	–	–	–	–	2	3	–	–	2	2	3
3SH205OE1.2	–	2	–	–	–	2	3	3	3	–	–	1	2	3
3SH205OE1.3	–	3	2	–	–	2	2	3	–	–	–	2	3	3
3SH205OE1.4	–	3	3	–	–	2	–	–	–	2	3	2	3	2
3SH205OE1.5	–	2	3	–	3	–	–	–	2	–	2	1	2	2
3SH205OE1.6	–	2	2	–	2	2	–	2	3	–	2	2	3	3
3SH205OE1CO	1	3	2	-	1	2	1	2	2	1	1	1	2	2

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**3SH205OE2**	Course Category:	**OE**
Course Name	**Team Building & Management**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 3SH205OE2Team Building & Management is a compulsory Open Elective Course for Second Year B. Tech All Branch Students.

Course Objectives:

The Objective of the course is to develop teamwork capabilities, leadership and managerial skills, collaborative problem-solving abilities, conflict management techniques, and effective decision-making skills required in professional and organizational settings.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3SH205OE2.1	Explain the principles and importance of effective team building in organizations to foster collaborative work culture.	C-2
3SH205OE2.2	Apply team dynamics and collaboration strategies to achieve common goals.	C-3 A-3
3SH205OE2.3	Analyze leadership styles and managerial roles for effective team performance.	C-4
3SH205OE2.4	Demonstrate conflict resolution, negotiation, and interpersonal management skills for effective team performance.	C-3 A-3
3SH205OE2.5	Apply motivation and performance management techniques in team-based environments for achieving organizational goals.	C-3
3SH205OE2.6	Perform effectively as a team member or leader in simulated managerial scenarios to develop leadership competencies	C-3 P-3 A-3

Course Contents:

Unit 1	**Fundamentals of Team Building:** Concept of teams; types of teams; stages of team development; characteristics of effective teams; roles and responsibilities of team members; barriers to effective teamwork; team norms and values.	7Hrs
Unit 2	**Team Dynamics & Interpersonal Relationships:** Group behaviour and dynamics; interpersonal communication in teams; trust and collaboration; listening as a team skill; diversity and inclusion in teams; cross-cultural team management	8Hrs
Unit 3	**Leadership in Teams:** Leadership concepts; leadership styles; emotional intelligence and leadership; situational leadership; influence and power in teams; leadership ethics and responsibilities.	7 Hrs
Unit 4	**Conflict Management & Negotiation:** Sources and types of conflict; conflict resolution techniques; negotiation strategies; managing difficult team members; stress management; maintaining team harmony	7 Hrs
Unit 5	**Motivation, Performance & Team Effectiveness:** Motivation theories; team motivation techniques; goal setting and performance measurement; feedback and appraisal systems; decision-making in teams; problem-solving techniques.	8 Hrs
Unit 6	**Managerial Skills & Team-Based Applications:** Managerial roles and functions; planning, organizing, and controlling teams; delegation and coordination; workplace simulations (team meetings, role plays); case studies on team management; team performance evaluation.	8 Hrs

Text Books:

1. Stephen P. Robbins, Organizational Behaviour, Pearson Education
2. L.M. Prasad, Management Principles and Practices, published by Sultan Chand & Sons

Reference Books:

1. Patrick Lencioni, The Five Dysfunctions of a Team, published by Jossey-Bass
2. Peter G. Northouse, Leadership, published by SAGE Publications
3. Daniel Goleman, Emotional Intelligence, published by Bantam Books

E Resources:

1. NPTEL – Organizational Behavior& Management Courses
2. LinkedIn Learning – Team Leadership & Management Modules
3. Harvard Business Review – Teamwork & Leadership Articles
4. Coursera / edX – Team Management and Leadership Courses

Mapping of COs with POs & PSO

CO	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
3SH205OE2.1	2	–	–	–	–	–	–	–	–	–	–	1	2	3
3SH205OE2.2	–	2	2	–	–	–	–	3	2	–	–	2	3	3
3SH205OE2.3	–	3	3	–	–	–	–	2	–	–	–	2	3	3
3SH205OE2.4	–	2	2	–	–	2	3	3	–	–	–	2	3	3
3SH205OE2.5	–	2	2	–	–	–	–	2	–	2	–	2	3	3
3SH205OE2.6	–	2	2	–	–	2	–	3	2	–	2	2	3	3
3SH205OE2 CO	1	2	2	-	-	1	1	2	1	1	1	2	3	3

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX206PC1**		Course Category: **PCC**		
Course Name	**Yarn Manufacturing-I Lab**				
Credits	**01**	Total L:T:P Hours	0:0:2 **30 Hrs**	Total SL Hours	**--**
Total Credit Hours	**30 Hrs**				
SEE Marks	**--**	SEE Time	**--**	CIA Marks	**--**
EE Marks	**25**	PA Marks	**25**	Total Marks	**50**

Course Description:

Subject Code 3TX206PC1 Yarn Manufacturing-I Lab is a compulsory Program Core Course for Second Year B. Tech Textile Engineering. This course serves as a core subject of the program.

Course Objectives:

The objective of this course is to provide practical exposure to the fundamental concepts of yarn manufacturing processes. It emphasizes understanding the working principles and functions of yarn manufacturing machines. The course aims to develop technical skills through hands-on machine operation and experimentation.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX206PC1.1	Demonstrate the construction, working principles and material passage through ginning, blowroom, carding, draw frame, and comber machines to develop fundamental operational understanding.	C-3 P-5
3TX206PC1.2	Perform essential machine settings and gearing calculations for carding, draw frame, and comber machines to achieve accurate processing performance.	C-3 P-4
3TX206PC1.3	Analyze how different machine settings affect fibre movement and machine performance to improve the quality of processing.	C-4 P-4

List of Practicals:

Minimum eight practicals from the list mentioned below.

1. To study the construction and working of roller ginning machine.
2. To study the construction and working of an automatic bale opener.

3. To study the construction and working details of the blowroom.
4. To study the passage of material through carding machine.
5. To study the settings of carding machine.
6. To study the gearing calculations of carding machine.
7. To study the passage of material through draw frame machine.
8. To study the drafting system of draw frame machine.
9. To study the passage of material through comber machine.
10. To study important settings of comber machine.

E- Resources

1. Ginning Technologies: https://circot.res.in
2. Roller Ginning Basics: https://cotton.tamu.edu
3. Cotton Ginning Research: https://www.ars.usda.gov
4. Truetzschler Technologies: https://www.truetzschler.in
5. Rieter Blowroom Concepts: https://www.rieter.com
6. Rieter Carding Technology: https://www.rieter.com
7. Truetzschler Card TC Series: https://www.truetzschler.in
8. Textile Learner – Carding Process: https://textilelearner.net

Mapping of COs with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
3TX206PC1.1	3	1	-	-	1	-	-	1	1	-	-	2	2	-
3TX206PC1.2	3	1	-	2	1	-	-	1	1	-	-	2	2	-
3TX206PC1.3	3	1	-	2	1	-	-	1	1	-	-	2	2	-
3TX206PC.CO	3	1	-	2	1	-	-	1	1	-	-	2	2	-

Correlation levels – 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**3TX207PC1**	Course Category:	**PCC**
Course Name	**Textile Fiber-I Lab**				
Credits	**01**	Total L:T:P Hours	0:0:2 **30 Hrs**	Total SL Hours	**--**
Total Credit Hours	**30 Hrs**				
SEE Marks	**--**	SEE Time	**--**	CIA Marks	**--**
EE Marks	**25**	PA Marks	**25**	Total Marks	**50**

Comp. Mapping (PO1, PO2, PO4, P7, PO8, PO9, PO10, P11)

Course Description:

Subject Code 3TX207PC1 Textile Fiber-I Lab is a compulsory Program Core Course for Second Year B. Tech B. Tech. Textile Engineering.

Course Objectives:

The objective of this course is to perform practicals on the concepts of Textile Fiber and identify, extract, analyze, and characterize natural fibers through visual, tactile, chemical, burning, and microscopic methods.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX207PC1.1	Identify natural fibers such as cotton, jute, wool, silk, and unconventional fibers using visual, tactile, chemical, and burning tests.	C-2, P-1
3TX207PC1.2	Prepare and Analyze microscopic slides of cotton, jute, wool, silk, and unconventional fibers to observe morphological characteristics.	C-4, P-2
3TX207PC1.3	Measure moisture regain and density of natural fibers using standard laboratory methods such as the density gradient technique for determine their fundamental physical characteristics	C-5, P-3, A-2

List of Practicals:

Minimum eight practicals from the list mentioned below.

1. Identification of natural fibers by feel and visual method.
2. Extraction of unconventional natural fiber by water retting method.
3. Conduct degumming and reeling of silk.
4. Microscopic study of cotton and jute fiber.
5. Study of cotton and jute fiber by chemical and burning method.

6. Microscopic study of unconventional natural fibers extracted by water retting method.
7. Study of unconventional natural fibers by chemical and burning method.
8. Microscopic study of wool and silk fiber.
9. Study of wool and silk fiber by chemical and burning method.
10. To determine moisture regain of fiber samples.
11. Determination of density of natural fibers by density gradient method.

E Resources:

1. Textile Fiber Microscopy Link: L-12302465-de6f76f788.pdf
2. Fiber Science and Technology Link: A_Text_Book_of_Fibre_Science _and_Technol.html?id=uHz-l5RTP1IC

Mapping of COs with POs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
3TX207PC1.1	3	3	-	3	-	-	1	2	2	1	2	3	2	1
3TX207PC1.2	3	3	-	3	-	-	1	2	2	1	2	3	2	1
3TX207PC1.3	3	3	-	3	-	-	1	2	3	1	1	3	2	1
3TX207PC1CO	3	3	-	3	-	-	1	2	2	1	2	3	2	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**3TX208PC1**	Course Category:	**PCC**	
Course Name	**Fabric Manufacturing-I Lab**					
Credits	**01**	Total L:T:P Hours	0:0:2 **30 Hrs**	Total SL Hours		**--**
Total Credit Hours	**30 Hrs**					
SEE Marks	**--**	SEE Time	**--**	CIA Marks		**--**
EE Marks	**25**	PA Marks	**25**	Total Marks		**50**

Course Description:

Subject Code 3TX208PC1 Fabric Manufacturing-I Lab is a compulsory Program Core Course for Second Year B.Tech. Textile Engineering.

Course Objectives:

The objective of this course is to perform practicals on the concepts of weaving preparatory like mechanisms of yarn warp and weft winding machines, warping machines and aspects of sizing machine in Fabric Manufacturing-I lab.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX208PC1.1	Demonstrate various mechanisms of yarn winding machine	C-3, P-5
3TX208PC1.2	Demonstrate various mechanisms of weft winding machine	C-3, P-4
3TX208PC1.3	Demonstrate various mechanisms of warping machine and aspects of sizing machine	C-3, P-5, A-2

List of Practicals:

Minimum eight practicals from the list mentioned below.

1. To determine the yarn count of various yarns using various yarn numbering systems.
2. To find out and clarify yarn objectionable faults by using yarn appearance board.
3. To compare the properties of yarn before and after winding process.
4. To study the passage of material through cimmco muller cone winding machine.
5. To study the gearing and its related calculation of cimmco muller cone winding machine.
6. To study the thread break stop motion of cimmco muller cone winding machine.

7. To study the passage of yarn through pirn winding machine.
8. To study the passage of material through warping machine.
9. To study the passage of material through single end sizing machine.
10. To compare the properties of sized and unsized yarn.

E Resources:

1. Yarn Winding Machine Process
   https://meeraind.com/blog/yarn-winding-machine-types-functions
2. Yarn Sizing: Important Warp Preparatory Process
   https://textilelearner.net/yarn-sizing-important-warp-preparatory-process/

Mapping of COs with POs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
3TX208PC1.1	3	1	-	2	-	-	-	3	2	-	-	3	2	1
3TX208PC1.2	3	1	-	-	-	-	-	-	-	-	-	3	2	1
3TX208PC1.3	3	1	-	1	-	-	-	3	3	-	-	3	2	2
3TX208PC1CO	3	1	-	1	-	-	-	2	2	-	-	3	2	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX209EM1**		Course Category: **EEM**		
Course Name	**Principles of Managements**				
Credits	**02**	Total L:T:P Hours	2:0:0 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	--	SEE Time	--	CIA Marks	--
EE Marks	--	PA Marks	**50**	Total Marks	**50**

Course Description:

Subject Code 3TX209EM1 Principles of Managements is a compulsory Humanities Social Science and Management Course for Second Year B. Tech. Textile Engineering.

Course Objectives:

The course aims to provide an understanding of basic management concepts, managerial roles and responsibilities in organizations and equip students with essential decision-making and problem-solving skills in management contexts.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX209EM1.1	Explain the core principles and functions of management for implementing in organisation.	C-2
3TX209EM1.2	Apply planning and organizing principles to business situations.	C-3
3TX209EM1.3	Demonstrate the use motivation, leadership, communication, and behavioural concepts in organisational working.	C-3

Course Contents:

Unit 1	**Introduction To Management:** Definition of Management, Science or Art; Manager Vs Entrepreneur; types of managers; managerial roles and skills; Functions of Management: Planning, Organizing, Directing Controlling; Evolution of Management, Management thoughts: Peter Drucker's Analysis Thoughts; Scientific Management Theory by F. W. Taylor; Administrative Management Theory by Henri Fayol; Human Relations Theory by Elton Mayo and Hawthorne Experiments; Henry Mintzberg Managerial Roles.	10 Hrs

Unit 2	**Planning and Organising:** Planning: Nature and purpose of planning; planning process; types of planning; objectives; setting objectives, policies, Planning premises, Strategic Management; Planning Tools and Techniques; Decision making steps and process. Organisation: Nature and purpose, Formal and informal organization, organization chart, organization structure, types. Line and staff authority, departmentalization, delegation of authority, centralization and decentralization, Job Design, Human Resource Management, HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.	10 Hrs
Unit 3	**Directing and Controlling:** Directing: Foundations of individual and group behaviour, motivation, motivation theories, motivational techniques, job satisfaction, job enrichment, leadership, types and theories of leadership, communication, process of communication, barrier in communication, effective communication. Controlling: System and process of controlling, budgetary and non-budgetary control techniques, Productivity problems and management, control and performance, direct and preventive control – reporting.	10 Hrs

Text Books

1. P. C. Tripathi & P. N. Reddy, Principles of Management, Mcgraw Hill Education(India) Private Limited, 2023
2. Harold Koontz & Heinz Weihrich, Essentials of Management, Mcgraw Hill Education(India) Private Limited, 2020
3. Peter F. Drucker, Management: Tasks, Responsibilities, Practices, New Delhi Allied Publisher Pvt. Ltd.

Reference Books

1. C.B. Gupta, Management Theory and Practice –Sultan Chand & Sons Pvt Ltd.
2. Stephen Robbins, Organizational Behaviour, Pearson Education.
3. Gary Dessler, Human Resource Management, Pearson Education.

E- Resources

1. NPTEL – Management Courses
2. Swayam – Management & Organizational Behaviour
3. eGyankosh – IGNOU Resources
4. https://www.managementstudyguide.com

Mapping of COs with POs & PSO

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3TX209EM1.1	-	-	-	-	-	-	-	-	-	3	-			
3TX209EM1.2	-	-	-	-	-	-	-	-	-	3	-		3	
3TX209EM1.3	-	-	-	-	-	-	-	3	-	2	-		2	
3TX209EM1CO	-	-	-	-	-	-	-	1	-	3	-		2	

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code:	**3SH210VE1**	Course Category:	**VEC**
Course Name	**Constitutional Values and Fundamental Duties**			
Credits	**02**	Total L:T:P Hours	2:0:0 **30 Hrs**	Total SL Hours **30 Hrs**
Total Credit Hours	**60 Hrs**			
SEE Marks	--	SEE Time	--	CIA Marks --
EE Marks	**25**	PA Marks	**25**	Total Marks **50**

Course Description:

Subject Code 3SH210VE1 Constitutional Values and Fundamental Duties is a compulsory Values enhancement Course for Second Year B. Tech.

Course Objectives:

The objective of the course is to introduce the Indian Constitution, its historical background, fundamental values, rights, and duties.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3SH210VE1.1	Explain the historical background, making, and significance of the Indian Constitution to Understand the Constitution, Preamble, and core values.	C2
3SH210VE1.2	Interpret Fundamental Rights and Duties (Articles 12–35, 51A) to evaluate their implications through case studies in professional and civic life.	C3
3SH210VE1.3	Apply constitutional principles to engineering ethics, sustainability concerns (Articles 48A, 51A (g)), and demonstrate social commitment, innovation, and inclusive growth as nation builders.	C3

Course Contents:

Unit 1	**Introduction to the Constitution and Fundamental Values**: Overview of the Indian Constitution – Historical background and making of the Constitution; Meaning of Constitution; Preamble – Meaning and significance. Core Constitutional Values – Justice (Social, Economic, Political); Liberty (thought, expression, belief, faith, worship); Equality (status and opportunity); Fraternity (dignity and unity of the nation). Relevance of constitutional values for professionals	10 Hrs

	and citizens.	
Unit 2	**Fundamental Rights and Duties**: Fundamental Rights (Articles 12–35) – Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies. Fundamental Duties (Article 51-A) – Importance and implications; Role of youth and professionals in upholding duties. Case studies highlighting real-life significance of rights and duties.	10 Hrs
Unit 3	**Application of Constitutional Values in Engineering and Public Life**: Ethical Responsibilities and Constitutional Alignment – Engineering ethics and public interest; Environment and sustainability as constitutional concern (Articles 48A, 51A(g)); Engineers as nation builders – Social commitment, innovation, and inclusive growth.	10 Hrs

Text Books:

1. Basu D. D., Introduction to the Constitution of India, LexisNexis Publication, New Delhi (Twenty-Third Edition).
2. Jain M. P., Constitution of India, LexisNexis Publication, New Delhi (Eighth Edition).
3. Laxmikanth M., Indian Polity, McGraw Hill Education, New Delhi (Sixth Edition).
4. Austin Granville, The Indian Constitution: Cornerstone of a Nation, Oxford University Press, New Delhi.
5. Shukla V. N., Constitution of India, Eastern Book Company, Lucknow (Twelfth Edition).
6. Government of India, Constitution of India (Bare Act), Government of India Publication, New Delhi.

Reference Books:

1. Subhash Kashyap, Our Constitution, National Book Trust, New Delhi.
2. Durga Das Basu, Shorter Constitution of India, LexisNexis Publication.
3. P. M. Bakshi, The Constitution of India, Universal Law Publishing.
4. J. N. Pandey, Constitutional Law of India, Central Law Agency.
5. Seervai H. M., Constitutional Law of India, N. M. Tripathi Pvt. Ltd. (Vols. I–III).
6. B. Shiva Rao, The Framing of India's Constitution: A Study, Indian Institute of Public Administration.
7. D. C. Wadhwa, Political Science and Constitutional Law, Eastern Book Company.
8. Madhav Khosla, The Indian Constitution: Oxford India Short Introductions, Oxford University Press.

E Resources:

1. NPTEL course on Constitutional Studies, Prof. Sudhir Krishnaswamy, National Law School of India University
2. Constitutional Values and Fundamental Duties (University of Delhi – aligned with NEP 2020, available via NPTEL/DU open learning) https://kmc.du.ac.in/kmcouter/collnews/download/407274481690637 91359.pdf/LinkedContents/pdf/All/All

Mapping of COs with POs & PSOs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3SH210VE1.1	3	2	-	1	-	-	-	-	-	-	-	2	2	
3SH210VE1.2	-	3	2	2	-	2	3	3	-	-	-	3	2	-
3SH210VE1.3	-	-	3	3	-	2	3	2	-	2	-	3	3	2
3SH210VE1CO	1	2	2	2	-	2	2	2	-	1	-	3	2	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX400FP1**		Course Category: **FP**		
Course Name	**Field Project**				
Credits	**02**	Total L:T:P Hours	0:0:4 **60 Hrs**	Total SL Hours	--
Total Credit Hours	**60 Hrs**				
SEE Marks	--	SEE Time	--	CIA Marks	--
EE Marks	**25**	PA Marks	**25**	Total Marks	**50**

Course Description:
Subject Code 3TX400FP1Community engagement project is a compulsory Experimental Learning Course for Second Year B. Tech. Textile Engineering

Course Objectives:
Objective of the course is to develop student's ability to identify and address real-world textile-related challenges in rural and urban communities through problem-solving, team work, and effective communication while fostering community-centric and sustainable engineering practices.

Course Outcomes:
After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX400FP1.1	Identify basic textile-related community issues for recognising and understanding key problem faced by communities in textile sector	C-1, P-1, A-1
3TX400FP1.2	Suggest simple, practical solutions based on textile knowledge for applying fundamental textile knowledge to develop feasible and easily implementable solutions	C-3, P-2, A-2
3TX400FP1.3	Present findings and recommendations effectively for proposing solution in a understandable manner	C-5, P-7

Course Contents:

Module	Description	Hours
Module 1	Orientation & Sensitization	4
Module 2	Field Visit & Problem Identification	24
Module 3	Problem–Solution Design & Implementation	20
Module 4	Documentation, Presentation & Reflection	12

Note:

1. Students must collaborate within their assigned practical batches. Each batch should be further divided into subgroups, with five students per subgroup, in accordance with the prescribed guidelines
2. **Project Type: (Must select from the guidelines provided)**

1. Interaction with Self Help Groups (SHGs) women members, for their skill-building activities

2. Small business ideas (handloom, handicraft, khadi, food products, etc.) for rural areas to make the people self reliant
3. Climate Change Awareness and Community Impact Assessment

3. Suggested Textile Project Themes

1. Recycling and reusing textile waste.
2. Support for traditional crafts using basic tools.
3. Basic skill-building sessions for artisans (e.g., dyeing or stitching techniques).
4. Awareness campaigns on eco-friendly textile practices.

4. Documentation /Project Report Format:

The Documentation /Project Report shall contain the following sections:

1. Title Page
2. Certificate & Declaration
3. Abstract
4. Introduction (Community + Textile relevance)
5. Objectives
6. Literature Survey
7. Methodology (Survey + Technical)
8. Problem Identification
9. Proposed Textile Solution
10. Implementation / Simulation
11. Results & Analysis
12. Community Feedback & Social Impact
13. Conclusion & Future Scope
14. References
15. Appendices (Photos, questionnaires, certification letter issued by the Gram Panchayat office)

Mapping of COs with POs & PSOs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3TX400FP1.1	3	2	2	-	2	-	-	2	2	-	2	2	3	-
3TX400FP1.2	3	2	2	-	3	-	-	2	-	-	2	2	-	-
3TX400FP1.3	2	2	2	-	2	-	-	2	3	-	2	-	-	3
3TX400FP1CO	3	2	2	-	2	-	-	2	2	-	2	-	-	-

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Course Plan:

Lecture No.	Module Title	Topic	Hours
1	Module1: Orientation & Sensitization	NEP 2020: Community Engagement & Role of Engineers, Ethics, Social Responsibility & SDGs for Textile Engineers, Overview of Rural & Urban Communication Infrastructure, Identification of Community Institutions (GP, School, Self Help Group (SHG), Health Centre), Field Safety, Team Formation, Area & Theme Allocation, Reorganization	4
2	Module 2: Field Visits & Problem Identification	Community visits to identify one specific issue.	24
3		Interaction with stakeholders (artisans, small-scale workers, cottage industry personals).	
4		Prepare a simplified problem statement.	
5		Conduct community visits for data collection.	
6		Identify one area of intervention (e.g., skill training, basic waste recycling ideas etc).	
7			
8	Module3: Engineering Problem–Solution Design & Implementation-	Analysis of Collected Field Data and Identification of Problems	20
9		Propose simple, actionable solutions.	
10		Create basic prototypes or plan a small activity	
11		Preparation of Quantity and Cost Estimate	
12		Evaluation of Feasibility and Expected Community Benefits	
13	Module4: Documentation, Presentation & Reflection	Data Analysis & Graphical Representation, Writing Methodology & Analysis Sections, Results, Discussion & Conclusion	12
14		Project Report Structure & Guidelines, Report Finalization, Presentation Preparation	
15		Evaluation and Viva	

Level: **5**	Course Code: **3AL001NC1**		Course Category: **NC**		
Course Name	**Disaster Management and Preparedness**				
Credits	--	Total L:T:P Hours	2:0:0 **30 Hrs**	Total SL Hours	--
Total Credit Hours	--				
SEE Marks	--	SEE Time	--	CIA Marks	--
EE Marks	--	PA Marks	--	Total Marks	--

Course Description:

Subject Code 3AL001NC1 Disaster Management and Preparedness is a Compulsory Non-Credit course for Second Year B. Tech all disciplines.

Course Objectives:

The objective of this course is to provide students with a comprehensive understanding of disasters, their types, impacts, the complete disaster management cycle, and the roles of various agencies in Disaster Risk Reduction.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3AL001NC1.1	Identify the concepts of disaster, hazard, vulnerability and risk, and classify disasters to understand the basic nature, causes and profiles of disasters in India.	C-2
3AL001NC1.2	Analyze the disaster management cycle for risk assessment, mitigation, preparedness, response, recovery, and international disaster management frameworks.	C-4
3AL001NC1.3	Apply disaster management practices, including stakeholder roles, national policies, engineers' responsibilities, and preparedness measures for effective disaster risk reduction.	C-3

Course Contents:

Unit 1	**Introduction to Disaster Management:** Concepts and definitions – disaster, hazard, vulnerability, risk, severity, frequency, exposure, capacity, and impact; classification of disasters- Natural disasters: earthquakes, tsunami, landslides, mining, Hydro-Meteorological Disasters: floods, draught, cyclones, coastal erosion. Biological Disaster: epidemics, pest attacks, forest fire, Manmade disasters:	10 hrs

	Industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, vulnerability profile of India, ecological fragility; principles of disaster prevention and mitigation	
Unit 2	**Disaster Management Cycle and Framework:** Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development. Awareness During Disaster – Evacuation, Disaster Communication, Search and Rescue, Emergency Operation Centre, Incident Command System, Relief and Rehabilitation. Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure, Early Recovery, Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action Phases of disaster management; vulnerability and capacity assessment, post-disaster environmental response	12 hrs
Unit 3	**Disaster Management practices:** Roles and responsibilities of government, community, local bodies, NGOs, and other stakeholders, National Policy on Disaster Management Act 2005 Mega Disasters of India and Lessons Learnt, Disaster Management practices at working and residential places. Key responsibility of engineers in disaster reduction techniques, medical preparedness aspect of disaster.	8 hrs

Textbooks:

1. Sharma, S. C. (2022). Disaster Management, Khanna Publication.
2. Subramanian, R. (2024). Disaster Management. Vikas Publication.

Reference Books:

1. Gaur, R. C. (2018). Environmental Engineering and Disaster Management. New Age International.
2. Pradeep Sahni, 2024, Disaster Risk Reduction in South Asia, Prentice Hall.
3. Mondal, D. (2022). Disaster Management. New Delhi: CBS Publishers & Distributors
4. Manual on natural disaster management in India, M C Gupta, NIDM, New Delhi
5. An overview on natural & man-made disasters and their reduction, R K Bhandani, CSIR, New Delhi
6. Natural Disaster Management Policy , 2009,GOI
7. H.N. Shrivastava& G.D. Gupta, Management of Natural Disasters in developing Countries, Daya Publishers , Delhi

8. S.L. Goyal, Encyclopedia of disaster Management, Vol I,II & III Disaster Managemnt Policy and administration, Deep & Deep, New Delhi,2006
9. Coppola D P, Introduction to International Disaster Management, Elsevier Science (B/H), London, 2007
10. Disaster Mitigation in Asia & Pacific, Asian Development Bank

Course Assignments

Internal Assessment at Institute level will be based on following assignments:

1.Study of Recent Disasters (at local, state and national level)
2.Preparation of Disaster Risk Management Plan of an Area or Sector
3.A Case study on Disaster Management

E Recourses:

1. https://onlinecourses.swayam2.ac.in/ntr25_ed61/preview

Mapping of COs with POs & PSOs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
3AL001NC1.1	3	2	-	-	-	3	2	-	-	-	3	1	1	2
3AL001NC1.2	3	3	-	-	-	3	3	-	-	-	3	2	2	3
3AL001NC1.3	3	3	-	-	-	3	3	-	-	3	3	2	2	3
3AL001NC1.CO	3	3	-	-	-	3	3	-	-	1	3	2	2	2

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX211DH1**		Course Category: **DH1**		
Course Name	**Introduction to Smart Textiles**				
Credits	**03**	Total L:T:P etc. Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 3TX211DH1 Introduction to Smart Textiles is a double minor/honours course offered by the department of Textile Engineering for Second Year B. Tech of all Discipline.

Course Objectives:

The objective of this course is to introduce students to the fundamental concepts of smart textiles, including the material, technologies and methods used to create textiles that can sense, respond adapt to environmental stimuli for potential applications.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX211DH1.1	Describe the various functions of smart textiles and analyze their importance and scope for modern applications.	C-1
3TX211DH1.2	Explain the roles of different textile structures such as woven, knitted, and nonwoven fabrics for smart textiles.	C-2
3TX211DH1.3	Identify various types of sensors integrated into textiles and their principles of operation for wearing sensing systems.	C-1
3TX211DH1.4	Explain various conductive materials and electronic components for integration in textiles.	C-2
3TX211DH1.5	Understand various techniques for embedding sensors and electronics into textiles through weaving, knitting, embroidery, and printing.	C-2
3TX211DH1.6	Analyze applications of smart textiles in various fields such as human health, safety, comfort, performance, communication, and environmental awareness by integrating sensing and adaptive technologies directly into fabrics.	C-4

Course Contents:

Unit 1	**Introduction to Smart Textiles:** Definition, Historical development and evolution, Classification of Smart Textiles -passive, active and ultra smart textiles, Functions of smart textile, Importance and scope of smart textiles.	7 hrs
Unit 2	**Textile Materials and structures for Smart Textiles:** Natural and synthetic fibers and fabrics, Textile structures: woven, knitted, nonwoven, Functional finishes and coatings, Nano material and composites in smart textiles.	8 hrs
Unit 3	**Sensors and Actuators in Smart Textiles:** Types of sensors integrated into textiles: temperature, pressure, humidity, strain, bio-sensors. Actuators for smart textiles: shape memory alloys, electroactive polymers, micro-heaters. Principles and working mechanisms.	8 hrs
Unit 4	**Conductive Materials and Electronic Components:** Conductive fibers, yarn and fabrics, Conductive inks and printable electronics, Flexible and stretchable electronic components, Integration of electronics with textiles	7 hrs
Unit 5	**Design and Fabrication of Smart Textiles:** Methods of embedding sensors and electronics: weaving, knitting, embroidery, printing. Wearable electronics Challenges in durability, washability, and user comfort	7 hrs
Unit 6	**Applications of Smart Textiles** Healthcare and medical monitoring: ECG, temperature, movement, Sports and fitness wearable, Fashion and interactive textiles, Protective clothing for military and industry, Environmental sensing and automotive applications.	8 hrs

Text Books

1. Xiaoming Tao, Handbook of Smart Textiles
2. Xiaoming Tao, Smart fibres, fabrics and clothing, Wood head publishing.
3. H. R. Mattila, Intelligent Textile and clothing edited by, Wood head publishing.
4. Vladan Koncar, Smart textiles and their applications, Wood head publishing.

Reference Books:

1. Y. L. and A. S. W Wang, Clothing Biosensor Engineering.
2. P. Westbrock, G. Priniotakis and P.Kienkens, Analytical Electro Chemistry in textiles.
3. William C. Smith, Smart textile coatings and laminates.

E- Resources:

1. https://link.springer.com
2. https://ocw.mit.edu
3. https://nptel.ac.in/courses/116/102/116102034

Mapping of COs with Pos & PSOs

CO	**PO**											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	3
3TX211DH2.1	3	2	1	-	-	2	-	-	-	-	1	2	1	2
3TX211DH2.2	3	2	1	-	-	1	-	-	-	-	1	2	1	2
3TX211DH2.3	2	3	3	2	2	2	1	1	1	1	1	3	2	3
3TX211DH2.4	3	2	2	-	-	3	-	-	-	-	1	2	2	2
3TX211DH2.5	3	2	1	1	-	1	-	-	-	-	1	3	2	2
3TX211DH2.6	3	3	2	3	2	2	-	-	1	-	1	3	2	3
3TX211DH2.CO	3	2	2	2	2	-	1	1	1	1	1	3	2	2

Correlation levels – 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **3TX211DH2**		Course Category: **DH2**		
Course Name	**Geo and Agro Textiles**				
Credits	**03**	Total L:T:P etc. Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 3TX211DH2 Geo and Agro Textiles is a double minor/honours course offered by the department of Textile Engineering for Second Year B. Tech of all Discipline.

Course Objectives:

The objective of this course is to identify and describe students to various types of geo textiles and agro textiles along with their manufacturing methods, applications and explore the role of geotextiles in civil engineering applications and agro textiles in enhancing agricultural productivity.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
3TX211DH2.1	Classify the various types of geosynthetics textiles for their applications civil engineering	C-4
3TX211DH2.2	Understand the roles of different textile structures such as woven, knitted, and nonwoven fabrics in geo textiles.	C-2
3TX211DH2.3	Design geotextile-based solutions for applications such as soil reinforcement, drainage, filtration, separation, and erosion control in civil engineering.	C-6
3TX211DH2.4	Understand the various agrotextile systems for crop protection, climate control, and water and soil management in agriculture.	C-2
3TX211DH2.5	Describe manufacturing techniques, raw materials, and structural characteristics of agrotextiles.	C-2
3TX211DH2.6	Analyze physical, mechanical, hydraulic, and functional properties relevant to agrotextiles.	C-4

Course Contents:

Unit 1	**Introduction to Geosynthetics:** Definition, Types of geosynthetics -geotextiles, geogrids, geomembranes, geocomposites, Historical development, Applications of geosynthetics in civil engineering.	7 hrs
Unit 2	**Types and Properties of Geotextiles:** Textile fibers used in geotextiles and their requirements, Types of geotextiles- woven, knitted, nonwoven, Properties of geotextiles- physical, mechanical and hydraulic.	7 hrs
Unit 3	**Design principles and methods of geotextiles:** Functions: Separation, filtration, drainage, reinforcement, protection. Design for separation and filtration in roads and railways, Design for reinforcement in embankments on soft soils, retaining walls, slopes; Pavement design with geotextiles, Drainage systems- design and construction, landfills and erosion control	8 hrs
Unit 4	**Introduction to Agrotextiles:** Definition and scope of agro textiles, Importance in agriculture and horticulture, Historical development and global trends, Advantages of using agrotextiles, Classification based on functions-crop protection, soil management, climate control, water management	8 hrs
Unit 5	**Raw Materials and Manufacturing:** Fibers used in agro textiles and their requirements, yarn structures, fabrication methods-woven, knitted, nonwoven, braided, composites. Functional finishes-UV resistance, antifungal, hydrophilic coatings.	7 hrs
Unit 6	**Properties and Testing of Agro textiles:** Physical properties: weight, thickness, porosity Mechanical properties: tensile strength, elongation, tear resistance, Functional properties: UV stability, water permeability, durability	8 hrs

Text Books

1. Horrocks & S. C. Anand, Handbook of Technical Textiles
2. G. P. Raymond, Handbook of Geosynthetic Engineering, Wood head publishing.
3. S. K. Rajendran, Agrotextiles and its Applications, Wood head publishing.
4. M. A. R. Ghani, Agrotextiles: Structure, Properties and Applications, Wood head publishing.

Reference Books:

1. Robert M. Koerner, Designing with Geosynthetics, Pearson Publishing.
2. B. Purushothama, Textiles for Agricultural Application, Woodhead Publishing.
3. Sabit Adanur, Hand book of Industrial Textiles, Wellington Sears.

E- Resources:

1. https://www.researchgate.net
2. https://pmc.ncbi.nlm.nih.gov
3. https://nptel.ac.in/courses/116102057

Mapping of COs with Pos & PSOs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
3TX211DH2.1	3	2	1	-	-	2	-	-	-	-	1	2	1	2
3TX211DH2.2	3	2	1	-	-	1	-	-	-	-	1	2	1	2
3TX211DH2.3	2	3	3	2	2	2	1	1	1	1	1	3	2	3
3TX211DH2.4	3	2	2	-	-	3	-	-	-	-	1	2	2	2
3TX211DH2.5	3	2	1	1	-	1	-	-	-	-	1	3	2	2
3TX211DH2.6	3	3	2	3	2	2	-	-	1	-	1	3	2	3
3TX211DH2.CO	3	2	2	2	2	-	1	1	1	1	1	3	2	2

Correlation levels – 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **4TX212PC1**		Course Category: **PCC**		
Course Name	**Textile Fiber-II**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 4TX212PC1 Textile Fiber-II is a compulsory Programme core Course for Second Year B. Tech. Textile Engineering.

Course Objectives:

The objective of this course is to provide fundamentals knowledge of manmade fibers, their classifications, various manufacturing technologies, properties and applications of manmade fiber.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX212PC1.1	Describe the classification, merits and demerits of manmade and natural fibers.	C-1
4TX212PC1.2	Illustrate the manufacturing process, structure, and properties of regenerated fibers such as viscose, cuprammonium and acetate fibers.	C-3
4TX212PC1.3	Analyze the production, structure, and properties of polyamide and polyester fibers.	C-4
4TX212PC1.4	Compare the characteristics and production techniques of acrylic, modacrylic, PVC, PVA, polyethylene, and polypropylene fibers	C-5
4TX212PC1.5	Demonstrate knowledge of texturizing techniques such as air-jet, false twist, stuffer box and evaluate their effect on yarn properties.	C-3
4TX212PC1.6	Evaluate the role and performance of sustainable fibers such as PLA, biodegradable polyesters/polyamides, and recycled polyester in modern textiles.	C-5

Course Contents:

Unit 1	**Introduction to Manmade Fibers:** Introduction to manmade fibers, Merits and Demerits of manmade and natural fibers, Addition and Condensation polymerisation methods, concept of thermoplastic and thermoset material, Introduction to melt spinning, dry spinning and wet spinning.	7 Hrs
Unit 2	**Regenerated Fiber:** Viscose Rayon: Manufacturing process, Physical and Chemical properties, Applications. Cuprammonium Rayon: Manufacturing process, Physical and chemical properties, Applications. High wet modulus and Polynosic Rayon: Manufacturing process, Physical and chemical properties, Applications. Introction to Acetate and Triacetate fibers, Bamboo fiber.	8Hrs
Unit 3	**Synthetic Fibers: Polyamide and Polyester** Polyamide: Nylon 6, Nylon 66, Raw materials, Manufacturing Process, Microscopic structure, Physical and Chemical properties, Applications. Polyester: Raw materials, Manufacturing Process, Microscopic structure, Physical and Chemical properties, Applications.	7 Hrs
Unit 4	**Vinyl and Polyolefin Fibers:** Polyacrylonitrile fibres: Acrylic and Modacrylic fibres, Raw materials, Manufacturing process, Microscopic structure, Physical and chemical properties, Applications. Polyvinyl alcohol and Polyvinyl chloride fibres: Raw materials, Manufacturing process, Microscopic structure, Physical and chemical properties, Applications. Polyethylene & Polypropylene fibres: Raw materials, Manufacturing process, Microscopic structure, Physical and chemical properties, Applications.	8 Hrs
Unit 5	**Texturizing Methods:** Introduction to various methods of texturizing: Draw Texturizing, sequential (False twist process) and simultaneous draw texturizing. Principle and working of machine of airjet texturizing machine. Other Texturizing Methods: Stuffer box crimping, Edge Crimping, Knit-de-knit, Gear, crimping. Properties of air and draw textured yarn	8 Hrs
Unit 6	**Sustainable Manmade Fibers:** Biodegradable Polyesters and Polyamides: Manufacturing process, Properties and Applications.	7 Hrs

	Polylactic acid fiber: Manufacturing process, Properties and Applications, Recycled polyester, Manufacturing process, Properties and Applications.	

Text Books

1. S. P. Mishra Fiber Science and Technology, New age International Publications.
2. Gohl and Vilensky, Textile Science.
1. V. K. Kothari, Textile Fibers: Developments and Innovations, IAFL Publications.
2. V. A. Shenai, Textile Fibers-Vol.-I, Sevak Publications.

Reference Books

1. Chi Zang, Biodegradable Polyesters, Wile Publications.
2. S. S. Muthu, Recycled Polyesters, Springer Publications.
3. R.W. Moncrieff, Manmade Fibers.
4. H. V. Sreenivasa Murthy, Introduction to Textile Fibers.

E- Resources

1. Classification of fibers and their properties Link: https://nptel.ac.in/courses/116102026
2. A book of manmade Fibers Link: https://www.slideshare.net/slideshow/mmf-54745894/54745894
3. Different types of manmade fibers with their applications Link :https://textilelearner.net/different-types-of-man-made-fibers-with-their-application/

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4TX212PC1.1	3	2	-	1	-	2	-	-	-	-	-	3	2	-
4TX212PC1.2	3	2	2	2	1	1	-	-	-	-	2	3	2	-
4TX212PC1.3	3	3	2	2	1	1	-	-	-	-	2	3	2	-
4TX212PC1.4	3	3	2	2	1	2	-	-	-	-	2	3	2	-
4TX212PC1.5	3	3	3	2	2	-	-	-	-	-	2	3	2	-
4TX212PC1.6	3	3	3	2	1	3	-	1	-	-	2	3	2	-
4TX212PC1.CO	3	3	2	2	1	2	-	1	-	-	2	3	2	-

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **4TX213PC1**		Course Category: **PCC**		
Course Name	**Yarn Manufacturing - II**				
Credits	**02**	Total L:T:P Hours	2:0:0 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hr**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

(*PO1, PO2, PO3, PO5, PO8, PO9, PSO1, PSO2, PSO3*)

Course Description:

Subject Code 4TX213PC1 Yarn Manufacturing - II is a compulsory Program Core Course for Second Year B.Tech. Textile Engineering.

Course Objectives:

The objective of this course is the basic knowledge about the speed frame, ring spinning, compact spinning and doubling processes and their applications in Textile Engineering with practical skills.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX213PC1.1	Explain the concept, construction and working of speed frame machine.	C-2
4TX213PC1.2	Demonstrate the concept construction and working of ring frame machine.	C-3
4TX213PC1.3	Illustrate the principle of drafting and various drafting systems.	C-3
4TX213PC1.4	Describe the influence of spinning geometry and spinning triangle on yarn quality.	C-2
4TX213PC1.5	Describe the concept, construction and working of compact spinning process.	C-2
4TX213PC1.6	Demonstrate the concept construction and working of doubling process.	C-3

Course Contents:

Unit 1	**Speed Frame Process:** Objectives, construction details of modern speed frame, Bobbin leading and flyer leading winding principle. Various parameters affecting roving quality and production. Recent developments in speed frame machine-Auto bobbin transport system etc.	5 Hrs

Unit 2	**Ring Spinning Process:** Objectives, principle of ring spinning, construction details of ring frame machine. Types of spindles and its drives, Building mechanism and influence on bobbin quality, Calculation related to production.	5 Hrs
Unit 3	**Drafting System:** Importance, advantages and principle of drafting system, Types of drafting system. Factors affecting on roller settings and drafting performance, Roller slip, drafting waves and floating fibres in drafting zone.	5 Hrs
Unit 4	**Spinning Geometry:** Importance and details of spinning geometry, yarn structure and properties. Different yarn faults its causes, effect, remedies, Yarn faults- its causes, effect and remedies, Recent developments in ring spinning.	5 Hrs
Unit 5	**Compact Spinning Process:** Principles, importance and advantages of compact spinning, Methods compact spinning systems and its constructional details, Structure and properties of compact yarns.	5 Hrs
Unit 6	**Doubling Process:** Objectives and importance of doubling process, Methods of yarn doubling, types of doubled yarn, Structure and properties of folded yarns.	5 Hrs

Text Books

1. Klein W, Manual of Textile Technology, Vol. I – III, The Textile Institute, UK, 1987.
2. Oxtoby E, Spun Yarn Technology, Butterworth and Co. Ltd. publication, 1987.
3. Lord P R, Handbook of Yarn Production, The Textile Institute, Woodhead Publication Limited.

Reference Books

1. Dr. A. R. Khare, Elements of Ring spinning.
2. T.K. Pattabhiraman, Essential calculations of practical cotton spinning.

E- Resources

1. Speed Frame and function of speed frame
   Link:https://textilestudycenter.com/speed-frame-and-function-of-speed-frame/
2. Study on Material Passage Diagram of Speed Frame
   Link:https://textilelearner.net/material-passage-diagram-of-speed-frame/

3. Ring Frame - Introduction
   Link:https://www.scribd.com/document/321691333/Ring-Frame-Introduction
4. Yarn Doubling & Twisting | Objectives | Twist | Applications
   Link:https://www.textilesphere.com/2021/10/yarn-doubling-and-twisting.html
5. New Spinning Technologies
   Link: https://onlinecourses.nptel.ac.in/noc25_te03/preview

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4TX213PC1.1	3	2	2	-	2	-	-	2	2	-	-	2	1	1
4TX213PC1.2	3	2	2	-	3	-	-	2	-	-	-	3	2	1
4TX213PC1.3	2	2	2	-	2	-	-	2	3	-	-	3	2	1
4TX213PC1.4	3	3	2	-	2	-	-	2	2	-	-	2	1	1
4TX213PC1.5	2	2	3	-	3	-	-	2	2	-	-	2	1	1
4TX213PC1.6	3	2	2	-	2	-	-	2	2	-	-	3	2	1
4TX213PC1.CO	3	2	2	-	2	-	-	2	2	-	-	3	2	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5.0**	Course Code: **4TX214PC1**		Course Category: **PCC**		
Course Name	**Fabric Manufacturing –II**				
Credits	**02**	Total L:T:P Hours	2:0:2 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**60**	SEE Time	**3 HRS**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 4TX214PC1 Fabric Manufacturing –II is a compulsory Professional core Course for Second Year B. Tech. Textile Engineering.

Course Objectives:

The objective of this course is to provide fundamental knowledge of fabric formation through weaving processes including automatic weaving and dobby and jacquard shedding mechanism along with the understanding of various fabric and machine defects.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX214PC1.1	Demonstrate about the concept of fabric forming by weaving for enabling students to practically illustrate and clearly present the basic principles involved in fabric formation through weaving.	C-3
4TX214PC1.2	Analyze various weaving mechanisms used in fabric formation for developing analytical skills for comparing and evaluating different weaving mechanisms.	C-2, P-4
4TX214PC1.3	Explain Kinematics and productivity analysis of shuttle weaving machines for helping students understand motion principles and efficiency evaluation of shuttle weaving machines.	C-2
4TX214PC1.4	Explain about the dobby shedding principle and it related machinery for imparting knowledge of dobby shedding operation and associated machinery used for patterned fabric production.	C-2
4TX214PC1.5	Explain about jacquard shedding principle & its related machinery for providing detailed	C-2

	understanding of jacquard shedding systems and machines.	
4TX214PC1.6	Distinguish the various warp way, weft way and loom faults for enabling identification and differentiation of fabric and loom defects for quality control.	C-5

Course Contents:

Unit 1	**Classification of different fabric forming process** weaving, knitting, breading. Non woven: - Brief description of all methods & there application. Looming: - Study of warp tying, leasing, reaching in, warp knotting and drop pinning processes	5 Hrs
Unit 2	**Basics of weaving:** classification of motions, Shedding:- Classification of shedding principle, types of shed, shed geometry, reversing motion, Brief description about shuttle picking and crank beat up	5 Hrs
Unit 3	**Motion and mechanism of weaving** Brief description about tertiary mechanism, kinematics of sley, Calculation regarding reed count, efficiency and production of weaving machine. Automatic loom: - limitations of plain loom and brief description about automatic loom, cop changing mechanism.	5 Hrs
Unit 4	**Automatic loom and Doddy Shedding:** Historical review of shuttle changing looms. Automatic let-off and positive take up system Historical review of about weft mixing by drop box motion. Dobby shedding: - objectives, classification, climax cam dobby, positive and rotary dobby, method of pegging,	5 Hrs
Unit 5	**Jacquard shedding** objectives, classification, principal parts , figuring capacity, harness, working principle of Double lift double cylinder jacquard, open shed jacquard, electronic jacquard comparison between various electronic jacquards	5 Hrs
Unit 6	**Fabric defects:** Warp and weft defects with causes and remedies, various loom faults with respect to their causes and remedies.	5 Hrs

Text Books

1. D. B. Ajagaonkar And M. K. Talukdar, Weaving Machine, Mechanism Management, Mahajan Publisher Pvt. Ltd. Ahmadabad
2. R. Sengupta, Weaving Calculations', By Published by D. B. Taraporevala Sons and Company, Bombay.
3. Allan Armored And walter S Sondhel, Weaving Technology And Operation', Published by The Textile Institute, Manchester.
4. N. M. Kulkarni Weaving Technology', Textile Association India

Reference Books

1. K.T. Aswani, Fancy Weaving, Mahajan Publishers Pvt. Ltd., Ahmedabad
2. N. N. Bannarji, Weaving Mechanism Vol. II, Textile Book Publishers, Bombay
3. R. Marks and A.T.C. Robinson, Principle of weaving, The Textile Institute, Manchester.

E- Resources

1. https://textilelearner.net/basic-weaving-mechanism-of-loom/
2. https://web.itu.edu.tr/~berkalpo/Weaving_Lecture/Weaving_Chapter1a_06S.pdfhttps://be-iitkgp.vlabs.ac.in/List%20of%20experiments.html
3. https://libcat.iitd.ac.in/bib/36515https://be
4. iitkgp.vlabs.ac.in/exp/voltage-regulator/
5. https://nptel.ac.in/courses/116102005

Mapping of COs with POs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
4TX214PC1.1	3	1	-	-	2	2	-	2	2	-	-	3	2	1
4TX214PC1.2	3	2	2	-	3	-	-	2	-	-	-	3	2	2
4TX214PC1.3	2	2	3	3	2	-	-	2	2	-	-	3	1	1
4TX214PC1.4	3	3	2	-	2	-	-	-	2	-	-	2	2	1
4TX214PC1.5	3	2	2	1	2	1	-	-	2	-	-	2	2	1
4TX214PC1.6	3	3	-	3	-	2	-	2	-	2	2	2	3	2
4TX214PC1CO	3	2	2	2	2	2	-	2	2	2	2	2.5	2	1.5

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **4TX215MD1**		Course Category: **MDM**		
Course Name	**Garment Pattern Designing**				
Credits	**02**	Total L:T:P etc. Hours	2:0:0 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**30**	SEE Time	**2 Hrs**	CIA Marks	**20**
EE Marks	**--**	PA Marks	**--**	Total Marks	**50**

Course Description:

Subject 4TX215MD1 Garment Pattern Designing is a compulsory Multi-Disciplinary Minor Course for second year B. Tech Textile Engineering.

Course Objective

The objective of this course is to provide basic knowledge of garment pattern designing, covering fundamental and advanced techniques with practical applications in the garment manufacturing industry.

Course Outcomes (COs)

After completing the course students will be able to:

CO	**Course Outcomes**	**Domain Level**
4TX215MD1.1	Describe the structure and functioning of the garment industry for value chain awareness.	C-2
4TX215MD1.2	Demonstrate skills in sketching for drafting garment components.	C-3, P-5
4TX215MD1.3	Apply pattern making techniques to create garment patterns.	C-3, P-3

Course Contents:

Unit 1	**Introduction to Pattern Making** Importance and scope of pattern making, Tools and equipment used, Body measurements: importance, methods, standard size charts, Basic pattern terminology, Drafting basic blocks: bodice block, sleeve block, skirt block (theory)	10 Hrs
Unit 2	**Pattern Development Techniques (10 Marks)** Types of patterns: drafted, draped, flat patterns Dart manipulation and fullness control Sleeve variations: cap, puff, raglan, kimono (theory diagrams indicated) Neckline variations: round, V-neck, collar styles Fabric grain, bias,	10 Hrs

	layout & cutting principles	
Unit 3	**Garment Pattern Adaptation & Fit (10 Marks)** Pattern grading basics—concept and rules Fit analysis: common fitting issues and pattern corrections Pattern alteration techniques: length, width, contour adjustments Industrial pattern standards Introduction to CAD pattern making	10 Hrs

Text Books:

1. Malcolm Barnard, Fashion Theory: A Reader
2. Roland Barthes, The Fashion System
3. Kathryn McKinley & Janine Munslow Fashion Design: A Process of Creation

Reference Books:

1. Bina Abling, Fashion Sketchbook
2. Anna Kiper, Fashion Illustration: Inspiration and Technique.
3. Joen Wolfram. Color for Fashion.
4. Michele Wesen Bryant, Fashion Drawing: A Visual Guide to Drawing Fashion.

E- Resource

1. Apparel Designing – Swayam
   https://onlinecourses.swayam2.ac.in/cec21_hs14/preview
2. Pattern Making Basics – University of Fashion (Free Lessons Section)
   https://www.universityoffashion.com/free-lessons/

Mapping of COs with Pos

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4TX215MD1.1	1	-	-	-	-	-	-	-	-	-	-	2	3	2
4TX215MD1.2	-	-	-	-	2	-	-	2	-	-	1	1	3	2
4TX215MD1.3	2	-	-	-	3	-	-	-	-	-	-	2	3	2
4TX215MD1	1	-	-	-	2	-	-	1	-	-	1	2	3	2

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**4SH216OE1**	Course Category:	**OE**
Course Name	**Quantitative and Logical Reasoning**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 4SH216OE1Quantitative and Logical Reasoning is a compulsory Open Elective Course forSecond Year B. Tech All Branch Students.

Course Objectives:

The Objective of the Course is to develop quantitative aptitude, logical reasoning, problem-solving efficiency, and decision-making skills for placements, competitive exams, and real-life applications

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4SH216OE1.1	Apply arithmetic and numerical techniques to solve quantitative problems accurately.	C-3
4SH216OE1.2	Solve algebraic and equation-based problems using simplification and approximation methods to improve problem-solving efficiency.	C-3
4SH216OE1.3	Analyze logical reasoning problems using structured and critical thinking approaches to improve decision-making skills.	C-4
4SH216OE1.4	Interpret and analyze data using graphical and tabular methods for decision making for strategic planning.	C-4
4SH216OE1.5	Solve complex logical puzzles and advanced reasoning problems efficiently for competitive examination success.	C-3
4SH216OE1.6	Demonstrate effective aptitude test strategies integrating quantitative and logical reasoning skills for career advancement opportunities.	C-3

Course Contents:

Unit 1	**Number System & Arithmetic Foundations:** Number system fundamentals; LCM and HCF applications; divisibility rules; percentage calculations; ratio and proportion; averages; profit and loss; simple and compound interest; speed mathematics and shortcut techniques.	7Hrs
Unit 2	**Algebra, Equations & Simplification Techniques:** Linear and quadratic equations; algebraic expressions; simplification and approximation; indices and surds; inequalities; time and work; pipes and cisterns; time, speed and distance; mixtures and alligation.	7 Hrs
Unit 3	**Logical Reasoning: Analytical & Critical Thinking:** Coding–decoding; blood relations; direction sense; series and pattern recognition; analogies; ranking and ordering; syllogisms; statement and assumption; statement and conclusion; cause–effect reasoning.	7 Hrs
Unit 4	**Data Interpretation & Analytical Aptitude:** Tables; pie charts; line graphs; bar graphs; caselets; data sufficiency; DI shortcut techniques; approximation in data interpretation; comparative and predictive data analysis.	8Hrs
Unit 5	**Advanced Logical Reasoning & Puzzle Solving:**Seating arrangements (linear, circular, and complex); floor-based puzzles; scheduling puzzles; selection-based puzzles; Venn diagrams; logical grouping; critical reasoning frameworks	8 Hrs
Unit 6	**Placement Aptitude Mastery & Test Strategies:** Integrated quantitative and logical reasoning practice; decision-making and elimination strategies; speed improvement techniques; mock placement aptitude patterns (TCS, Infosys, Wipro, Accenture, Capgemini); common error analysis; test-taking strategies; aptitude and reasoning simulations.	8 Hrs

Text Books:

1. R. S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S. Chand Publishing
2. Arun Sharma, Logical Reasoning and Data Interpretation, McGraw Hill

Reference Books:

1Arun Sharma, How to Prepare for Quantitative Aptitude,published by McGraw Hill Education.
2. R.S. Aggarwal, A Modern Approach to Logical Reasoning, published by S. Chand Publishing
3. M.K. Pandey, Analytical Reasoning, published by BSC Publishing Co. Pvt. Ltd.

4. Rajesh Verma, Fast Track Objective Arithmetic, published by Arihant Publications

E Resources:

1. NPTEL – Quantitative Aptitude & Logical Reasoning Courses
2. IndiaBIX – Quantitative and Logical Reasoning Practice
3. CareerRide – Aptitude Preparation Modules
4. PrepInsta / HackerEarth – Placement Aptitude Practice Platforms

Mapping of COs with POs & PSO

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4SH216OE1.1	3	3	2	–	–	–	–	–	–	–	–	2	3	1
4SH216OE1.2	3	3	2	–	–	–	–	–	–	–	–	3	2	1
4SH216OE1.3	–	3	3	–	–	–	–	–	–	–	–	2	3	2
4SH216OE1.4	–	3	2	–	–	–	–	–	–	–	–	3	3	2
4SH216OE1.5	–	3	3	–	–	–	–	–	–	–	–	2	3	2
4SH216OE1.6	–	3	2	–	–	–	–	–	–	2	3	2	3	2
4SH216OE1 CO	1	3	3	–	–	–	–	–	–	1	1	2	3	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	5	Course Code:	4SH216OE2	Course Category:	OE
Course Name	**Critical Thinking & Decision Making**				
Credits	**03**	Total L:T:P Hours	3:0:0 **45 Hrs**	Total SL Hours	**45 Hrs**
Total Credit Hours	**90 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 4SH216OE2 Critical Thinking & Decision Making is a compulsory Open Elective Course forSecond Year B. Tech All Branch Students.

Course Objectives:

The objective of this course is to develop critical thinking and decision-making competencies by strengthening analytical reasoning and structured problem-solving skills applicable to professional and real-world situations.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4SH216OE2.1	Apply critical thinking frameworks to analyze problems systematically.	C-3
4SH216OE2.2	Evaluate information, assumptions, and arguments for logical consistency and validity.	C-5
4SH216OE2.3	Analyze complex situations and identify feasible alternatives for decision making.	C-4
4SH216OE2.4	Design rational and ethical decision-making strategies under uncertainty to ensure sustainable organizational outcomes.	C-6 A-3
4SH216OE2.5	Apply quantitative and qualitative tools to support decision-making processes.	C-3
4SH216OE2.6	Demonstrate effective decision making in simulated professional and team-based scenarios to resolve workplace challenges effectively	C-3 P-3 A-3

Course Contents:

Unit 1	**Foundations of Critical Thinking:** Concept of critical thinking; elements of reasoning; logical vs illogical thinking; assumptions and inferences; inductive and deductive reasoning; common cognitive biases; barriers to critical thinking.	7Hrs
Unit 2	**Analytical Reasoning & Problem Framing:** Problem identification and structuring; root cause analysis; issue trees; questioning techniques; systems thinking; analytical reasoning models.	7 Hrs
Unit 3	**Decision Making Models & Techniques:** Rational decision-making model; intuitive decision making; bounded rationality; decision trees; cost–benefit analysis; risk and uncertainty; heuristics.	7 Hrs
Unit 4	**Data-Driven & Ethical Decision Making:** Use of data in decision making; qualitative vs. quantitative data; basic decision matrices; ethical frameworks; professional ethics; social and environmental considerations in decisions.	8Hrs
Unit 5	**Creativity, Innovation & Strategic Thinking:** Creative thinking techniques; lateral thinking; design thinking approach; scenario planning; strategic decision making; innovation in problem solving.	8 Hrs
Unit 6	**Applied Decision Making & Case Analysis:** Case studies from industry and management; individual and group decision simulations; conflict resolution through decision frameworks; decision-making under pressure; reflection and feedback	8 Hrs

Text Books:

1.Alec Fisher, Critical Thinking, published by Cambridge University Press.
2. John Adair, Decision Making and Problem Solving, published by Kogan Page.

Reference Books:

1Daniel Kahneman, Thinking, Fast and Slow published by Farrar, Straus and Giroux.
2. Rolf Dobelli, The Art of Thinking Clearly,published by Sceptre.
3. John S. Hammond, Ralph L. Keeney, Howard Raiffa, Smart Choices, published by Harvard Business School Press.
4. Ken Watanabe, Problem Solving 101, published by Portfolio.

E Resources:

1. NPTEL – Critical Thinking &Decision Making Courses
2. Coursera – Critical Thinking and Decision-Making Modules
3. Harvard Business Review – Decision Making Articles
4. MIT OpenCourseWare – Decision Analysis

Mapping of COs with POs & PSO

CO	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
4SH216OE2.1	2	3	2	–	–	–	–	–	–	–	–	3	2	2
4SH216OE2.2	–	3	3	–	–	–	–	–	–	–	–	3	2	2
4SH216OE2.3	–	3	2	–	–	–	–	–	–	–	–	3	3	2
4SH216OE2.4	–	3	3	–	–	2	3	–	–	–	–	2	3	3
4SH216OE2.5	–	2	2	–	2	–	–	–	–	–	–	3	3	2
4SH216OE2.6	–	2	2	–	–	2	–	2	2	–	2	3	3	3
4SH216OE2. CO	1	3	3	-	1	1	1	1	1	-	1	3	3	2

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**4TX217PC1**	Course Category:	**PCC**	
Course Name	**Yarn Manufacturing-II Lab**					
Credits	**01**	Total L:T:P Hours	0:0:2 **30 Hrs**	Total SL Hours		**--**
Total Credit Hours	**30 Hrs**					
SEE Marks	**--**	SEE Time	**--**	CIA Marks		**--**
EE Marks	**25**	PA Marks	**25**	Total Marks		**50**

Course Description:

Subject Code 4TX217PC1 Yarn Manufacturing-II Lab is a compulsory Program Core Course for Second Year B.Tech. Textile Engineering.

Course Objectives:

The objective of this course is to perform practicals on the various mechanisms of speed frame, fundamentals aspects of Ring Frame process and mechanisms of doubling machine in Yarn Manufacturing-II lab.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX217PC1.1	Demonstrate the various mechanisms of Speed frame machines.	C-3, P-5
4TX217PC1.2	Describe fundamentals aspects of Ring Frame process	C-2, P-4
4TX217PC1.3	Perform experiments to understand the significance of spinning geometry and Demonstrate the mechanisms of Doubling machines.	C-3, P-5, A-2

List of Practicals:

Minimum eight practicals from the list mentioned below.

1. To study the passage of material through the Speed frame machine.
2. To study the Differential motion.
3. To study the drafting system of various machines.
4. To study the Building Mechanism of Speed Frame.
5. To study the passage of material through the Ring frame machine.
6. To study the Building mechanism of ring frame.
7. To study the passage of material through Doubling Machine.
8. To study geometrical aspects of yarn balloon in ring spinning
9. To study passage of material through two for one twister.
10. To determine the cot hardness of ring spinning machine.

E Resources:

1. Speed Frame in Yarn Spinning
   https://www.textileschool.com/444/speed-frame-in-yarn-spinning/
2. Ring Spinning Systems
   https://www.woolwise.com/wp-content/uploads/2017/07/Wool-482-582-08-T-14.pdf

Mapping of COs with POs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
4TX217PC1.1	3	1	-	2	-	-	-	3	2	-	-	3	2	1
4TX217PC1.2	3	1	-	-	-	-	-	-	-	-	-	2	1	1
4TX217PC1.3	3	1	-	2	-	-	-	3	3	-	-	3	2	2
4TX217PC1CO	3	1	-	2	-	-	-	2	2	-	-	3	2	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5.0**	Course Code: **4TX218PC1**			Course Category: **PCC**	
Course Name	**Fabric Manufacturing –II Lab**				
Credits	**01**	Total L:T:P Hours	0:0:2 **30 Hrs**	Total SL Hours	**-**
Total Credit Hours	**30 Hrs**				
SEE Marks		SEE Time		CIA Marks	
EE Marks	**25**	PA Marks	**25**	Total Marks	**50**

Course Description:

Subject Code 4TX218PC1 Fabric Manufacturing –II Lab. is a compulsory Professional core Course for Second Year B. Tech. Textile Engineering program.

Course Objectives:

The objective of this course is to provide fundamental knowledge of fabric formation through weaving processes including automatic weaving and dobby and jacquard shedding mechanism along with the understanding of various fabric and machine defects.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX218PC1.1	Comprehend how fabrics are created through the different mechanisms of a weaving machine for clear understanding of how weaving machines function to form fabrics,	C-2
4TX218PC1.2	Gain knowledge of automatic looms, the principles of dobby shedding, and the associated mechanisms for students to recognize modern loom technologies and understand the mechanical principles that control pattern formation in fabrics.	C-2
4TX218PC1.3	Analyze different warp and weft pathways along with potential loom defects for identifying the troubleshoot issues in weaving, ensuring quality and efficiency in fabric production	C-3, P-1, A-4

List of Practicals:

Minimum eight practicals from the list mentioned below.

1. Passage of warp sheet through shuttle loom during the process of fabric formation.
2. Driving of shuttle loom with the help of motion distribution system.
3. Identification of various faults of woven fabric produced on loom.
4. Study of Tappet Shedding mechanism of plain loom.
5. Working of Top reversing mechanism of plain loom.
6. Study of fast reed Warp protector mechanism.
7. The construction and working of over-pick mechanism of shuttle loom.
8. The construction and working of side lever under-pick mechanism of shuttle loom.
9. Study the construction and working loose reed mechanism warp protector mechanism of loom.
10. The construction and working of Climax dobby.

E- Resources

1. https://textilelearner.net/basic-weaving-mechanism-of-loom/
2. https://libcat.iitd.ac.in/bib/36515https://be-iitkgp.vlabs.ac.in/exp/voltage-regulator/
3. https://www.scribd.com/document/645849994/Dobby-Shedding

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4TX218PC1.1	3	2	2	-	2	-	-	2	2	-	-	3	2	1
4TX218PC1.2	3	2	2	-	3	-	-	2	-	-	-	2	3	1
4TX218PC1.3	2	2	2	-	2	-	-	2	3	-	2	2	3	2
4TX218PC1CO	3	2	2	-	2	2	-	2	3	-	2	2	3	1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**4TX219VS1**	Course Category:	**VSC**	
Course Name	**Garment Manufacturing Technology**					
Credits	**02**	Total L:T:P Hours	0:0:4 **60 Hrs**	Total SL Hours	--	
Total Credit Hours	**60 Hrs**					
SEE Marks	--	SEE Time	--	CIA Marks	--	
EE Marks		PA Marks	**50**	Total Marks	**50**	

Course Description:

Subject Code 4TX219VS1 Engineering a Vocational & Skill Enhancement Course for Second year B. Tech Textile Engineering.

Course Objectives:

The objective of this course is to perform practical's on the concepts of Vocational & Skill Enhancement is to develop technical skills related to the operation, handling of material, and maintenance of machinery and equipment.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX219VS1.1	Demonstrate garment manufacturing tools, measurement techniques, drafting methods, and sewing operations to complete foundational practical tasks	C-3
4TX219VS1.2	Demonstrate analyze fabric properties, identify suitable techniques for cutting, seam construction, and finishing, and select appropriate methods based on garment requirements.	C-3
4TX219VS1.3	create a complete basic garment by integrating pattern drafting, fabric cutting, sewing techniques, and finishing operations as per industry standards	C-6

List of Practical's:

Minimum eight practicals from the list mentioned below.

1. Study of Tools & Equipment Used in Garment Manufacturing.
2. Study of Taking Body Measurements (Direct & Standard System)

3. Drafting Basic Blocks (Bodice, Sleeve, Skirt).
4. Study of Pattern Alteration & Adaptation.
5. Study of Fabric Identification & GSM Calculation.
6. Study of Marker Planning & Fabric Estimation.
7. Study of Fabric Cutting Techniques.
8. Study of Industrial Sewing Machine Operation.
9. Study of Stitching & Seam Samples.
10. Study of Garment Construction Mini Project

E- Resource

1. Apparel Designing – Swayam
   https://onlinecourses.swayam2.ac.in/cec21_hs14/preview
2. Pattern Making Basics – University of Fashion (Free Lessons Section)
   https://www.universityoffashion.com/free-lessons/

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4TX219VS1.1	1	-	-	-	-	-	-	-	-	-	-	2	3	2
4TX219VS1.2	-	-	-	-	2	-	-	2	-	-	1	3	3	1
4TX219VS1.3	2	-	-	-	3	-	-	-	-	-	-	3	3	2
4TX219VS1	2	-	-	-	2	-	-	1	-	-	1	3	3	2

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code:	**4SH220AE1**	Course Category:	**AEC**
Course Name	**Technical Writing**			
Credits	**02**	Total L:T:P Hours	1:0:2 **45 Hrs**	Total SL Hours	**15 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	--	SEE Time	--	CIA Marks	--
EE Marks	--	PA Marks	**50**	Total Marks	**50**

Course Description:

Subject Code 4SH220AE1 Technical Writing is common Ability Enhancement Course for Second Year B. Tech.

Course Objectives:

The objective of the course is to enhance students' ability to write effective technical documents, professional correspondence, and research-oriented content with clarity, accuracy, and ethical standards.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4SH220AE1.1	Apply principles of technical writing in engineering documents.	C-3 P-2 A-2
4SH220AE1.2	Apply technical writing skills to prepare professional documents.	C-4 P-2 A-2
4SH220AE1.3	Create ethical, well-structured technical and research documents using IEEE referencing for professional and academic communication.	C-3 P-3 A-3

Course Contents:

Unit 1	**Fundamentals of Technical Writing:** Nature and importance of technical communication, characteristics of technical writing, audience analysis, technical vocabulary, grammar and style, clarity and conciseness, paragraph structure, coherence, technical descriptions, instructions and manuals.	7 Hrs
Unit 2	**Professional and Research Writing:** Technical reports and documentation, structure of reports, abstracts and summaries, research papers, project proposals, resumes and cover letters, business emails, documentation ethics, plagiarism, referencing styles (IEEE), editing and proofreading.	8 Hrs

List of Practicals:

Minimum eight practicals from the list mentioned below.

1. Analysis of Technical Communication to Identify the nature, purpose of given technical documents and evaluate their effectiveness.
2. Editing technical text for clarity and brevity
3. Technical description of an engineering device/system
4. Writing step-by-step technical instructions
5. Preparation of structured technical reports
6. Resume and cover letter drafting
7. Technical report writing based on laboratory work, case study, or project work
8. Abstract and executive summary writing for technical documents
9. Referencing and citation using IEEE format
10. Editing, proofreading, and plagiarism check of technical documents

Text Books:

1. Rizvi A. M. & Patnaik P., Effective Technical Communication, McGraw Hill Education (India), New Delhi (Second Edition).
2. Verma S., Technical Communication for Engineers, Vikas Publishing House Pvt. Ltd., New Delhi (First Edition).
3. Misra P. & Tyagi K., Advanced Technical Communication, PHI Learning Pvt. Ltd., New Delhi (Second Edition).

Reference Books:

11. Chauhan G. S., Kashiramka S. & Thimmesha L., Technical Communication, Cengage Learning India Pvt. Ltd., New Delhi (First Edition).

12. Alred G. J., Brusaw C. T. & Oliu B., Handbook of Technical Communication, Oxford University Press, New Delhi (Second Edition).

13. IEEE Editorial Style Manual, IEEE Standards Association, IEEE, USA (Latest Edition).

14. Joseph G. & Joseph B., Grammar and Usage for Technical Communication, Cambridge University Press India, Delhi (First Edition).

E Resources :

1. NPTEL–SWAYAM, IIT Roorkee, Technical Communication for Engineers.
2. https://owl.purdue.edu
3. https://ieeeauthorcenter.ieee.org

Mapping of COs with POs & PSOs:

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4SH220AE1.1	-	-	-	-	-	-	-	-		3	-	2	2	1
4SH220AE1.2	-	-	-	-	-	-	-	-	3	3	-	1	3	2
4SH220AE1.3	-	-	-	-	-	-	-	3		3	3	3	3	3
4SH220AE1 CO	-	-	-	-	-	-	-	1	1	3	1	2	2	2

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **4SH221EM1**		Course Category: **EEM**		
Course Name	**Elements of Costing and Economics**				
Credits	**02**	Total L:T:P Hours	1:0:2 **45 Hrs**	Total SL Hours	**15 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**--**	SEE Time	**--**	CIA Marks	**--**
EE Marks	**--**	PA Marks	**50**	Total Marks	**50**

Course Description:

Subject Code 4SH221EM1 Elements of Costing and Economics is a compulsory Humanities Social Science and Management Course for Second Year B. Tech. Textile Engineering.

Course Objectives:

The objective of this course is to provide the basic knowledge of elements of cost and costing principles which can be used to determine the cost of any product or process of industry.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4SH221EM1.1	Explain costing principles and demonstrate the use of costing techniques.	C-2, C-3
4SH221EM1.2	Apply fundamental concepts of economics to analyse the market trends.	C-3,C-4,
4SH221EM1.3	Calculate the various cost using costing principles	C-3

Course Contents:

Unit 1	**Introduction to Costing:** Meaning and methods of costing; elements of cost, prime cost, factory overheads, factory cost, selling and distribution overheads, total cost. Concept of BEP, fixed and variable cost, CVP relationship, C/V ratio, desired sales volume for profit, effect of cost/selling price changes on BEP; numerical examples.	8 Hrs
Unit 2	**Introduction to Economics:** Definition and scope; characteristics and types of wants; demand and supply laws; elasticity; market types such as perfect competition, monopoly, oligopoly; money functions, inflation and price levels.	7 Hrs

List of Case-studies:

Minimum eight case-studies from the list mentioned below.

1. To prepare Cost Sheet for a Textile Manufacturing Unit.
2. To determine the prime cost
3. To determine the overhead cost.
4. To determine Break-Even Point.
5. To determine Break-Even Point for target profit.
6. To prepare Demand schedule and Demand curve.
7. To measure the Demand Elasticity.
8. To measure the Demand Elasticity.
9. To prepare price index.
10. Study of inflation level

Text Books

1. B. M. Lall Nigam & I. C. Jain, COST ACCOUNTING: Principles and Practice, Prentice Hall India Learning Private Limited.
2. K. K. Dewett & J. D. Varma, Elementary Economic Theory, Sultan Chand & Sons Pvt Ltd.

Reference Books

1. Maheshwari & Mittal, Cost Accounting: Theory & Problems, Mahavir Publications.

E- Resources

1. NPTEL – Economics and Cost Accounting Courses
2. eGyankosh – Indira Gandhi National Open University Repository
3. Swayam – Online Learning Platform
4. https://www.accountingtools.com/
5. https://www.economicsdiscussion.net/

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4SH221EM1.1	-	-	-	-	-	-	-	-	-	3	-			
4SH221EM1.2	-	-	-	-	-	2	-	-	-	-	-		3	
4SH221EM1.3	-	-	-	-	-	-	-	-	-	3	-		2	
4SH221EM1CO	-	-	-	-	-	1	-	-	-	2	-		2	

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **4CE222VE1**		Course Category: **VEC**		
Course Name	**Environmental Science**				
Credits	**02**	Total L:T:P Hours	2:0:0 **30 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**60 Hrs**				
SEE Marks	**30**	SEE Time	**2 Hrs**	CIA Marks	**20**
EE Marks	**--**	PA Marks	**--**	Total Marks	**50**

Course Description:

Subject Code 4CE222VE1 Environmental Science is a Value Education course for Second Year B. Tech Civil Engineering.

Course Objectives:

The objective of this course is to develop understanding of environmental systems, natural resource management, ecological balance, and sustainable development practices to promote awareness and responsibility toward environmental protection and societal well-being.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4CE222VE1.1	Analyze renewable and non-renewable natural resources and associated problems to promote sustainable utilization for future generations.	C-4
4CE222VE1.2	Analyze food chains, webs, and ecological pyramids to evaluate ecological interactions and succession processes.	C-4
4CE222VE1.3	Examine shift from unsustainable to sustainable development to promote responsible resource planning for society.	C-3

Course Contents:

Unit 1	Renewable and non-renewable resources Environmental Science, Definition, scope and importance, Need for public awareness, Renewable and non-renewable resources, Natural resources and associated problems. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable life styles.	10 hrs

Unit 2	**Ecosystem:** Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem.	10 hrs
Unit 3	**Social Issues & Environment:** From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions, Environment Protection Act. Air (Prevention and Control of Pollution) Act., Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, public awareness.	10 hrs

Text Books:

1. Suresh K. Dhameja, Environmental Studies, Katson Books
2. Benny Joseph, Environmental Studies, McGraw Hill Education

Reference Books:

1. Masters & Wendell Ela, Introduction to Environmental Engineering and Science, Pearson Education
2. William Cunningham & Mary Cunningham, Environmental Science, McGraw Hill

E Recourses:

https://www.vlab.co.in/broad-area-civil-engineering

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
4CE222VE1.1	3	2	-	-	-	2	2	-	-	-	-	-	-	-
4CE222VE1.2	3	2	-	-	-	3	2	-	-	-	-	-	1	-
4CE222VE1.3	3	2	-	-	-	3	3	-	-	-	-	-	1	-
4CE222VE1.CO	3	2	-	-	-	3	3	-	-	-	-	-	1	-

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5**	Course Code: **4TX223DH1**		Course Category: **DH1**		
Course Name	**Sensor and E Textiles**				
Credits	**04**	Total L:T:P etc. Hours	4:0:0 **60 Hrs**	Total SL Hours	**60 Hrs**
Total Credit Hours	**120 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 4TX223DH1 Sensors and E Textiles is a double minor/honours course offered by the department of Textile Engineering for Second Year B. Tech of all Discipline.

Course Objectives:

The objective of this course is to provide knowledge of materials and integration techniques for developing conductive and functional electronic textiles and understanding of textile-based sensors, their types, materials, and production methods.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX223DH1.1	Explain the concept, properties, and types of E-textiles and their link with smart textiles and wearable systems for functionality inside fabric.	C-2
4TX223DH1.2	Explain the suitable materials such as conductive fibers, yarns, inks, and substrates for E-textile applications.	C-2
4TX223DH1.3	Understand various integration techniques (weaving, knitting, embroidery, and coating) for embedding sensors and conductive pathways in fabrics.	C-2
4TX223DH1.4	Understand the design of E-textiles by integrating conductive materials, programmable microcontrollers, and circuits for functional, comfortable wearable electronics.	C-2
4TX223DH1.5	Evaluate electrical performance (resistance, conductivity, signal quality) of E-textiles using techniques like four-point probe and impedance spectroscopy for electrical behavior of conductive fabrics and circuits.	C-5

4TX223DH1.6	Assess textile properties (mechanical, thermal, water repellency) and their effect on the functionality and durability of E-textiles.	C-5

Course Contents:

Unit 1	**Introduction to E-textiles:** Definition, relationship with smart textiles and wearable technology, Properties of E-textiles: electrical conductivity, flexibility, stretchability, and conformability, allowing for the integration of electronics into fabrics for sensing, Types of E-textiles: embedded E-textiles, laminated E-textiles.	10 hrs
Unit 2	**Materials for E Textiles:** Conductive fibers and yarns, Conductive inks and coatings, Substrates and textiles suitable for embedding sensors, Integration techniques: weaving, knitting, embroidery	10 hrs
Unit 3	**Manufacturing of E textiles:** Conductive Materials & Fabrication, Electronics Integration programmable microcontroller, Circuit Design & Prototyping	10 hrs
Unit 4	**Textile Based Sensors :** Introduction, Types of Textile Sensors: Pressure Sensors, humidity, temperature, or other environmental sensors integrated into fabrics, Materials and Manufacturing for sensors.	10 hrs
Unit 5	**Testing of electrical properties**: Measuring the flow of current and resistance through the e-textile system using technique like four-point probe or impedance spectroscopy, Evaluating the quality of electrical signals transmitted through the conductive threads or embedded components, Testing of electrical properties change after repeated use, washing, and other stresses.	10 hrs
Unit 6	**Testing of textile material properties:** Mechanical Properties: evaluating tensile strength, tear resistance, and flexibility of the base fabric, Thermal Properties: Measuring heat distribution and stability of the e-textile system, Water Repellency & Permeability: Assessing the e-textile's interaction with moisture affects its electronic functionality and user comfort.	10 hrs

Text Books

1. Kate Hartman Make, Wearable Electronics, Shroff publishers & distributors pvt ltd.
2. Xiaoming Tao, Wearable electronics and photonics , Woodhead Publishing Limited.
3. Vladan Koncar, Smart textiles and their applications, Wood head publishing.

Reference Books:

1. Matteo Stoppa and Alessandro Chiolerio, Wearable Electronics and Smart Textiles: A Critical Review.
2. P. Westbrock, G. Priniotakis and P.Kienkens, Analytical Electro Chemistry in textiles.
3. William C. Smith, Smart textile coatings and laminates.
4. M.K. Gupta & S.C. Jana, Advanced Functional Materials for Smart Textiles.

E- Resources:

1. https://www.mdpi.com/journal
2. https://nptel.ac.in/courses/116102006
3. https://ieeexplore.ieee.org

Mapping of COs with Pos & PSOs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
4TX223DH1.1	3	2	1	-	1	2	-	-	-	-	2	2	1	3
4TX223DH1.2	3	2	1	-	2	-	-	-	-	-	1	3	1	2
4TX223DH1.3	3	3	2	1	2	-	-	-	-	-	1	3	2	2
4TX223DH1.4	3	2	1	2	3	1	-	-	-	-	2	2	2	3
4TX223DH1.5	3	2	2	3	3	-	-	-	-	-	1	2	2	3
4TX223DH1.6	2	3	1	2	2	3	1	-	-	-	2	3	2	3
4TX223DH1.CO	3	2	1	2	2	2	1	-	-	-	2	3	2	3

Correlation levels – 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level:	**5**	Course Code:	**4TX223DH2**	Course Category:	**DH2**
Course Name	**Industrial & Automotive Textiles**				
Credits	**04**	Total L:T:P Hours	4:0:0 **60 Hrs**	Total SL Hours	**60 Hrs**
Total Credit Hours	**120 Hrs**				
SEE Marks	**60**	SEE Time	**3 Hrs**	CIA Marks	**40**
EE Marks	**--**	PA Marks	**--**	Total Marks	**100**

Course Description:

Subject Code 4TX223DH2 Industrial & Automotive Textiles is a double minor/honours course offered by the department of Textile Engineering for Second Year B. Tech of all Discipline.

Course Objectives:

The objective of this course is to understand the role of textiles in vehicle systems such as interior, exterior, safety and emerging functional applications.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
4TX223DH2.1	Explain the concept, characteristics, and importance of industrial textiles and their role in various industries.	C-2
4TX223DH2.2	Describe the materials, manufacturing methods, properties, and applications of transport bags and sheets, oil spill control fabrics, protective covers, and packaging materials.	C-2
4TX223DH2.3	Understand an overview of the automotive industry and applications of textiles in automotive sectors	C-2
4TX223DH2.4	Explain suitable materials, manufacturing process and its specific requirements for automotive applications.	C-2
4TX223DH2.5	Explore the many applications of textiles in automotive sector.	C-5
4TX223DH2.6	Evaluate the mechanical, thermal, durability, and aging tests specific to automotive textiles.	C-6

Course Contents:

Unit 1	**Introduction to Industrial Textile Applications:** Paper making felt, Conveyor belts, Drive belts Industrial ropes and cordages, Industrial webbings and slings	10 hrs
Unit 2	**Industrial Textile Products:** Filtration fabrics, Battery separators, Transport Bags and sheets, Fabrics for oil spill control, Protective covers and packaging materials	10 hrs
Unit 3	**Introduction to Automotive Textiles:** Overview of automotive industry and applications of textiles, Classification of automotive textiles, functions of automotive textiles, properties of automotive textiles.	10 hrs
Unit 4	**Materials and Manufacturing Techniques:** Natural and synthetic fibers and their requirements for automotive application, Fabric formation: Weaving, knitting, nonwoven, Surface treatments and dyeing methods Lamination and coating techniques, Molding and shaping techniques, , Adhesion and bonding processes	10 hrs
Unit 5	**Applications of Automotive textiles:** Interior Applications: Seat covers, headliners, carpets, door liners, roof liners. Exterior Applications: Convertible tops, tyre cords: manufacturing process of tyre cord, body covers. Safety Applications : airbags, types of airbags, seat belts, insulation, sound-proofing Specialty Areas: Sensors, heating textiles, smart fabrics	10 hrs
Unit 6	**Testing of automotive textiles :** Tensile strength, tear strength, bursting strength, seam strength, flammability testing, UV and light fastness, Abrasion Resistance, Thermal Resistance and Heat Aging, Air Permeability & Porosity, Chemical Resistance, Sound Absorption & Acoustic, Moisture Management and Comfort Test, Aging and Weathering Tests.	10 hrs

Text Books

1. Horrocks & S. C. Anand, Handbook of Technical Textiles.
2. Walter Fung & J. M. Hardcastle, Textiles in Automotive Engineering.
3. Jeffrey F. L. Partridge & S. K. Mukhopadhyay, Automotive Textiles.
4. Sabit Adanur, Wellington Sears Handbook of Industrial Textiles.

Reference Books:

1. Senthil Kumar, Textiles for Industrial Applications
2. Don Taylor, Automotive Upholestery handbook.
3. Roshan Shishoo,Textile Advances in the Automotive Industry.

E- Resources:

1. https://www.researchgate.net/publication/363855148
2. https://www.ijirset.com

Mapping of COs with Pos & PSOs

CO	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
4TX223DH2.1	3	1	-	-	-	2	-	-	1	-	1	3	1	2
4TX223DH2.2	3	2	2	1	1	1	-	-	-	-	1	3	2	2
4TX223DH2.3	3	2	1	-	-	2	-	-	1	-	1	3	2	2
4TX223DH2.4	3	3	3	1	2	3	2	1	1	-	1	3	2	3
4TX223DH2.5	3	2	2	3	2	2	1	-	1	-	1	3	2	3
4TX223DH2.6	2	2	3	2	3	3	2	1	1	1	3	2	2	3
4TX223DH2.CO	3	2	2	2	2	2	2	1	1	1	1	3	2	3

Correlation levels – 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5.5**	Course Code: **5TX224EC1**		Course Category: **EC**		
Course Name	**Chemical Processing of Textile Materials**				
Credits	**04**	Total L:T:P Hours	2:0:4 **90 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**120 Hrs**				
SEE Marks	**30**	SEE Time	**2 Hrs**	CIA Marks	**20**
EE Marks	**25**	PA Marks	**50**	Total Marks	**50**

Course Description:

Subject Code 5TX224EC1 Chemical Processing of Textile Materials is an optional exit course for under graduate diploma in Textile Engineering. This course introduces students to the fundamentals of textile wet processing, including fiber preparation, dyeing, printing, and finishing processes.

Course Objectives:

The objective of this course is impart knowledge of preparatory, dyeing, printing, and finishing processes used in textile chemical processing, to develop skills in handling wet processing machinery and executing chemical treatments.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
5TX224EC11.1	Explain the sequence and purpose of various wet processing operations	C-2
5TX224EC11.2	Apply suitable dyeing and printing techniques to different textile materials	C-3, P-3
5TX224EC11.3	Evaluate color fastness and processing quality parameters	C-5, P-4

Course Contents:

Unit 1	**Introduction to Textile Chemical Processing:** Sequence of wet processing in the textile value chain. Preparatory Processes: Desizing, Purpose, methods, and chemicals used; Scouring, Removal of natural impurities; alkali treatment of cotton; Bleaching, Optical brighteners and whitening agents; Mercerization, Principle, process, and effects on properties of cotton fibers.	10 Hrs

Unit 2	**Dyeing of Textiles:** Classification of dyes, natural, synthetic, direct, reactive, disperse, vat, acid, and basic dyes. Dyeing of natural and synthetic fibers. Dyeing machinery: winch, jigger, jet, and beam dyeing machines. Colorfastness properties and testing.	10 Hrs
Unit 3	**Printing of Textiles:** Printing pastes and thickeners, Fixation of prints and after-treatments. Printing methods: block printing, screen printing (manual, flat-bed, rotary), transfer printing, and digital printing.	10 Hrs

List of Practicals:

Minimum ten practicals from the list mentioned below.

1. To study desizing process on cotton fabric.
2. To perform scouring of cotton.
3. To carry out bleaching of cotton by Hydrogen peroxide.
4. To study mercerization process of cotton fabric.
5. To dye cotton with direct dyes.
6. To dye cotton with reactive dyes.
2. To dye polyester with disperse dyes using high-temperature method.
3. Study of jigger dyeing machine operation.
4. To perform pigment printing using screen printing method.
5. To print cotton fabric with direct dye using direst style.
6. To measure color fastness to washing,
7. To measure color fastness to rubbing,

Text Books

1. V.A. Shenai, Technology of Textile Processing, Sevak Publications
2. E. R. Trotman, Textile Scouring & Bleaching, B. I. Publications.
3. S.R. Karmakar, Fundamentals of Textile Chemical Processing, Elsevier.

Reference Books

1. J.T. Marsh, Textile Finishing, Chapman & Hall ltd
2. Leslie W.C. Miles, Textile Printing, Society of Dyers and Colourists (SDC)

E- Resources

1. NPTEL: Textile Chemistry & Wet Processing Modules
2. Swayam – Textile Chemical Processing
3. eGyankosh – IGNOU Textile Resources
4. https://textilelearner.net
5. [https://wetprocessingoftextiles.com]

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
5TX224EC11.1	3	2	2	-	2	-	-	-	2	-	-	2		
5TX224EC11.2	3	2	2	-	3	2	-	-	-	-	-	3		3
5TX224EC11.3	2	2	2	-	2	2	-	-	3	-	-			
5TX224EC11CO	3	3	2	-	2	1	-	-	2	-	-	2		1

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Level: **5.5**	Course Code: **5TX225EC1**		Course Category: **EC**		
Course Name	**Modern Yarn and Fabric Manufacturing Technology**				
Credits	**04**	Total L:T:P Hours	2:0:4 **90 Hrs**	Total SL Hours	**30 Hrs**
Total Credit Hours	**120 Hrs**				
SEE Marks	**30**	SEE Time	**2 Hrs**	CIA Marks	**20**
EE Marks	**25**	PA Marks	**25**	Total Marks	**50**

Course Description:

Subject Code 5TX225PC1 Modern Yarn and Fabric Manufacturing Technology is an optional exit course for undergraduate Diploma in Textile Engineering.

Course Objectives:

The objective of this course is to focuses on fundamental concepts related to advance yarn and fabric manufacturing processes. Through a series of lectures, students will be briefly introduced to key terms, principles, and modern techniques involved in yarn and fabric production.

Course Outcomes:

After completing the course students will be able to:

CO	Course Outcome	Domain Level
5TX225EC1.1	Demonstrate the principle of rotor, friction spinning and constructional details of rotor and friction spinning machines.	C-3, P-4
5TX225EC1.2	Demonstrate the concept of air jet, air vortex spinning and constructional details of air jet and air vortex spinning machines.	C-4, P-4
5TX225EC1.3	Describe the technical features, design and working principle of projectile, rapier and airjet weaving machine.	C2, P-4

Course Contents:

Unit 1	**Rotor and Friction Spinning:** Rotor Spinning: Introduction, open end spinning principle, sequence of operations, Construction details of rotor spinning machines, Process parameters influencing yarn quality, Properties of rotor yarn, Applications of rotor yarn. Friction Spinning: Introduction, principle of friction spinning, sequence of operation in fiction spinning, Construction details of different friction spinning machines-dref-I, dref-II, dref-III,	10 Hrs

	dref-2000 and dref-3000, Process parameters influencing yarn quality, properties of friction yarn, Applications of friction yarn.	
Unit 2	**Air Jet & Air Vortex Spinning:** Air jet spinning: Introduction, principle of air jet spinning, Construction details of air jet spinning machines, Details of yarn structure, properties and applications of air jet yarn, Air vortex spinning- Introduction, principle of air vortex spinning, Construction details of air vortex spinning machine, Details of yarn structure, properties and application of air vortex yarn.	10 Hrs
Unit 3	**Projectile, Rapier and Airjet Weaving:** Projectile weaving : Introduction to shuttle-less weaving - Classification of shuttle-less weaving machines, weft accumulator, selvedges formation on shuttle-less weaving machines, Introduction, technical features, advantages, phases of weft insertion, projectile picking mechanism, Timing cycle of projectile weaving, weft tension variation. Rapier Weaving: Classification of rapier weaving machines, rigid and flexible rapiers, Methods of weft insertion viz. rapier driving mechanism, weft control mechanism, Weaving timings, shedding, take up, Selvedge formation and quick style change. Air jet weaving: principle of airjet weaving, phases of weft insertion, Air requirements and air jet nozzles.	10 Hrs

List of Practicals:

Minimum ten practicals from the list mentioned below.

1. To study passage of material through rotor spinning machine.
2. To produce yarn sample on pilot rotor spinning machine.
3. To compare unevenness & imperfection of ring & rotor yarn.
4. Analysis of physical properties of ring & rotor yarn.
5. Analysis of physical properties of ring & air jet yarn.
6. To study microscopic structure & physical properities, U% of air vortes & core spun yarn.
7. To study microscopic structure & physical properities, U% of air vortes & dref yarn.
8. To study the picking mechanism of rapier loom.
9. To study the picking mechanism of projectile weaving machine
10. To study the different phases of weft insertion in air jet loom.

Text Books

1. Klein W, Manual of New Spinning System Vol. I – III, The Textile Institute, UK.
2. Oxtoby E, Spun Yarn Technology, by Butterworth and Co. Ltd. publication, 1987.
3. Lord P R, Handbook of Yarn Production, The Textile Institute, Woodhead Publication Limited.

Reference Books

1. Allen Armord, Handbook of Weaving operations.
2. Sabit Adnur, Handbook of Weaving.
3. R. Marks, Principle of Weaving, A.T.C. Robinson,

E- Resources

1. New Spinning Technologies Link: http://www.digimat.in/nptel/courses/video/116102059/L11.html
2. Unconventional and New Spinning System and Technologies Link: textilelearner.net/modern-and-new-spinning-technologies/
3. Shuttle less Looms Link: https://ebooks.inflibnet.ac.in/hsp08/chapter/shuttleless-looms
4. Unconventional and new spinning systems and technologies Link:https://textilelearner.net/modern-and-new-spinning-technologies/#google_vignette

Mapping of COs with POs

CO	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
5TX225EC1.1	3	2	-	-	3	1	1	-	-	-	1	3	2	-
5TX225EC1.2	3	2	-	-	3	1	1	-	-	-	1	3	2	-
5TX225EC1.3	3	3	2	3	2	1	1	-	-	-	1	3	2	-
5TX225EC1CO	3	2	1	1	2	1	1	-	-	-	1	3	2	-

Correlation levels- 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)