

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
(VJTI)
MATUNGA, MUMBAI 400 019

(Autonomous Institute affiliated to University of Mumbai)



Curriculum

(Scheme of Instruction & Evaluation and Course contents)

(Revision 2018)

For

Third Year

of

Four Year Undergraduate Programmes Leading to
Bachelor of Technology (B Tech) Degree in Textile Technology

Implemented from the batch admitted in Academic Year 2018-19

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VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

(Autonomous Institute affiliated to University of Mumbai)

Curriculum

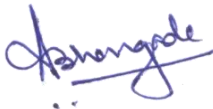
(Scheme of Instruction & Evaluation and Course contents)

For

Third Year

of

**Four Year Undergraduate Programmes Leading to
Bachelor of Technology (B Tech) In Textile Technology**



VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

Textile Manufactures Department

VISION

To develop competent professionals and leaders for the global textile community, through quality education, innovation and research.

MISSION

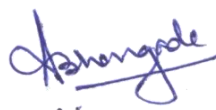
- To provide comprehensive knowledge of textile technology through structured course delivery and active participation in innovative and collaborative research work.
- To foster stronger interface with industry, alumni and research organizations in India and abroad.
- To kindle a sense of social and environmental responsibility and inculcate the ability to perform well in team based projects in the professional sphere.

Bachelor of Technology in Textiles

Program Educational Objectives (PEOs)

The undergraduate programme of textile technology is designed:

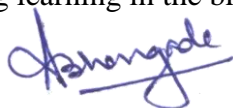
1. To impart in-depth knowledge in the field of textile products, processes and quality assurance aspects.
2. To impart leadership and problem solving skills to enable the graduates excel in challenging work environments in textile domain and assume positions of higher responsibility in their professional career.
3. To motivate the graduates towards continuous learning of new products and processes in the field of textile manufacturing.
4. To instil the spirit of professionalism, ethical conduct, effective communication and team work within the individual.



Program Outcomes (POs)- As specified by NBA

On successful completion of the programme, graduates will be able to:

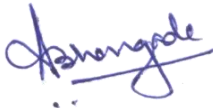
1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems (**Engineering knowledge**).
2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences (**Problem analysis**).
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations (**Design/development of solutions**).
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions (**Conduct investigations of complex problems**).
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations (**Modern tool usage**).
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice (**The engineer and society**).
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development (**Environment and sustainability**).
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice (**Ethics**).
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings (**Individual and team work**).
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions (**Communication**).
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments (**Project management and finance**).
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change (**Life-long learning**).



Program Specific Outcomes (PSOs)

On successful completion of the programme, graduates will be able to:

1. Apply knowledge of textile products and processes, statistical, analytical and computational skills to investigate technical problems in textile and allied industries.
2. Demonstrate knowledge in textiles and management principles effectively in the workplace and manage projects in multidisciplinary environments.
3. Understand the impact of the textile processes in societal and environmental contexts and demonstrate the knowledge and need for sustainable development.

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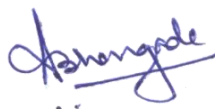
VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

Bachelor of Technology in Textiles

Scheme of Instruction and evaluation
SEM – V

Scheme of Instruction						Scheme of Evaluation			
Sr. no.	Course Code	Course Name	Hr/Week			Credits	TA	MST	ESE
			L	T	P				
1	R4 TT3001T	Advanced Yarn Manufacturing	3	0	0	3	20	20	60
2	R4 TT3002T	Advanced Fabric Manufacturing	3	0	0	3	20	20	60
3	R4 TT3003T	Testing of Textiles	3	0	0	3	20	20	60
4	R4 TT3004S	Technical Textiles	3	1	0	4	20	20	60
5	R4 TT3005T	Cloth Structure Analysis	2	0	0	2	20	20	60
6	R4 HM3001L	Professional Communication Skills	1	0	2	2	60	---	40
7	R4 TT3001P	Advanced Yarn Manufacturing Laboratory	0	0	2	1	60	---	40
8	R4 TT3002P	Advanced Fabric Manufacturing Laboratory	0	0	2	1	60	---	40
9	R4 TT3003P	Testing of Textiles Laboratory	0	0	2	1	60	---	40
10	R4 TT3004P	Cloth Structure Analysis Laboratory	0	0	2	1	60	---	40
			15	1	10	21			

Abbreviations: L – Lecture, T-Tutorial, P-Practical, TA- Teacher's Assessment/ Term work Assessment, MST-Mid Semester Test, ESE- End Semester Examination.



SEM – VI

Scheme of Instruction						Scheme of Evaluation			
Sr. no.	Course Code	Course Name	Hr/Week			Credits	TA	MST	ESE
			L	T	P				
1	R4 TT3006S	Man Made Fibre Production Technology	3	1	0	4	20	20	60
2	R4 TT3007T	Design of Textile Structures	3	0	0	3	20	20	60
3	R4 TT3008T	Knitting Technology	3	0	0	3	20	20	60
4	Program Elective (1)	<i>*Refer Table below</i>	3	0	0	3	20	20	60
4	Open Elective R4TT3601S	Polymers & Fibres for Engineering Applications	3	0	0	3	20	20	60
5	R4 TT3012A	Policies & Prospects of Indian Textile Industry	1	2	0	P/NP			
6	R4 TT3008P	Knitting Technology Laboratory	0	0	2	1	60	---	40
7	R4 TT3009 P	Apparel Manufacturing Technology	1	0	2	2	60	---	40
8	Professional Elective 1 Lab	<i>*Refer Table below</i>	0	0	2	1	60	---	40
		Total	17	3	6	20			

*Mandatory internship after VIth semester; credit will be accounted in semester VII.

List of Program Elective (I) Courses:

Theory course(s)		Lab course(s)	
Course Code	Course	Course Code	Course
R4 TT3101T	a) Long Staple Spinning & Weaving	R4 TT3101P	a) Long Staple Spinning & Weaving Laboratory
R4 TT3102T	b) Interior Textiles: Design & Development	R4 TT3102P	b) Interior Textiles: Design & Development Laboratory
R4 TT3103T	c) Advanced Finishing of Textiles	R4 TT3103P	c) Advanced Finishing of Textiles Laboratory
R4 TT3104T	d) High Performance Fibers	R4 TT3104P	d) High performance Fibers Laboratory

Abbreviations: L – Lecture, T-Tutorial, P-Practical, TA- Teacher's Assessment/ Term work Assessment, MST-Mid Semester Test, ESE- End Semester Examination.

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3001T		
Course Title	Advanced Yarn Manufacturing		
Course Objective	To impart knowledge of processing of blends and unconventional yarn forming techniques		
Course Outcomes	<p>After completing this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Explain per-requisites of fibre blending and various methods of fibre blending to form blended yarns. 2. Describe the different types of unconventional spinning techniques 3. Recognize the merits and demerits of open-end spinning techniques. 4. Describe the different techniques of yarn doubling. 5. Discuss the latest developments in yarn manufacturing. 		
Prerequisite	Student should have background of engineering Physics, Mechanics, Basics of Yarn Manufacturing		

Course Content

Modules	Description
Module 1	Spinning of Man made Fibres and Blends: Fibre characteristics and spinnability of manmade fibres. Fibre properties and end uses. Relationship between fibre properties and yarn quality and yarn characteristics. Role of spin finish and fibre crimp in processing. Blending and its objectives. Estimation of blend intimacy and blend irregularity and factors affecting them. Migration. Selection of blend constituents. Effect of blend composition on yarn properties. Processing of man-made fibres and blends on short staple spinning system.
Module 2	Introduction to unconventional spinning: Fibre characteristics requirements for different leading spinning technologies. Possibilities and limitations of different spinning technologies.
Module 3	Rotor Spinning: Principle and raw material preparation. Design and working of rotor spinning machine and effect of each on the process and product quality. Structure of rotor spun yarns and comparison with ring spinning. New developments
Module 4	Air-jet Spinning: Principle and raw material preparation. Process and machine parameters affecting product quality. Principle of vortex yarn manufacture. Difference between air jet spun and vortex spun yarn structure.
Module 5	Friction Spinning: Principle and raw material preparation, process and machine parameters affecting product quality. Assessment of DREF-II and DREF-III yarn structures and properties. Compact Spinning: Principle and raw material preparation. Comparative assessment of the structure and performance with respect to ring yarn.

Module 6	Other Spinning system: Self twist, twistless, wrap spinning, Core spinning, Siro spinning, Bobtex yarn manufacture, Compact spinning. New Developments.
Module 7	Doubling: Preparation for Doubling. Objects of doubling, assembly winding machine – its construction & working, stop motion. Construction of a Doubler, dry & wet doubling, different methods of threading the yarn through doubler, Construction of ring, traveler and spindles for doubler. Two for One twister. Defects in doubling process, and doubled yarn. Different types of doubled & cabled yarns used in Industry. Fancy yarns and fancy doubler.

Text Books:

1. W. Klein, Manual of Textile Technology: New Spinning Systems, 1st Ed; The Textile Institute, Manchester, UK 1993.
2. Carl A. Lawrence“ Fundamentals of Spun Yarn Technology”, CRC Publications, 2003.
3. P.R. Lord, Hand Book of Yarn Production: Science, Technology and Economics, Tailor and Francis, 2003.

Recommended Readings:

1. K.R. Salhotra, Spinning of Manmade & Blends on Cotton System, Textile Association (India), 2004.
2. W. Klein, Manual of Textile Technology: New Spinning Systems, 1st Ed; The Textile Institute, Manchester, UK 1993.
3. R.H.Gong&R.M.Wright, Fancy Yarns : their manufacture and application, The Textile Institute, CRC Press, Woodhead Publishing Ltd., ISBN 0-8493-1550-6.
4. Salhotra K R and Ishtiaque S M, Rotor Spinning: Its advantages, limitations and prospects in India, 1st Ed; National Information Centre for Textile and Allied Subjects, 1995.

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3002T		
Course Title	Advanced Fabric Manufacturing		
Course Objective	To make students aware of advances in the manufacture of woven fabrics.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Explain the concept of shuttleless weaving. 2. Discuss the principle and mechanics of weft insertion on various shuttleless weaving machines. 3. Appraise advanced weaving techniques like leno weaving, multiphase weaving and multiaxial weaving. 4. Comprehend energy conservation and techno-economics of shuttleless weaving. 		
Prerequisite	Student should have knowledge of Engineering Physics, Mathematics, Mechanics and basics of Fabric Manufacture.		

Course Content

Modules	Description
Module 1	Shuttleless Looms: Introduction and classification to shuttleless weaving machines, weft velocity, comparison of various weft insertion systems, selvages, weft storage units, need for better weft insertion methods, requisites for successful installation of shuttleless looms.
Module 2	Projectile loom: Principle of weft insertion, projectile preparation for picking, picking mechanism, sequence of weft insertion, power of picking, energy utilization, fabric density, weaving performance and fabric quality, Motion of sley.
Module 3	Rapier loom: Classification of rapier weaving machines, principles of weft insertion, sequence of weft insertion, tip to tip and loop transfer, rapier drives.
Module 4	Air-jet Loom: Principles of weft insertion, sequence of weft insertion, air jet nozzles, relay nozzles, methods of air jet control, quality of air supply for air jet looms, factors affecting pneumatic weft propulsion, motion of weft, nozzle design, technical features of modern airjet weaving machines.
Module 5	Water-jet Loom: Introduction, principle, nozzles, sequence of weft insertion, quality of water for water jet looms, and technical features of modern water jet weaving machines.
Module 6	Multiphase weaving & Circular Weaving: Principles of weft insertion, sequence of weft insertion in multiphase looms, principles of fabric formation on two phases, multiphase, circular and narrow fabric weaving, applications and technical features of looms.

Module 7	Leno weaving, Triaxial weaving, Denim manufacturing, Filament weaving , Weaving of slit yarn fabrics.
Module 8	Energy consumed, timings, drive to sley and healds, fabric quality and productivity of shuttleless looms, theoretical analysis of weft insertion in shuttleless looms, comparison of various shuttleless weaving technologies with respect to reed width, loom speed, WIR and capital cost.

Text Books:

1. Textile Institute Manchester – A.T.C. Robinson & R. Marks, Principles of Weaving, ISBN - 0900739258
2. Talukdar, Sriramulu & Ajgaonkar. Weaving Machines Mechanism & Management, Mahajan Publishers, Ahmedabad -
3. A. Ormerod , Weaving, Technology and Operations, Woodhead Publishing Ltd. - - ISBN-13: 978-1870812764
4. Sabit Adanur ,Handbook of Weaving, CRC Press, ISBN -1-58716-013-7.

Recommended Readings:

1. Extension programme on shuttleless looms, Filament Weaving – NCUTE.
2. Mechanisms of flat weaving technology, Woodhead Publishing Limited - Valeriy V. Choogin, Palitha Bandara and Elena V. Chepelyuk, ISBN 978-0-85709-780-4

SEM – V

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3003T		
Course objective	To provide comprehensive knowledge about evaluation of fabric properties.		
Course Title	Testing of Textiles		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Recognize the various parameters for evaluation of fabric properties. 2. Associate the relationship between fabric structure and properties like permeability. 3. Estimate the fabric serviceability properties like abrasion, pilling, wrinkle etc. 4. Judge fabric functional properties like water repellency, flame retardancy, comfort, handle etc. 5. Determine mechanical properties of fabrics. 		
Prerequisite	Students should have knowledge of physics, mathematics, basic testing of yarns and fibres.		

Course content

Modules	Description
Module 1	Testing of Fabric: Measurement of fabric dimensions and other physical properties such as thickness, weight, yarn crimp, fabric shrinkage.
Module 2	Relationship between fabric porosity and permeability. Air, water and water-vapour transmission through fabrics, thermal resistance of fabrics. Measurement of fabric porosity and permeability.
Module 3	Concept of serviceability of fabric. Testing of parameters such as abrasion resistance, pilling, crease and wrinkle recovery, fabric handle, bending length, assessment of barre and other form of fabric defects.
Module 4	Concept of Fabric wettability, Water repellency and waterproof and their measurement.
Module 5	Concept of Fabric Flammability, testing of flame retardancy and their measurement.
Module 6	Measurement of Fabric mechanical properties like strength, tear strength, bursting strength.
Module 7	Concept of Fabric low stress mechanical properties such as smoothness, stiffness, softness, shear, drape and their measurement- Introduction to Kawabata and FAST system.
Module 8	Chemical Testing of Textiles: Evaluation of Colour fastness, Rubbing fastness, Laundering fastness, sublimation fastness, blend composition.

Text Books:

1. Saville B P, "Physical Testing of Textiles", Woodhead Publishing Ltd, 2004, ISBN 1 85573 367 6.
2. "Testing and Quality Management", Ed. V. K. Kothari, IAFL Publications, New Delhi, 1999.
3. Booth J E, "Principles of Textile Testing", CBS Publishers and Distributors, New Delhi, 1999.

Recommended Readings:

1. Angappan P & Gopalakrishnan R, "Textile Testing", SSM Institute of Textile Technology, Komarapalayam, 2002.

Programme Name	Bachelor of Technology in Textiles	Semester V
Course Code	R4 TT3004S	
Course Title	Technical Textiles	
Course Objective	To make student aware of non-apparel functions performed by textiles	
Course Outcomes	After completing this course, the students will be able to: 1. Differentiate between conventional and technical textiles. 2. Comprehend the various classifications of technical textiles. 3. Identify the specifications and desirable functional characteristics for each class of technical textiles. 4. Identify the process parameters for designing a technical textile for particular technical applications.	
Prerequisite	Basic knowledge of Spinning, Weaving and Processing of textile materials	

Course Content

Modules	Description
Module 1	Introduction: Definition and scope for technical textiles, Market size – present status and future trends in Technical Textiles – Areas of Application of Technical Textiles and Sectors of Technical textiles (Classification). Comparison with conventional fabrics, a brief idea about technical fibers, role of yarn and fabric construction, composite material. Various technologies for making of technical textiles.
Module 2	Geotextiles: Brief idea about geo-synthetics and their uses, essential properties of geotextiles, geotextile testing and evaluation, application examples of geotextiles.
Module 3	Filtration Textiles: Definition of filtration parameters, theory of dust collection and solid liquid separation, filtration requirements, concept of pore size and particle size, role of fiber, fabric construction and finishing treatments.
Module 4	Medical textiles: Classification of medical textiles, description of different medical textiles.
Module 5	Protective Clothing: Brief idea about different type of protective clothing, functional requirement of textiles in defense including ballistic protection materials and parachute cloth, military and defense textiles.
Module 6	Sports and recreation textiles: Functional requirement of different types of products and their construction.
Module 7	Automotive Textiles: Application of textiles in automobiles, requirement and design for different tires, airbags and belts, methods of production and properties of textiles used in transportation applications.
Module 8	Sewing threads, cords and ropes: Types- methods of production and applications, functional requirements, structure and properties.
Module 9	Other uses of technical textile: Functional requirements and types of textiles used for paper making, agricultural, electronics, power transmission belting, hoses, canvas covers and tarpaulins.

Text Books:

1. “Handbook of Technical Textiles”, Ed. A R Horrocks and S C Anand, Woodhead Publication Ltd., ISBN 9781782424659.
2. “Wellington Sears Handbook of Industrial Textiles”, Ed. Sabit Adanaur, Technomic Publishing Company, Inc., Pennsylvania, USA, 1995, ISBN 1566763401.

Recommended Readings:

1. "Engineering with Geosynthetics", Ed. G V Rao and G V S Raju, Tata McGraw Hill Publishing Co. Ltd., New Delhi 1990, ISBN 9780074603239.
2. "Modern Textile Characterization Methods", Ed. M Raheel, Marcel Dekker, Inc., 1996, ISBN 0824794737.
3. "Automotive Textiles", S. K. Mukhopadhyay & J. F. Partridge, Journal Textile Progress, The Textile Institute, 1999, Vol 29, 1999, Issue 1-2.
4. "Sewing Threads", J. O. Ukponmwan, A. Mukhopadhyay & K. N. Chatterjee, Journal Textile Progress, The Textile Institute, Vol 30, 2000, Issue 3-4.

Programme Name	Bachelor of Technology in Textiles	Semester V
Course Code	R4 TT3005T	
Course Title	Cloth Structure Analysis	
Course Objective	To impart knowledge of different woven cloth constructions and methodology of designing the same on a loom	
Course Outcomes	<p>After completing this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Comprehend the concept and representation of woven fabric design. 2. Reproduce the basic weaves and their derivatives with draft and lifting plans. 3. Apply the concept of color and weave effect in ornamentation of fabrics 4. Identify and analyze the specialty woven designs for various classes of applications like apparel, home textiles, industrial textiles etc. 5. Estimate fabric parameters for producing particular weave. 	
Prerequisite	Knowledge of Fabric manufacturing and Yarn testing.	

Course Content

Modules	Description
Module 1	Introduction: Different types of yarn such as spun, filament, textured and fancy yarns and their impact on textile design. Importance of fabric structure and analysis, weave and its correlation with various physical properties of fabric like strength, cover and crimp etc.
Module 2	Basic Weaves: Method of construction and representation, features and uses of plain weave and its derivatives, twill weave and its derivatives, Satin and sateen weaves and their derivatives.
Module 3	Colour and Weave Effect: Features, criteria for selection of weaves for combination, Method of preparation of various effects like line effect, Hounds tooth, Birds eye, Hair lines and Step pattern and their uses. weaves and colour combinations, various Stripe and Check Weaves.
Module 4	Absorbent Fabrics and weaves: Method of preparation, features and uses of Diamond and Diaper Weaves, Honeycomb weaves, Huck-a-back and Mock-leno weaves. Crepe Weave: Special feature, construction of the weave, method of preparation of its derivatives and uses.
Module 5	Bedford Cord weaves: Method of construction, features, cross-sectional view, derivatives and uses. Backed fabrics: Definition, features, classification and usage. Graphical representation, warp backed and weft backed cloth, reversible backed fabric, wadded backed fabric, Extra warp and weft ornamentations.
Module 6	Double Cloth: Definition, features, classification and uses. Method of preparation of self-stitched and center-stitched double cloths, their salient feature and uses. Wadded double cloth.
Module 7	Terry Weaves: Definition, classification, process of formation of pile, graphical representation of terry weaves, loop sprouting, extra attachments.
Module 8	Calculations: Raw material calculations to produce different weaves. Technical specification of important fabrics.

Text Books:

- 1 Groscicki Z J, “Watsons Textile Design and Colour”, NewnesButtersworth, 1988.
- 2.Groscicki Z J, “Watsons Advanced Textile Design”, Newnes Buttersworth, 1989.
- 3 Klibbe J W, “Structural Fabric Design”, Revised edition, 1965, North Carolina State University.

Recommended readings:

Gokarneshan N, “Fabric Structure and Design”, New Age International, New Delhi, 2004

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 HM3001L		
Course Title	Professional Communication Skills		
Course Objective	<ul style="list-style-type: none"> • To enable students to become effective communicators through gaining knowledge and skills in professional communication. • To develop the communicative abilities of students making them industry- ready. 		
Course Outcomes	<p>After completing this course students will be able to:</p> <ol style="list-style-type: none"> 1. Apply the principles and practices of business communication for communicating in a professional environment. 2. Design a technical document with correctness of language, appropriate vocabulary and style. 3. Display competence in oral and visual communication. 4. Demonstrate capabilities for self -assessment and development. 		
Prerequisite	Basic command of English Language.		

Course Content

Modules	Description
1	<p>Basics of Business Communication</p> <ol style="list-style-type: none"> a. Concept and meaning of communication b. Verbal and non-verbal communication c. barriers to the process of communication d. Channels of communication <p>Role of communication in the age of information technology</p>
2	<p>Technical Writing</p> <ol style="list-style-type: none"> a. Technical writing process b. Style and organization in technical writing c. objectivity, clarity, precision as defining features of technical communication d. Language and format of various types of business letters, reports; proposals, e-mails, minutes of meeting, research papers
3	<p>Self-Development & Assessment</p> <ol style="list-style-type: none"> a. Time Management b. Perception & Attitude c. Personal Goal Setting d. Emotional Intelligence e. Team work f. Creativity

4	Spoken Communication <ol style="list-style-type: none"> a. Public Speaking b. Group Discussion c. Presentation d. Interviews e. None verbal Communication f. Using Visual Aids
5	Business Ethics & Etiquettes <ol style="list-style-type: none"> a. Business & Corporate Ethics b. Social and Business Etiquettes c. Interview Etiquettes

Text Books:

1. Hory Shankar Mukharjee. Business Communication, OUP .
2. Asharaf Rizvi, Effective Technical Communication, The McGraw Hill.
3. Meenakshi Raman, Prakash Singh, Business Communication, OUP.

Recommended Readings:

1. E.H. McGrath, Basic Managerial Skills for All, , PHI Learning Pvt Ltd
2. R. Subramanian, Professional Ethics, OUP.
3. <https://learnenglish.britishcouncil.org/en/english-grammar>

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3001P		
Course Title	Advanced Yarn Manufacturing Laboratory		
Course Objective	To make students aware of processes for making advanced yarns and doubled yarns.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Understand the technical details, passage of material and settings of unconventional spinning machines. 2. Recall the processing parameters on doubling and fancy doubling of yarns. 3. Analyze the blended yarns. 4. Evaluate the properties of fancy yarns. 		
Prerequisite	Students should be conversant with basic operations of spinning machines.		

Course Content

Modules	Description
Module 1	Estimation of FQI, SCI and spinning limit.
Module 2	Microscopic study of fibre migration in blended yarns.
Module 3	Image analysis of unconventional yarn using microscope.
Module 4	Study of rotor spinning machine.
Module 5	Study of DREF spinning machine.
Module 6	General study of Ring Doubling Frame – passage, building mechanism, threading methods, dray & wet doubling. Gearing calculations.
Module 7	Study of a conventional “Fancy Doubler” – threading, slub forming mechanism.
Module 8	Production of different types of fancy yarns.
Module 9	Evaluation of evenness characteristics of yarns through USTER tester.
Module 10	Study of features of “Direct Twisting” machine- study of control panel, different threading methods and function of various parts.
Module 11	Production and characterization of “Cover” yarn with different process parameters.
Module 12	Production and characterization of “SIRO” yarn with different process parameters.
Module 13	Production and characterization of “SIRO” yarn incorporating elastane yarn with different process parameters.
Module 14	Production and characterization of “Multi Twist” yarn with different process parameters.
Module 15	Production and characterization of three ply yarn: Microscopic study, Calculation of twist and resultant count.

Recommended References:

1. W. Klein, The Technology of Short staple spinning, The Textile Institute Publication, 1998.
2. R.H.Gong & R.M.Wright, Fancy Yarns : their manufacture and application, The Textile Institute, CRC Press, Woodhead Publishing Ltd., ISBN 0-8493-1550-6.
3. Machine manual, Direct Twisting Machine, AGTEKS, PVT.LTD, India.

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3002P		
Course Title	Advanced Fabric Manufacturing Laboratory		
Course Objective	To provide practical knowledge of advanced weaving techniques		
Course Outcomes	After completing this course, students Will be able to: 1. Describe the mechanism of shuttleless weaving machines. 2. Grasp the concept of yarn tension variation during weaving. Compare conventional and unconventional weaving techniques.		
Prerequisite	Students should be aware of basics of weaving preparatory processes and weaving technology.		

Course Content

Modules	Description
Module 1	Study of Projectile loom.
Module 2	Study of Rapier loom.
Module 3	Study of Airjet loom.
Module 4	Analysis of picking force on conventional shuttle loom.
Module 5	Study of warp tension in conventional and unconventional looms.
Module 6	Production of woven fabric of given parameters in weaving workshop.
Module 7	Study of sample warping, sizing and weaving equipment.
Module 8	Analysis of woven fabrics produced in weaving workshop.
Module 9	Study of nonwoven fabric forming machine.
Module 10	Manufacture and testing of nonwoven fabrics.

Recommended References:

1. Winding, Warping & Sizing – BTRA Silver Jubilee monograph series.
2. Woven Cloth Construction, Manchester: Textile Institute, London: Butterworths, 1967 - A. T. C. Robinson and R. Marks.
3. Sizing Materials, Methods and Machines, Textile Trade Press, Bombay, 1982 - Talukdar M.K. & Ajgaonkar D.B and Wadekar.

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3003P		
Course Title	Testing of Textiles Laboratory		
Course Objective	To provide practical training in testing of fabrics.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Perform various physical tests for fabrics. 2. Determine the mechanical properties of fabrics. 3. Perform the serviceability test of fabrics. 		
Prerequisite	Student must be aware of basic testing of fibres and yarns.		

Course Contents

Modules	Description
Module 1	Measurement of dimensions of fabric and calculation of GSM.
Module 2	Study of air permeability property of fabric.
Module 3	Study of water permeability property of fabric..
Module 4	Study of thermal insulation property of fabric.
Module 5	Study of drapability of fabric.
Module 6	Study of fabric assistance property.
Module 7	Study of abrasion resistance property of fabric (both linear and Lissajous motion).
Module 8	Study of pilling propensity of fabric.
Module 9	Study of tearing strength measurement technique for fabric.
Module 10	Study of bursting strength measurement technique for fabric.

Recommended References:

1. Saville B P, "Physical Testing of Textiles", Woodhead Publishing Ltd, Cambridge, 2002.
2. "Testing and Quality Management", Ed. V. K. Kothari, IAFL Publications, New Delhi, 1999.
3. Booth J E, "Principles of Textile Testing", CBS Publishers and Distributors, New Delhi, 1999.

Programme Name:	Bachelor of Technology in Textiles	Semester V
Course Code:	R4 TT3005P	
Course Title:	Cloth Structure Analysis Laboratory	
Course Objective	To make students aware of the analysis of fabric structures and also their representation for fabric development	
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Analyze structure of various fabrics. 2. Evaluate the yarn dimensions and fabric sett particular for making a fabric structure. 3. Demonstrate the pictorial details of fabric analysis on fabric instruction sheet with design, draft and peg plan 4. Construct designs for specialized fabrics like terry towels, leno, backed fabrics etc. 	
Prerequisite :	Basic knowledge of fabric manufacturing and yarn testing	

Course Content

Modules	Description
Module 1	Study of plain weave and derivative fabrics
Module 2	Study of twill weave and derivative fabrics
Module 3	Study of diamond and Diaper weaves
Module 4	Study of absorbent fabric structures like huckaback, honeycomb
Module 5	Study of double cloth fabrics
Module 6	Study of terry pile fabrics
Module 7	Study of leno and mock leno structures
Module 8	Study of extra warp and weft structures
Module 9	Study of colour and stripe effect fabrics
Module 10	Computer Aided Designing of fabrics

Recommended readings:

- 1 Groscicki Z J, "Watsons Textile Design and Colour", NewnesButtersworth, 1988.
2. Groscicki Z J, "Watsons Advanced Textile Design", Newnes Buttersworth, 1989.
- 3 Klibbe J W, "Structural Fabric Design", Revised edition, 1965, North Carolina State University.
4. Gokarneshan N, "Fabric Structure and Design", New Age International, New Delhi, 2004

SEM – VI

Programme Name	Bachelor of Technology in Textiles	Semester- VI
Course code	R4TT3006S	
Course Title	Man Made Fibre Production Technology	
Course objective	To impart knowledge of synthetic and regenerated fibre spinning	
Course Outcomes	After completing this course, students will be able to: 1. Understand the fundamental polymerization and pre-requisites for man-made fibres. 2. Explain the difference in synthetic and regenerated fibres. 3. Understand the different manmade fibre spinning techniques. 4. Describe high performance fibre spinning.	
Prerequisite	Students must have knowledge of textile fibres and their testing, basics of physics and chemistry	

Course content

Modules	Description
Module 1	Classification & synthesis of various polymers Polymerization: types & reactions, chain growth, step growth, condensation, addition, free radical, anionic, cationic polymerization. Techniques of polymerization: Bulk, solution, suspension, emulsion, interfacial polymerization
Module 2	Structural principles of polymeric fibres: Molecular orientation and crystallinity in fibres, Polymers as fibres, plastics and rubbers, Fibre morphology, Thermal transitions, Polymer Viscoelastic Properties, Effect of Temperature on Viscoelastic Properties of Polymers
Module 3	Polymer rheology: Transport Phenomena In Fibre Manufacturing- Heat And Mass; Polymer Rheology-Newtonian And Non-Newtonian Fluids, Factors Affecting Shear Viscosity; Necessary Conditions Of Fibre Forming Polymer; Melt Instabilities.
Module 4	Melt spinning: Melting device, Grid and extruder, Static mixer, Pre-filtration, Manifold, Spin pack, Spinneret, Quenching chamber, Spin finish application, drawing, Take-up winding. Staple fibre line production details, high speed spinning. Solution spinning: Preparation of dope, extrusion and fibre formation by wet spinning and dry spinning technique. The equipment and technique for manufacturing of filament via wet and dry spinning method. Comparison of wet and dry spinning processes.
Module 5	Poly(ethylene terephthalate) fibre : PET: Esterification & poly condensation, DMT, TPA routes, melt spinning variables, fibre production, and structure formation during spinning. LOY, MOY, POY, HOY, High speed spinning. Nylon 6 and nylon 66 fibre: Manufacturing technology of Nylon 6 and Nylon 66. Comparison between Nylon 6 and nylon 66 fibre-manufacturing routes and fibre properties.
Module 6	Acrylic fibre: Polymer manufacture, Influence of polymerization conditions on properties of acrylic polymer, Spinning processes and properties. Polypropylene fibre manufacturing:

	Polymerization, Stabilization against degradation, spinning of the fibre, Structure development during solidification and properties.
Module 7	Rayon fibres : Raw material for viscose, The viscose fibre manufacturing process, Viscose fibre variants, Alternatives to the viscose process.

Text Books:

1. V. B. Gupta and V. K. Kothari- Manufactured Fibre technology, Chapman & Hall Publications, 1997.
2. Production of Synthetic Fibres by A. A. Vaidya, PHI Pub 2003
3. Fibre science and Technology by Premamoy Ghosh , Tata McGraw Hill Publication

Recommended Readings:

1. Manmade Fibre technology (Vol. 1-3) by Mark Atlas & Cernia

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3007T		
Course Title	Design of Textile Structures		
Course Objective	To impart knowledge on designing custom made textile structures		
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Recognize the importance of product designing. 2. Extrapolate the inter-relation between fibre, yarns and fabrics and their influence on product properties. 3. Comprehend the process of making fabrics with functional properties. 4. Understand the concept of comfort and aesthetic properties of fabric. 5. Outline the techniques of designing fabrics with predefined properties. 		
Prerequisite	Students must know fundamentals of spinning, weaving and cloth structure along with Physics and Mathematics.		

Course Content

Modules	Description
Module 1	Concept of ‘Product Development’ in textiles: Reason for product development, Concept of ‘Concurrent Engineering’, Phases of product development, Concept of ‘Design Review’, Failure Modes and Effect Analysis (FMEA).
Module 2	Raw material as a factor affecting production : Inter relation between fibre -yarn – fabric property, Effect of fabric parameters on functional properties, Strategic fabric design methods.
Module 3	Elements of yarn Structures – Classification and comparison based on consolidation mechanism, Introduction to coaxial helix model, theoretical treatment of yarn tensile behavior, twist – strength relationship , Causes and effects of unevenness of yarn, Yarn Hairiness and its measurement.
Module 4	Elements of fabric Structures - Classification and comparison based on consolidation mechanism, Introduction to geometry of woven -knitted and non woven fabrics, Cloth setting rules, Concepts of fabric aerial density-Fabric specific volume-Tightness factor-weavability limits.
Module 5	Design of fabrics for protection against: Temperature variation, wetting, air-dust-aerosol, UV, heat and fire, electrostatic charge, chemical and biological agents.
Module 6	Elements of comfort- hand and aesthetic property of fabrics : Concept, factors affecting , designing textile products with enhanced comfort property, evaluation techniques.
Module 7	Techniques of designing fabrics with predefined functional properties – Design methods, design and development process flow chart, Role of CAD.

Text Books:

1. Structure and Mechanics of Textile Fibre Assemblies – Edited by P. Schwartz, Woodhead Publishing Limited, ISBN 978-1-84569-135-6
2. Textiles for Protection - Edited by R.Scott, Woodhead Publishing Limited, ISBN 978-1-85573-921-5
3. Fundamentals of Spun Yarn Technology – C.A.Lawrence, CRC Press, ISBN 1-56676-821-7

Recommended readings:

1. Chemical Finishing of Textiles – W.D.Schindler & P.J.Hauser, Woolhead Publishing Limited, ISBN 1 85573 905 4
2. Textile Yarns Technology , Structure and Applications –B.C Goswami, J.G.Martindale & F.L.Scardino (Wiley Interscience pub.)
3. Weaving- Calculation, Costing & Projects-Dr. M.K.Talukdar, Dr. Anirban Guha (2018), Shree Samarth Krupa Publishers, Gujarat, India.
4. Relevant papers from journals.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3008T		
Course Title	Knitting Technology		
Course Objective	To impart knowledge on technology of knitting for manufacture of fabrics		
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Get associated with the different terminology and processing elements related to knitted fabric structures 2. Relate different weft knitted machinery and weft knitted structures 3. Recognize different warp knitted machinery and warp knitted structures 4. Recall the aspect of quality control techniques relevant to knitting. 		
Prerequisite	Student must have knowledge of yarn and fabric properties		

Course content

Modules	Description
Module 1	Introduction: history of knitting and the evolution of hand knitting, The invention of the stocking had frame, the bearded needle, the principles of frame knitting, The development of warp knitting, The potential of knitting technology, Properties of Knitted fabrics, comparison with woven.
Module 2	General Terms in knitting: Knitted loop structure, elements of knitted loop structure, Basic mechanical principles of knitting technology, The sinker, the jack, Cams, the two method of yarn feeding, the three methods of forming yarn into needle loops.
Module 3	weft knitting: classification, various machines, Weft Knitting Elements like Knitting needles, sinkers, cam systems, type of feeding systems, tensioning devices, stop motions.
Module 4	Flat Knitting: Machines, Process of loop formation, cam track, features, and structures produced.
Module 5	Weft Knitted Structures: Properties and uses of basic weft knitted structures- Plain, Rib, Interlock and Purl along with their derivatives. Different types of stitches.
Module 6	Warp Knitting: classification, Machines and mechanism of tricot and raschel, Study of let-off and take up mechanism.
Module 7	Warp knitted Structures: Guide bar movements like Swinging and shogging, underlap and overlap and Lapping diagrams. Various warp knitted structures like pillar, tricot, satin, velvette, atlas and locknit fabrics
Module 8	Science of Knitting: Concept of loop length, knitting tension, spirality, production calculations, fabric faults in weft knitting
Module 9	Latest development in knitting technology : concept of jacquard in knitting, terry, other structures and blanket manufacture etc.

Text Books:

1. Spencer D J, "Knitting Technology", 2nd edition, Pergamon Press, 1989
2. Ajgaonkar D B, "Knitting Technology", Universal Publishing Corporation, 1998.
3. D. F. Paling, Warp Knitting Technology Published by Columbine Press, 1965

Recommended Readings:

1. S.C.Ray, Fundamentals and Advances in Knitting Technology, ISBN 9789380308166, Woodhead Publishing India.
2. Booth J E, "Textile Mathematics", Vol. 3, Textile Institute, Manchester, 1977.
3. Reichman C., Lancashire J B and Darlington K D, "Knitted Fabric Primer", National Knitted outwear Association, New York, 1967.on Yarn Manufacturing, Indian Institute of Technology, Delhi

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3101T		
Course Title	Long Staple Spinning and Weaving (Core Elective 1a)		
Course Objectives	To provide knowledge about the technology of long staple spinning and weaving.		
Course outcome	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Outline the features of various long staple fibers. 2. Differentiate the long staple spinning technology with respect to short staple spinning 3. Estimate the process parameters for spinning and weaving of long staple fibers 4. Discuss the modern technology used in the spinning and weaving of long staple fibers. 5. Comprehend process parameters for unconventional fibres production and processing. 		
Prerequisite	Knowledge of spinning and weaving of short staple fibers.		

Course Content

Module	Description
Module 1	Introduction to Long staple spinning : Concept, requirements of long staple spinning, flow chart, comparative study of short and long staple spinning,
Module 2	Processing of bast fibers like jute, flax, hemp, ramie and bamboo: Preparation, batching, carding, drawing, roving, spinning, winding, weaving.
Module 3	Processing of wool fibre: Woolen yarn vs. worsted yarn; Manufacturing of woolen yarn- preliminary processes, blending or mixing, woolen carding, woolen spinning, woolen yarn numbering; Manufacturing of worsted yarn- worsted carding, back washing, oiling, gilling and combing, tow to top conversion, worsted drawing, worsted yarn spinning, worsted yarn numbering, norms and modern developments; Advances in Manufacturing of worsted and woolen fabrics ; Utility of KAWABATA and FAST system in worsted garment manufacturing.
Module 4	Processing of silk fibre: Raw silk reeling: various devices, methods, quality control during reeling; Raw silk testing and quality control; Production of spun silk; Manufacturing of silk fabrics with special emphasis on silk satin, velvets, brocades, crepe de chin and georgette structures; Evaluation of silk fabric handle.
Module 5	Processing of other animal hair fibres like Cashmere, Mohair, Angora, Alpaca etc.

Text Books:

1. Bast and other plant fibres, Edited by Robert R. Frank, 2005, WPI, ISBN 1-85573-684-5.
2. Tomar, R.S. – Hand Book of Wool and Blended Suiting Process, 2010, WPI, ISBN: 978-1-84569-954-3.
3. Silk, mohair, cashmere and other luxury fibres, Edited by Robert R. Frank, 2001, WPI, ISBN 1-85573-540-7.

VJTI- T.Y.B.Tech- Textile Technology. Revised Syllabus:

Recommended Readings:

1. Arindam Basu, Advances in Silk Science and Technology, Woodhead Publications
2. Corbman, B.P. - Textiles:Fibre to Fabric, McGraw Hill International Edition, 1983
3. R.R. Atkinson – Jute Fibre to yarn, B.I. Publication, Bombay, India, 1965.
4. Richards, RTD, Sykes, A.B. – Wollen Yarn Manufacture, The Textile Institute, 1994
5. N.A.G Johnson and I.M Russell, Advances in Wool Technology.
7. Lee, Y.W. – Silk reeling and testing manual, FAO Agricultural Services Buiietin 136.
8. Matsudaira, M., Kawabata, S. – A Study of The Mechanical properties of Woven Silk Fabrics (Part I, II, III), Journal of The Textile Institute, 1988, 79 (3), pp. 490-503.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3102T		
Course Title	Interior Textiles: Design and Development (Professional Elective 1b)		

Course Objective	To apprise the students with knowledge of textiles used in home and industry interior(s).
Course outcome:	After attending this course, students will be able to: <ol style="list-style-type: none"> 1. Differentiate various types of home textiles and its significance. 2. Implement their knowledge in evaluation of home textiles. 3. Comprehend various innovations and future trends in interior textiles. 4. Outline various technical applications of fabric for interior textiles. 5. Understand impact of overall interior textiles on environment.
Prerequisite	Students must have knowledge of basic textiles and technical textiles.

Course Content

Module	Description
Module 1	Fundamentals of interior textiles Introduction, Types of Fibres, yarns and Fabrics, Natural fibres for textile production, Interior Applications.
Module 2	Surface designing of Interior Textiles Significance of surface designing, Surface design techniques for Dyeing; printing; texture formation; embellishing, finishing, technological advancement and future of design for interior textiles.
Module 3	Textile for Seating Upholstery fabrics for domestic applications – scope, fixed upholstery, non-stretch loose covers, stretch covers. Upholstery fabrics for contract use – general, automotive applications, commercial applications, smart textiles for seating, Seamless 3D shape fabric for seating Textile Floor Coverings Introduction, pile fibres, backing fibres & fabrics – Tufted carpets, woven carpet. Woven Carpet Manufacture, Tufted Carpet Manufacture – Needling machinery textured & patterned needle felts, thermo-bonded products. Unconventional methods for making carpets, carpet properties.
Module 4	Window Textiles Sun filters (sheers and nets), semi-sheers, reflective textiles, curtain fabrics & drapes, blinds. Bed Textiles Sheets & pillow cases, quilted textile, blankets & rugs - Jacquard blankets, printed blankets, fire proof blankets, baby blankets, bed spreads, mattress covers (Ticking). Bathroom Textiles General shower curtains, terry towels, Types of towels, bath robes, beach towels, terry towels, napkins - Construction, weave, pile height, patterning, production, dyeing, finishing, etc.
Module 5	Velour - Types of velvets – Jacquard, Dobby, Plain, Printed – Manufacture & construction. Methods of velour making by cutting and shearing.
Module 6	Kitchen Textiles

	Aprons, dish cloth, teacosy, bread bag, mittens, pot holders, kitchen towels table mats – Construction & manufacturing details.
Module 7	Environmental issues in interior textiles Introduction, Textile certification programs, types of sustainable and recycled textiles used for interior, applications and future trends.
Module 8	Evaluation of Home Textiles Introduction, Test Method for towels, rug and home textiles.

References:

1. Performance of Home Textiles, Subrata Das, 2010, Woodhead Publications India Pvt Ltd., ISBN 978-0-85709-007-2.
2. Interior Textiles: Design and Developments, T.Rowe, 2009, Woodhead Publishing Ltd, ISBN 978-1-84569-351-0.

Recommended Readings:

1. Textile Floor coverings by G.H. Crawshaw, Textile Progress, Vol.9, No.2, The Textile Inst. Publisher.
2. Interior Furnishings', Textile Progress, Vol.11, No.1, By Mortimer O.Shea, The Textile Inst. Publication
3. Carpets: Back to Front, Textile Progress, Vol.19, No.3 by – L Cegielka MA, The Textile Inst. Publication.

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3103T	
Course Title	Advanced Finishing of Textiles (Professional Elective 1c)	
Course Objective	To make students aware about the advances in the field of textile finishing technology.	
Course Outcomes	<p>After completing this course, students will able to:</p> <ol style="list-style-type: none"> 1. Understand the importance of finishing process and classify finishes for various apparel and industrial applications. 2. Explain the various mechanical finishing techniques used on textile materials and the impact it has on the aesthetics of the fabric. 3. Describe the mechanism of various functional finishes and their application techniques. 4. Apply innovative methodology to resolve environmental issues in various textile finishing processes. 5. Learn various characterization techniques for evaluation of finishing of textile materials. 	
Prerequisite	Students must have knowledge of the fabric production and pretreatment processes involved for textiles.	

Course Content

Module	Description
Module 1	Introduction to Textile Finishing: Object of finishing, Importance of textile finishing, classification of finishing, process sequence of finishing of 100% cellulose, regenerated and synthetic material, concept and working of machinery like Calendaring, felting, Sanforising, Stentor, Aero finishing technology
Module 2	Advances in Crease Resistant Finishing: Mechanism of creasing, concept of antcrease, wash-n-wear and Durable Press, Methods for developing crease resistant textiles. Mechanism of formaldehyde release, various methods to reduce formaldehyde release. Ecofriendly cross linking agents, Low and ultra-low formaldehyde resins. Resin finishing formulations for 100% Cotton garments and evaluation of crease resistant finishing.
Module 3	Advances in Flame Retardant finishing: Concept of flame retardant, Role of LOI of various textile fibers in flame retardant finishing. Chemicals used for flame retardant finishing of textiles. Impact assignment of various chemicals such as antimony oxide and phosphorous base compounds Resin finishing formulations for 100% Cotton garments and evaluation of crease resistant finishing.
Module 4	Advances in Therapeutical (Antimicrobial) Finishing: Concept of therapeutical textile finishing Mechanism and methods of antimicrobial finishing various antimicrobial finishes for cotton, wool, silk, PET, Nylon and Acrylic, Mildew-proof and rot proof finishing, Evaluation of antimicrobial finishes.
Module 5	Specialty Finishing Methods: Chiffon finishing for PET, Nano-finishing technology for various applications (sport textiles, self-cleaning textiles etc.), Finishing of technical textile products.
Module 6	Advances in various functional finishing:

	Water proof and water repellent finishes, UV protective finishing, softening finish, Antistatic finish etc. Evaluation of the various finishes.
Module 7	Best Available Techniques for finishing of Textiles: Plasma Finishing Technology, Diamond finishing technology for denims and other products, Biopolishig of denims,
Module 8	Ecological Aspects in Modern Finishing Technology: Foam finishing technology, Concept of foam and blow ratio. Properties of foam, Factors affecting the stability of foam. Methods to determine the stability of foam. Various approaches for Energy Conservation and cost reduction in finishing.

Text Books:

1. WD Schindler and PJ Hauser, Chemical Finishing of Textiles, CRC Press, 2004.
2. R.S.Prayag, Textile Finishing, 1994.
3. Dr. V.A. Shenai, Technology of Printing, Sevak Publications, Mumbai, 1990

Recommended readings:

1. Derek Heywood, Textile Finishing, Society of Dyers and Colourists. 2003.
2. Technology of Finishing – Dr. V.A. Shenai, Sevak Pub. ,1999 , Mumbai
3. Textile Printing – Edited by L.W.C. Miles, SDC Pub., U.K., 1981
4. An Introduction to Textile Finishing – J.T. Marsh, Asia Pub. House, 1959, Mumbai.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3104T		
Course Title	High Performance Fibers (Professional Elective 1d)		
Course Objectives	To impart the knowledge about the various high performance of textile fibers		
Course outcome	After completing this course, students will be able to: 1. Differentiate the properties of conventional and high performance fibers. 2. Describe the manufacturing technology f of various high performance fibers 3. Discuss the practical applications of high performance fibers 4. Analyse the properties of high performance fibers.		
Prerequisite	Knowledge of conventional textile fibers along with the properties and applications.		

Course Content

Module	Description
Module 1	Introduction to High Performance fibers : Concept, Drawbacks of conventional fibers, Market scenario of high performance fibers, Future growth etc.
Module 2	Natural polymer based high performance fibers: Cellulose based high performance fibers, Production process of regenerated fibers such as rayon, protein base fiber: Spider silk, Characteristics and applications.
Module 3	Carbon based fibers: Manufacturing process, Classification, Properties and applications
Module 4	Aromatic Polyamide fibers : Fiber structure, Manufacturing process, Classification, Properties and applications
Module 5	Aromatic Polyester and Liquid crystalline fibers: Comparative study of aliphatic and aromatic fibers, Manufacturing process, Futures of LCP, Properties and applications etc.
Module 6	Inorganic high performance fibres: Glass fibre manufacture, properties and Applications, Basalt fiber, Ceramic Fibres: Analysis of characteristics and applications of silicon carbide based fibres, Alumina based fibres. Single crystal oxide fibres.
Module 7	Chlorinated and Fluorinated Fibres: PVDC: PTFE, PVF, PVDF and FEP Poly (etheretherketones): PEEK Poly (phenylene sulphide): PPS Poly (ether imide) : PEI, PBI, and PBO.

Text book:

1. Hearle JWS, "High Performance Fibers", Textile Institute, CRC Press, 2001

Recommended Readings:

1. Menachan Lewis & Jack Preston, "High Technology Fibres", Part A,B, C,Merceb Dekkar Inc, 1993
2. Datsziya, Hongu, Glyno Phillips, "New Fibers" , Woodhead Publishers Ltd, 2001.

Program Name:	Bachelor of Technology in Textiles	Semester- VI
Course Code:	R4TT3601S	
Course Title:	Polymer & Fibres for Engineering Applications (Open Elective I)	
Course Objective	To provide knowledge to the students of all engineering branches other than textiles about the basic concept of Polymers for Engineering Applications.	
Course Outcomes:	After completing this course, students will able to: <ol style="list-style-type: none"> 1. Describe the basic concept of polymer and its products. 2. Explain the major fibres, plastics and rubbers used for engineering applications. 3. Outline the methods for the production of fibres, rubbers and plastics. 4. Discuss the various testing and evaluation methods for fibres and polymers. 5. Demonstrate the various applications of fibres and polymers 	
Prerequisites:	Knowledge of chemistry and physics.	

Course Content:

Module	Description
Module 1	Introduction to polymers and textile fibres: Definition and classification. Molecular size and interaction, Molecular orientation and crystallinity in fibres, Polymers as fibres, plastics and rubbers. Properties and Structure of fibres, plastics and rubbers. Melting and Glass Transition Temperatures of Polymers. Fibre forming processes. Importance of polymer in the field of Medical, Military, Agriculture, Composites, etc.
Module 2	Manufacturing techniques overview: Spinning of Manmade fibres via melt spinning and solution spinning. Manufacturing of plastics by injection molding and other techniques. Rubber processing via calendaring.
Module 3	Fibre properties and applications: Natural fibres like Cotton, Wool, Jute, Etc. Regenerated fibres like Viscose. Man-made fibres like PET, PP, PA, PAN, Glass, Carbon, etc.
Module 4	Polymers properties and applications: Polyethylene, LDPE, HDPE, LLDPE, UHMWPE, Poly(Vinyl Chloride), Poly(Vinylidene Chloride), Polytetrafluoroethylene, Polyisobutylene, Polystyrene, Acrylonitrile, butadiene styrene, etc.
Module 5	Elastomer properties and applications: Natural rubber, Styrene–Butadiene Rubber, Nitrile Rubber, Ethylene–Propylene–Elastomer, Butyl Rubber, Thermoplastic Elastomers, Polybutadiene (Butadiene Rubber), etc.
Module 6	Testing of fibres, plastics and rubbers: Identification of material, Tensile testing, Impact testing, Flexural testing, water absorption, Flame resistance, etc.

Text books:

1. Industrial Polymers, Specialty Polymers, and Their Applications, Manas Chanda Salil K. Roy, CRC press 2009.
2. Manufactured Fibre Technology, V.B. Gupta and V.K. Kothari, Springer Science + Business Media, 2003.
3. Plastics End Use Applications, Donald V. Rosato, springer, 2011.

Recommended reading:

1. High-performance Fibres, Edited by J W S Hearle, 2001, WPI.

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3012A	
Course Title	Policies & Prospects of Indian Textile industry (MNC)	
Course Objective	To impart knowledge on Textile sector in India and policies conducive to textile business	
Course outcome	After completing this course student will be able to 1. Gain an overview of different sectors of Indian textile industry. 2. Comprehend the problems and prospects of the various textile sectors. 3. Discuss the various policies and procedures for venturing into textile business. 4. Compare the various government policies to support textile business.	
Prerequisite	Students must have knowledge of textile manufacturing industry	

Course content

Modules	Description
Module 1	Introduction to various producing sectors of Indian textile industry : Fibre sector, spinning sector, Handloom sector, power loom sector, knitting and hosiery sector, readymade garments and made-ups sector, Intersectoral Competition, Nationalisation and Industrial Sickness problems in textile industry.
Module 2	The Fibre Balance in textile industry : natural and man-made textiles Choice of Technique -Appropriate Technology and Modernisation How Competitive are Indian Textiles?
Module 3	Scenario of cluster development in textiles: various textile clusters in India and their success stories like sports goods, Jalandhar, sarees in Maheshwar, Towels & chadar in Solapur and Knitwear in Ludhina and Tirupur
Module 4	Environment for entrepreneurship in textiles: Opportunities for Entrepreneurship, Meaning and Definition of SSI, MSME, Government policies for SSI & MSME. Schemes for entrepreneurship development and Make in India. Documentation for registering a business - Company registration, MSME Registration, NOC and Environmental clearance certificate from State Pollution Control Board, Tax registration from a Commercial Tax Officer.
Module 5	Schemes to promote textile business Merchandise Exports from India Scheme (MEIS) Amended Technology Up-gradation Fund Scheme (A-TUFS) Integrated Wool Development Programme (IWDP) Scheme for Capacity Building in Textile Sector (SCBTS)
Module 6	Green entrepreneurship possibilities in Indian textile industry Waste management, Alternative renewable sources of energy etc.

Text Books:

1. India's Textile Sector : a policy analysis , Sanjiv Misra, Sage Publications, 1993
2. Dynamics of India's textile economy: towards a pragmatic textile policy, K. D. Saksena, Shipra Publications, 2002

Recommended Readings:

1. Compendium of Textile Statistics: With a Review, Office of the Textile Commissioner, Government of India, Ministry of Textiles, 2004
2. India's textile exports: performance, policies, prospects, S. M. S. Tulsi, Centre for Economic & Marketing Information publication, 2010.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3008P		
Course Title	Knitting Technology Laboratory		
Course Objective	To impart practical knowledge in the field of Knitting of textile Structures.		
Course Outcomes	After completing this course, the students will be to: 1. Identify various components of knitting machine 2. Explain different process parameters in designing of knitted structures 3. Analyse knitted fabric structures		
Prerequisite	Student must have knowledge of fundamentals of weaving technology		

Course Content

Module	Description
Module 1	Study of Plain single jersey circular knitting machine.
Module 2	Study of Flatbed and V-bed knitting machines, Plain, Rib etc
Module 3	Designing for plain single jersey fabrics
Module 4	Analysis of Plain single jersey knitted fabrics.
Module 5	Preparation of Rib fabrics on knitting machine.
Module 6	Identification of fabric defects in knitted fabrics.
Module 7	Analysis of warp knitted fabrics.
Module 8	Designing for warp knitted fabrics.
Module 9	Study of positive feeders on knitting machines
Module 10	Analysis of different types of knitted fabrics

Recommended Readings:

1. Spencer D J, "Knitting Technology", 2nd edition, Pergamon Press, 1989
2. Ajgaonkar D B, "Knitting Technology", Universal Publishing Corporation, 1998.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3009P		
Course Title	Apparel Manufacturing Technology		
Course Objective	To impart knowledge on converting fabrics into garments		
Course outcome	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Understand the process sequence of garment industry with different fabric characteristics for apparel. 2. Identify various stitches, stitching machine parameters and seam types. 3. Design basic patterns and do their grading. 4. Identify various apparel accessories for garment making. 5. Examine possible faults in garment making. 		
Prerequisite	Student must have knowledge of different fabric structures and fabric properties.		

Course Contents

Modules	Description
Module 1	Apparel Manufacturing: Introduction, Indian apparel industry. Various departments in garment industry, Different garment production systems.
Module 2	Fabric characteristics for Apparel Manufacturing: style characteristics, hand characteristics, visual characteristics, utility characteristics, durability characteristics, garment production working characteristics and selection of fabric.
Module 3	Pattern making: Introduction to pattern making and garment, Construction. Different terminologies. Drafting, Basic bodies blocks, Muslin pattern. Commercial pattern, Methods of making basic pattern, grading of pattern, size, size charts
Module 4	Spreading and lay planning: Introduction to symmetrical and asymmetrical fabrics, criteria of spreading, methods of spreading, spreading m/cs. Principles of lay plan, types of lay plan.
Module 5	Garment Cutting: Introduction to cutting room processes, various cutting tools and methods and their merit demerits. Bundling system
Module 6	Garment Sewing: Introduction to sewing m/c and its parts, Classification of basic sewing machineries, sewing machine shapes, requirements for work aids. Sewing room processes and working details. Attachment of sewing m/c, Sewing needle and its sizes
Module 7	Sewing stitches and seams types: Stitch formation, types of stitches, seam classification, seam geometry seam strength and slippage, seam puckering. Thread calculation and its consumption.
Module 8	Apparel accessories and supporting material: zipper, buttons, lining, interlining, shoulder pad, wadding.
Module 9	Fusing, pressing and packaging: purpose of interlining, requirement of fusing, fusing process, fusing machinery and equipment, classification of pressing, types of pressing equipment, types of packaging form.

Text Books:

1. Garment Manufacturing Technology, Edited by R. Nayak & R. Padhye, 2015, ISBN 978-1-78242-232-7, WPI.
2. Mehta P V and Bhardwaj S K, “Managing Quality in apparel industry”, Om Book Service, New Delhi.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3009P		
Course Title	Apparel Manufacturing Technology Laboratory		
Course Objective	The students will acquire practical knowledge of processes involved in manufacture of garments		
Course Outcomes	After completing this course, student will be able to: <ol style="list-style-type: none"> 1. Demonstrate pattern making for garment 2. Recognize different types of sewing machines 3. Compare the different types of seams and stitches and evaluate them 4. Recollect the methods of testing of garments, stitches, seams and accessories. 5. Prescribe garment quality evaluation techniques. 		
Prerequisite	Students must have knowledge of applied mathematics & applied physics.		

Course Content

Module	Description
Module 1	Making of basic patterns on paper.
Module 2	Understanding the mechanisms of sewing machine.
Module 3	Stitching a bodice.
Module 4	To study pattern making, marker planning with grading.
Module 5	To study sewing machine with machine specifications.
Module 6	Preparation of different stitches and seams as per norms.
Module 7	Study of quality characteristics of garments.
Module 8	To study the sewability and calculate seam efficiency of given fabric.
Module 9	Study of FAST system for tailorability measurement.
Module 10	Computer Application in Garment Manufacturing: Application in pattern making, grading, lay planning, sewing and finishing, computer aided embroidery designs. Concepts of computer integrated manufacturing (CIM) to the garment industry.
Module 11	To construct a garment using commercial pattern
Module 12	Study of garment defects.

Recommended Readings:

1. Aldrich W, "Metric Pattern Cutting", OM Book Service, New Delhi, 1998.
2. Cooklin Gerry, "Garment Technology for Fashion Designers", OM Book Service, New Delhi, 1997.
3. Eveleyn M and Ucas, "Clothing Construction", 2nd Edition Hughton Mifflin Co, Boston 1974.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3101P		
Course Title	Long Staple Spinning and Weaving Laboratory (Professional Elective Lab 1a)		
Course Objectives	To provide practical knowledge on spinning and weaving of long staple fibres.		
Course outcome	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Identify the unique features of various long staple fibers. 2. Demonstrate the fibre preparation for bast fibre spinning. 3. Explain the Difference between roller and clearer card and cotton carding machine. 4. Describe the salient features of the flyer spinning technique with respect to ring spinning. 5. Explain the preparatory processes for weaving of long staple fibers 6. Describe the process parameters considered for weaving of long staple fibers 7. Discuss the modern technology used in the evaluation of long staple fiber-based products. 		
Prerequisite	Knowledge of spinning and weaving of short staple fibers.		

Course Content

Module	Description
Module 1	Study of engineering properties of conventional long staple fibres.
Module 2	Study of engineering properties of unconventional long staple fibres.
Module 3	Microscopic study of conventional and unconventional long staple fibres.
Module 4	Study of bast fibre opening and cleaning systems.
Module 5	Comparative study of roller and clearer card and cotton carding machine.
Module 6	Study of roller setting and Gill drawing system used for long staple fibres.
Module 7	Study of worsted spinning system.
Module 8	Study of woolen spinning system.
Module 9	Study of long staple weaving machines.
Module 10	Study of carpet weaving machines.
Module 11	Study of KAWABATA and FAST system in worsted garment manufacturing.
Module 12	Evaluation of thermal and comfort properties of worsted-woolen and silk fabrics.

Recommended Readings:

1. Arindam Basu (Edt.), Advances in Silk Science and Technology, Woodhead Publications, ISBN 978-1-78242-311-9.
2. R.R. Atkinson – Jute Fibre to yarn, B.I. Publication, Bombay, India, 1965.
3. Richards, RTD, Sykes, A.B. – Woolen Yarn Manufacture, The Textile Institute, 1994
4. Lee, Y.W. – Silk reeling and testing manual, FAO Agricultural Services Bulletin 136.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3102P		
Course Title	Interior Textiles: Design and Development Laboratory (Professional Elective Lab 1b)		
Course Objective	To help the students garner practical knowledge of interior textiles.		
Course Outcome	After completing this course, students will be able to - <ol style="list-style-type: none"> 1. Differentiate various types of interior textiles 2. Describe types of testing taken place for interior textile. 3. Define procedures required for performance assurance of interior textiles. 4. Apply methodology to resolve various quality issues in interior textile industry. 		
Prerequisite	Students must have knowledge of the basic knowledge of textile testing and technical textiles.		

Course Content

Module	Description	No. of contact hours
Module 1	To study the dimensional stability of home furnishing fabric.	2
Module 2	To study drapability of upholstery fabric.	2
Module 3	To study pilling property of automotive seat cover fabrics.	2
Module 4	To study abrasion resistance of seating fabric.	2
Module 5	To study flammability of floor covering fabric.	2
Module 6	To study surface water absorption of towels.	2
Module 7	To study weathering properties of window textiles.	2
Module 8	To study soil and stain repellent properties of kitchen textiles.	2
Module 9	To study wicking property of home textile fabric.	2
Module 10	To study antimicrobial property of bathroom textile fabrics.	2

Recommended Readings:

1. Interior Textiles: Design and Developments, T.Rowe, 2009, Woodhead Publishing Ltd, ISBN 978-1-84569-351-0.
2. Performance of Home Textiles, Subrata Das, Woodhead Publications India Pvt Ltd
3. Principles of Textile Testing, J. E. Booth, Third Edition, Butterworths, 1986

Program Name:	Bachelor of Technology in Textiles	Semester-VI
Course Code:	R4TT3103P	
Course Title:	Advanced Finishing of Textiles Laboratory (Professional Elective Lab 1c)	
Course Objective	To give exposure to the students on emerging techniques and challenges in the textile finishing.	
Course Outcomes:	After completing this course, students will be able to, 1. Describe the mechanism involved in the various finishing techniques 2. Grasp the knowledge of various finishing and auxiliary chemicals used in the field of textile finishing 3. Develop new finishing formulations for various applications 4. Suggest the advanced characterization techniques for evaluation of products	
Prerequisites:	Knowledge of basic pre-treatments and finishing of textiles.	

Contents:

Module	Description	No. of contact hours
Module 1	Antimicrobial finishing for 100% cotton fabric using natural antimicrobial agent	2
Module 2	Antimicrobial finishing for 100% cotton fabric using synthetic antimicrobial agent	2
Module 3	Finishing of cotton and cotton/polyester blend fabric for flame retardant applications	4
Module 4	Finishing of cotton, nylon and polyester fabric for water repellent applications	4
Module 5	Finishing of cotton, nylon and polyester fabric for water proof applications	3
Module 6	Study of Durable press finishing for cotton and cotton/viscose fabric	2
Module 7	Study of Fragrance finishing for various fabrics	2
Module 8	Finishing of PET and Wool for soil resistant applications	4
Module 9	Development and evaluation of silk like polyester	2
Module 10	Finishing of silk and wool fabrics for moth proof applications	2

Recommended readings:

1. Derek Heywood, Textile Finishing, Society of Dyers and Colourists. 2003.
2. Technology of Finishing – Dr. V.A. Shenai, Sevak Pub. ,1999 , Mumbai
3. Textile Printing – Edited by L.W.C. Miles, SDC Pub., U.K., 1981

Program Name:	Bachelor of Technology in Textiles	Semester-VI
Course Title:	High Performance Fibers Laboratory (Professional Elective Lab 1d)	
Course Objectives	To make the students familiar about the manufacturing techniques and properties high performance fibers for various applications.	
Course Outcomes:	After completing this course, students will able to: 1. Explain the manufacturing technology of various high performance fibers 2. Learn structural properties of high performance fibers. 3. Summarize the technical parameters and evaluation techniques for high performance fibers	
Prerequisites:	Knowledge of structure and properties of conventional fibers.	

Course Content

Module	Description	No. of contact hours
Module 1	Study of engineering properties of conventional fibers.	2
Module 2	Study of silk like PET and its Evaluation.	2
Module 3	Comparative study of conventional and new solvent spinning technology.	2
Module 4	Study of structural and mechanical properties of carbon fibers.	2
Module 5	Study of structural and mechanical properties of Kevlar fiber.	3
Module 6	Study of structural and mechanical properties of glass fiber.	2
Module 7	Study of physical and chemical properties of PLA fibers.	2
Module 8	Study and evaluation of thermal, chemical and mechanical properties of HDPE fiber.	2
Module 9	Study and evaluation of thermal, chemical and mechanical properties of UHMPE fiber.	2
Module 10	Development and evaluation of electro-spun PVDF fibers.	2

Recommended reading:

1. Hearle JWS, "High Performance Fibers", Textile Institute, CRC Press, 2001

CO-PO-PSO MAPPING

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3001T		
Course Title	Advanced Yarn Manufacturing		
Course Objective	To impart knowledge of processing of blends and unconventional yarn forming techniques		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Explain per-requisites of fibre blending and various methods of fibre blending to form blended yarns. 2. Describe the different types of unconventional spinning techniques 3. Recognize the merits and demerits of open-end spinning techniques. 4. Describe the different techniques of yarn doubling. 5. Discuss the latest developments in yarn manufacturing. 		
Prerequisite	Student should have background of engineering Physics, Mechanics, Basics of Yarn Manufacturing		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 5	3	3	3	3	1	---	3	---	1	1	2	3	3	2	2

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3001P		
Course Title	Advanced Yarn Manufacturing Laboratory		
Course Objective	To make students aware of processes for making advanced yarns and doubled yarns.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Understand the technical details, passage of material and settings of unconventional spinning machines. 2. Recall the processing parameters on doubling and fancy doubling of yarns. 3. Analyze the blended yarns. 4. Evaluate the properties of fancy yarns. 		
Prerequisite	Students should be conversant with basic operations of spinning machines.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	2	3	2	3	3	2	3	3	3	3
CO 4	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3002T		
Course Title	Advanced Fabric Manufacturing		
Course Objective	To make students aware of advances in the manufacture of woven fabrics.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Explain the concept of shuttleless weaving. 2. Discuss the principle and mechanics of weft insertion on various shuttleless weaving machines. 3. Appraise advanced weaving techniques like leno weaving, multiphase weaving and multiaxial weaving. 4. Comprehend energy conservation and techno-economics of shuttleless weaving. 		
Prerequisite	Student should have knowledge of Engineering Physics, Mathematics, Mechanics and basics of Fabric Manufacture.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	2	2	---	1	1	2	3	3	2	2

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3002P		
Course Title	Advanced Fabric Manufacturing Laboratory		
Course Objective	To provide practical knowledge of advanced weaving techniques		
Course Outcomes	After completing this course, students Will be able to: <ol style="list-style-type: none"> 1. Describe the mechanism of shuttleless weaving machines. 2. Grasp the concept of yarn tension variation during weaving. 3. Compare conventional and unconventional weaving techniques. 		
Prerequisite	Students should be aware of basics of weaving preparatory processes and weaving technology.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	2	3	2	3	3	2	3	3	3	3

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3003T		
Course objective	To provide comprehensive knowledge about evaluation of fabric properties.		
Course Title	Testing of Textiles		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Recognize the various parameters for evaluation of fabric properties. 2. Associate the relationship between fabric structure and properties like permeability. 3. Estimate the fabric serviceability properties like abrasion, pilling, wrinkle etc. 4. Judge fabric functional properties like water repellency, flame retardancy, comfort, handle etc. 5. Determine mechanical properties of fabrics. 		
Prerequisite	Students should have knowledge of physics, mathematics, basic testing of yarns and fibres.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	2	2	---	1	1	2	3	3	2	2
CO 5	3	3	3	3	1	2	2	---	1	1	2	3	3	2	2

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 TT3003P		
Course Title	Testing of Textiles Laboratory		
Course Objective	To provide practical training in testing of fabrics.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Perform various physical tests for fabrics. 2. Determine the mechanical properties of fabrics. 3. Perform the serviceability test of fabrics. 		
Prerequisite	Student must be aware of basic testing of fibres and yarns.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	2	3	2	3	3	2	3	3	3	3

Programme Name	Bachelor of Technology in Textiles	Semester V
Course Code	R4 TT3004S	
Course Title	Technical Textiles	
Course Objective	To make student aware of non-apparel functions performed by textiles	
Course Outcomes	After completing this course, the students will be able to: 1. Differentiate between conventional and technical textiles. 2. Comprehend the various classifications of technical textiles. 3. Identify the specifications and desirable functional characteristics for each class of technical textiles. 4. Identify the process parameters for designing a technical textile for particular technical applications.	
Prerequisite	Basic knowledge of Spinning, Weaving and Processing of textile materials	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2

Programme Name	Bachelor of Technology in Textiles	Semester V
Course Code	R4 TT3005T	
Course Title	Cloth Structure Analysis	
Course Objective	To impart knowledge of different woven cloth constructions and methodology of designing the same on a loom	
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Comprehend the concept and representation of woven fabric design. 2. Reproduce the basic weaves and their derivatives with draft and lifting plans. 3. Apply the concept of color and weave effect in ornamentation of fabrics 4. Identify and analyze the specialty woven designs for various classes of applications like apparel, home textiles, industrial textiles etc. 5. Estimate fabric parameters for producing particular weave. 	
Prerequisite	Knowledge of Fabric manufacturing and Yarn testing.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 5	3	3	3	3	1	---	3	---	1	1	2	3	3	2	2

Programme Name:	Bachelor of Technology in Textiles	Semester V
Course Code:	R4 TT3005P	
Course Title:	Cloth Structure Analysis Laboratory	
Course Objective	To make students aware of the analysis of fabric structures and also their representation for fabric development	
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Analyze structure of various fabrics. 2. Evaluate the yarn dimensions and fabric sett particular for making a fabric structure. 3. Demonstrate the pictorial details of fabric analysis on fabric instruction sheet with design, draft and peg plan 4. Construct designs for specialized fabrics like terry towels, leno, backed fabrics, etc 	
Prerequisite :	Basics of fabric manufacturing and yarn testing	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	2	3	2	3	3	2	3	3	3	3
CO 4	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	R4 HM3001L		
Course Title	Professional Communication Skills		
Course Objective	<ul style="list-style-type: none"> To enable students to become effective communicators through gaining knowledge and skills in professional communication. To develop the communicative abilities of students making them industry- ready. 		
Course Outcomes	<p>After completing this course students will be able to:</p> <ol style="list-style-type: none"> Apply the principles and practices of business communication for communicating in a professional environment. Design a technical document with correctness of language, appropriate vocabulary and style. Display competence in oral and visual communication. Demonstrate capabilities for self -assessment and development. 		
Prerequisite	Command of basic English Language		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	---	1	2	1	2	1	---	2	3	3	---	3	---	---	1
CO 2	---	1	1	1	2	1	---	2	3	3	---	3	---	---	1
CO 3	---	1	1	1	2	1	---	2	3	3	---	3	---	---	1
CO 4	---	1	2	1	2	1	---	2	3	3	---	3	---	---	1

Programme Name	Bachelor of Technology in Textiles	Semester- VI
Course code	R4TT3006S	
Course Title	Man Made Fibre Production Technology	
Course objective	To impart knowledge of synthetic and regenerated fibre spinning	
Course Outcomes	After completing this course, students will be able to: 1. Understand the fundamental polymerization and pre-requisites for man-made fibres. 2. Explain the difference in synthetic and regenerated fibres. 3. Understand the different manmade fibre spinning techniques 4. Describe high performance fibre spinning.	
Prerequisite	Students must have knowledge of textile fibres and their testing, basics of physics and chemistry	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	1	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	1	1	1	2	3	3	2	3
CO 3	3	3	3	3	1	2	3	1	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	1	1	1	2	3	3	2	3

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3007T	
Course Title	Design of Textile Structures	
Course Objective	To impart knowledge on designing custom made textile structures	
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Recognize the importance of product designing 2. Extrapolate the inter-relation between fibre, yarns and fabrics and their influence on product properties. 3. Comprehend the process of making fabrics with functional properties. 4. Understand the concept of comfort and aesthetic properties of fabric 5. Outline the techniques of designing fabrics with predefined properties 	
Prerequisite	Students must know fundamentals of spinning, weaving and cloth structure along with Physics and Mathematics	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	1	1	1	2	3	3	3	3
CO 2	3	3	3	3	1	---	2	1	1	1	2	3	3	3	3
CO 3	3	3	3	3	1	---	3	1	1	1	2	3	3	3	3
CO 4	3	3	3	3	1	---	2	1	1	1	2	3	3	3	3
CO 5	3	3	3	3	1	---	2	1	1	1	2	3	3	3	3

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3008T	
Course Title	Knitting Technology	
Course Objective	To impart knowledge on technology of knitting for manufacture of fabrics	
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Get associated with the different terminology and processing elements related to knitted fabric structures 2. Relate different weft knitted machinery and weft knitted structures 3. Recognize different warp knitted machinery and warp knitted structures 4. Recall the aspect of quality control techniques relevant to knitting. 	
Prerequisite	Student must have knowledge of yarn and fabric properties	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	---	---	1	1	2	3	3	3	3
CO 2	3	3	3	3	1	---	---	---	1	1	2	3	3	3	3
CO 3	3	3	3	3	1	---	---	---	1	1	2	3	3	3	3
CO 4	3	3	3	3	1	---	---	---	1	1	2	3	3	3	3

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3008P	
Course Title	Knitting Technology Laboratory	
Course Objective	To impart practical knowledge in the field of Knitting of textile Structures.	
Course Outcomes	After completing this course, the students will be to: 1. Identify various components of knitting machine 2. Explain different process parameters in designing of knitted structures 3. Analyse knitted fabric structures	
Prerequisite	Student must have knowledge of fundamental concepts of weaving technology.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	2	3	2	3	3	2	3	3	3	3

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT30009P	
Course Title	Apparel Manufacturing Technology	
Course Objective	To impart knowledge on converting fabrics into garment	
Course outcome	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Understand the process sequence of garment industry with different fabric characteristics for apparel. 2. Identify various stitches, stitching machine parameters and seam types. 3. Design basic patterns and do their grading. 4. Identify various apparel accessories for garment making. 5. Examine possible faults in garment making. 	
Prerequisite	Student must have knowledge of different fabric structures and fabric properties.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	1	1	2	2	2	3	3	3	3
CO 2	3	3	3	3	2	---	1	1	2	2	2	3	3	3	3
CO 3	3	3	3	3	2	---	1	1	2	2	2	3	3	3	3
CO 4	3	3	3	3	2	---	1	1	2	2	2	3	3	3	3
CO 5	3	3	3	3	2	---	1	1	2	2	2	3	3	3	3

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3009P	
Course Title	Apparel Manufacturing Technology	
Course Objective	The students will acquire practical knowledge of processes involved in manufacture of garments	
Course Outcomes	After completing this course, student will be able to: <ol style="list-style-type: none"> 1. Demonstrate pattern making for garment 2. Recognize different types of sewing machines 3. Compare the different types of seams and stitches and evaluate them 4. Recollect the methods of testing of garments, stitches, seams and accessories. 5. Prescribe garment quality evaluation techniques. 	
Prerequisite	Students must have knowledge of applied mathematics & applied physics.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	1	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	1	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	---	1	2	3	3	2	3	3	3	3
CO 4	3	3	3	3	2	---	1	2	3	3	2	3	3	3	3
CO 5	3	3	3	3	2	---	1	2	3	3	2	3	3	3	3

Program Name:	Bachelor of Technology in Textiles	Semester- VI
Course Code:	R4TT3601T	
Course Title:	Polymer & Fibres for Engineering Applications (Open Elective 1)	
Course Objective	To provide knowledge to the students of all engineering branches other than textiles about the basic concept of Polymers for Engineering Applications.	
Course Outcomes:	After completing this course, students will able to: <ol style="list-style-type: none"> 1. Describe the basic concept of polymer and its products. 2. Explain the major fibres, plastics and rubbers used for engineering applications. 3. Outline the methods for the production of fibres, rubbers and plastics. 4. Discuss the various testing and evaluation methods for fibres and polymers. 5. Demonstrate the various applications of fibres and polymers 	
Prerequisites:	Knowledge of chemistry and physics.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	1	1	1	1	3	3	2	3
CO 2	3	3	3	3	1	---	2	1	1	1	1	3	3	2	3
CO 3	3	3	3	3	1	---	3	1	1	1	1	3	3	2	3
CO 4	3	3	3	3	1	---	2	1	1	1	1	3	3	2	3
CO 5	3	3	3	3	1	1	2	2	1	1	1	3	3	2	3

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3101T		
Course Title	Long Staple Spinning and Weaving (Professional Elective 1a)		
Course Objectives	To provide knowledge about the technology of long staple spinning and weaving.		
Course outcome	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Outline the features of various long staple fibers. 2. Differentiate the long staple spinning technology with respect to short staple spinning 3. Estimate the process parameters for spinning and weaving of long staple fibers 4. Discuss the modern technology used in the spinning and weaving of long staple fibers. 5. Comprehend process parameters for unconventional fibres production and processing. 		
Prerequisite	Knowledge of spinning and weaving of short staple fibers.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 5	3	3	3	3	1	---	3	---	1	1	2	3	3	2	2

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3101P		
Course Title	Long Staple Spinning and Weaving Laboratory (Professional Elective Lab 1a)		
Course Objectives	To provide practical knowledge on spinning and weaving of long staple fibres.		
Course outcome	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Identify the unique features of various long staple fibers. 2. Demonstrate the fibre preparation for bast fibre spinning. 3. Explain the Difference between roller and clearer card and cotton carding machine. 4. Describe the salient features of the flyer spinning technique with respect to ring spinning. 5. Explain the preparatory processes for weaving of long staple fibers 6. Describe the process parameters considered for weaving of long staple fibers 7. Discuss the modern technology used in the evaluation of long staple fiber-based products. 		
Prerequisite	Knowledge of spinning and weaving of short staple fibers.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 4	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 5	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 6	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 7	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3102T	
Course Title	Interior Textiles: Design and Development (Professional Elective 1b)	
Course Objective	To apprise the students with knowledge of textiles used in home and industry interior(s).	
Course outcome:	After attending this course, students will be able to: <ol style="list-style-type: none"> 1. Differentiate various types of home textiles and its significance. 2. Implement their knowledge in evaluation of home textiles. 3. Comprehend various innovations and future trends in interior textiles. 4. Outline various technical applications of fabric for interior textiles. 5. Understand impact of overall interior textiles on environment. 	
Prerequisite	Students must have knowledge of basic textiles and technical textiles.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 5	3	3	3	3	1	---	3	---	1	1	2	3	3	2	2

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3102P	
Course Title	Interior Textiles: Design and Development Laboratory (Professional Elective Lab 1b)	
Course Objective	To help the students garner practical knowledge of interior textiles.	
Course Outcome	After completing this course, students will be able to - 1. Differentiate various types of interior textiles 2. Describe types of testing taken place for interior textile. 3. Define procedures required for performance assurance of interior textiles. 4. Apply methodology to resolve various quality issues in interior textile industry.	
Prerequisite	Students must have knowledge of the basic knowledge of textile testing and technical textiles.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 4	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3103T	
Course Title	Advanced Finishing of Textiles (Professional Elective 1c)	
Course Objective	To make students aware about the advances in the field of textile finishing technology.	
Course Outcomes	<p>After completing this course, students will able to:</p> <ol style="list-style-type: none"> 1. Understand the importance of finishing process and classify finishes for various apparel and industrial applications. 2. Explain the various mechanical finishing techniques used on textile materials and the impact it has on the aesthetics of the fabric. 3. Describe the mechanism of various functional finishes and their application techniques. 4. Apply innovative methodology to resolve environmental issues in various textile finishing processes. 5. Learn various characterization techniques for evaluation of finishing of textile materials. 	
Prerequisite	Students must have knowledge of the fabric production and pretreatment processes involved for textiles.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 5	3	3	3	3	1	---	3	---	1	1	2	3	3	2	2

Program Name:	Bachler of Technology in Textiles	Semester-VI
Course Code:	R4TT3103P	
Course Title:	Advanced Finishing of Textiles Laboratory (Professional Elective Lab 1c)	
Course Objective	To give exposure to the students on emerging techniques and challenges in the textile finishing.	
Course Outcomes:	After completing this course, students will able to, 1. Describe the mechanism involved in the various finishing techniques 2. Grasp the knowledge of various finishing and axillary chemicals used in the field of textile finishing 3. Develop new finishing formulations for various applications 4. Suggest the advanced characterization techniques for evaluation of products	
Prerequisites:	Knowledge of basic pre-treatments and finishing of textiles.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 4	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	R4TT3104T		
Course Title	High Performance Fibers (Professional Elective 1d)		
Course Objectives	To impart the knowledge about the various high performance of textile fibers		
Course outcome	After completing this course, students will be able to: 1. Differentiate the properties of conventional and high performance fibers. 2. Describe the manufacturing technology f of various high performance fibers 3. Discuss the practical applications of high performance fibers 4. Analyse the properties of high performance fibers.		
Prerequisite	Knowledge of conventional textile fibers along with the properties and applications.		

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	2	3	3	2	3
CO 2	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2
CO 3	3	3	3	3	1	2	3	---	1	1	2	3	3	2	3
CO 4	3	3	3	3	1	---	2	---	1	1	2	3	3	2	2

Program Name:	Bachelor of Technology in Textiles	Semester-VI
Course Title:	High Performance Fibers Laboratory (Professional Elective Lab 1d)	
Course Objectives	To make the students familiar about the manufacturing techniques and properties high performance fibers for various applications.	
Course Outcomes:	After completing this course, students will able to: 1. Explain the manufacturing technology of various high performance fibers 2. Learn structural properties of high performance fibers. 3. Summarize the technical parameters and evaluation techniques for high performance fibers	
Prerequisites:	Knowledge of structure and properties of conventional fibers.	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	---	3	2	3	3	2	3	3	3	3
CO 2	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2
CO 3	3	3	3	3	2	---	2	2	3	3	2	3	3	3	2

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	R4TT3012A	
Course Title	Policies & Prospects of Indian Textile industry (MNC)	
Course Objective	To impart knowledge on Textile sector in India and policies conducive to textile business	
Course outcome	After completing this course student will be able to 1. Gain an overview of different sectors of Indian textile industry. 2. Comprehend the problems and prospects of the various textile sectors. 3. Discuss the various policies and procedures for venturing into textile business. 4. Compare the various government policies to support textile business.	
Prerequisite	Students must have knowledge of textile manufacturing industry	

CO ↓	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	1	---	3	---	1	1	3	3	3	3	3
CO 2	3	3	3	3	1	---	2	---	1	1	3	3	3	3	3
CO 3	3	3	3	3	1	2	3	---	1	1	3	3	3	3	3
CO 4	3	3	3	3	1	---	2	---	1	1	3	3	3	3	3