

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 2014)
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 2014-15

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.

Programme Name:	Bachelor of Technology in Textiles	Semester – V
Course Code	TT3001S	
Course Title	Textile Calculations	
Course Objective	To impart knowledge of calculations related to machine production, productivity and efficiency and identify sources of losses and wastage in the process	
Course Outcomes	After completing this course, students will be able to: 1. Calculate the production and efficiency of machineries at various stages of spinning and weaving. 2. Assess the performance of textile machineries. 3. Estimate raw material requirement and wastage of different textile machineries. 4. Employ the concept of machine choice, labour allocation at each processing step.	
Prerequisites	Knowledge of Mathematics and Textile processes	

Course Contents

Modules	Description
Module 1	Performance and production calculations at spinning preparatory Degree of opening and cleaning. Calculations pertaining to blow room and carding. Performance assessment of blow room line. Draft and production calculations at draw frame. Combing efficiency calculation, Machine and labour productivity.
Module 2	Performance and production calculations at spinning Machine and labour productivity problems at speed frame and ringframe. Production per spindle calculation Yarn realisation, % waste calculation, TPI in yarn
Module 3	Performance assessment at doubling and winding Doubling TPI, doubling count, shrinkage in doubled yarn, Yarn clearing efficiency, production in yards, operating efficiency of winder, Production per shift per winder
Module 4	Calculations related warping and sizing Raw material requirements, production and efficiency calculations, size add-on, sizing machine efficiency
Module 5	Fabric weaving calculations Fabric raw materials required, weight of warp and weft, fabric gramamge, reed count.Loom production and efficiency, loomshed efficiency and valu loss during weaving
Module 6	Preparation of organization for spinning / weaving mill , Choice of machinery & its specification for different counts & blends. Principles of machinery lay-outs and different flow plans of material for spinning / weaving department.

Text Books:

1. V K Kothari, V Kothari, R Alagirusamy, A. Das, A Majumdar -Process Control in Textile Manufacturing, Elsevier Science, Woodhead Publishing, ISBN: 9780857090270
2. Shrivastava S. K., Spinner's Handbook of Quality Control, Mahajan Publication Pvt. Ltd.,Ahmedabad, 2000.

Recommended Readings:

1. Kulkarni M.G. – 'Textile Manufacturing', Current literature Co. Pvt. Ltd., Malhotra House, Mumbai.
2. Industrial Organization and Engg. Economics by T.R. Banga and S.C.Sharma, Khanna Publishers, Delhi.
3. Project Planning, Analysis, Selection, Implementation and Review, Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd

Programme Name:	Bachelor of Technology in Textiles	Semester	V
Course Code :	EE3007S		
Course Title :	Electrical & Electronic Devices		
Course Objective:	To present the importance and principles of electrical and electronics devices used in textile manufacturing process.		
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Explain the fundamental concepts of D.C. and A.C. power supply systems 2. Explain the construction & working principle of various electrical machines. 3. State the working principle of semi-conductor and sensory devices. 4. Interpret the concepts behind various control systems available. 5. Recognize the basic concepts of digital electronics. 6. Outline the working principle of various electrical and electronic devices utilized in textile machinery 		
Prerequisite :	<ul style="list-style-type: none"> • Knowledge of basic physics, mathematics and process flow in textile manufacturing 		

Course Content

Modules	Description
1	Basics of D.C and A.C. drives: Concepts of D.C. power supply, D.C. Drives - Shunt, Series, Stepper motor, its uses and applications in textile industry. Concepts of A.C. power supply- Single phase and three phase, A.C. Drives - Induction motor, Synchronous motor etc., speed controllers, Concepts of power factor and power factor regulation.
2	Transformer: Principle and working of a single phase and three phase transformer, regulation, efficiency and all day efficiency.
3	Measuring Instruments: Principle and working of Continuity tester, Multimeter, Oscilloscope, Storage Oscilloscope, Megger Tester.
4	Concepts of Semi conductors: Brief description of semi-conductors, Working principle of Transistors, Oscillator, Rectifiers, Diodes, Zener diode as regulator, SCR, TRIACS etc.
5	Sensory Devices/ Transducers: Transducer and its applications as sensing device, Classification of transducers, Optical Sensors, Piezo-electric sensor, proximity sensor, Pressure-Temperature-Displacement sensing devices, IR based sensor and Pyrometer.
6	Introduction to Control System: Basic ideas of process control, Study of simple open loop and closed loop control system. Servo Mechanism. Error detector.
7	Elements of Digital Electronics: D/A and A/D conversion techniques, accuracy, resolution. Electronic counting techniques, Flip-Flop, Ripple Counter, Decade Counter. Counters in Textile Machinery.
8	Application of Electrical and Electronic devices In Textile Machinery: Working principle of Blow room feed control, Auto leveler in carding and Draw frames, Stop motions in various machines, weft Exhaustion detector, warp breakage detector, Sensors in wet processing machinery.

Text Books:

1. B.L.Theraja, Fundamentals of Electrical & Electronic Engineering, S.Chand & Co.
2. NCUTE publication - Electronic controls in Textile Machines
3. Mehta V.K., Principle of Electronics, S.Chand & Co. New Delhi, 110055, 2001

Recommended reading:

1. Malvino Albert P. & Leach D. P., Digital Principal & Application Tata Mc-Grow Hill pub. New Delhi, 1974

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	TT3002S		
Course Title	Cloth Structure		
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 like double cloth and Bedford cord. 5. Estimate fabric parameters for producing particular weave. 		
Prerequisite	Basics 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. Concept of fabric designing through fabric structure and textile printing. Fabric cover and crimp, importance of fabric structure and analysis, detection of directions of warp and weft, classification of woven fabrics, method of fabric presentation, weaving plans.
Module 2	Basic Weaves: Method of construction, features and uses of plain weave and its derivatives, twill weave and its derivatives, Satin and sateen weaves and their derivatives.
Module 3	Stripe and Check Weaves: Features, criteria for selection of weaves for combination, rules governing the joining of different weaves. Method of preparation and uses. Colour and Weave Effect: Weave and colour combinations, features, method of preparation of Continuous line effect, Hounds tooth, Birds eye, Crows foot, Hair lines and Step pattern.
Module 4	Absorbent Fabrics: Method of preparation, features and uses of Diamond and Diaper Weaves, Honey comb 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.
Module 6	Double Cloth: Definition, features, classification and uses. Method of preparation of self stitched and centre 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. 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 8	Calculations: Raw material calculations to produce different weaves. Technical specification of important fabrics.

Text Books:

1. Groszicki Z J, "Watsons Textile Design and Colour", NewnesButtersworth, 1988.
2. Groszicki Z J, "Watsons Advanced Textile Design", NewnesButtersworth, 1989.
3. Klibbe J W, "Structural Fabric Design", Revised edition, 1965, North Carolina State University.

Recommended reading: Gokarneshan N, "Fabric Structure and Design", New Age International, New Delhi, 2004

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	TT3003T		
Course Title	Advanced Yarn Manufacture		
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 processes of fibre blending to form blend yarns. 2. Describe the different types of unconventional spinning techniques and comparison with ring spinning. 3. Recognize the merits and demerits of open-end spinning techniques. 4. 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 and Blends: Significance of manmade fibre sector. 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 cotton system of spinning.
Module 2	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.
Module 3	Introduction to unconventional spinning: Fibre characteristics requirements for different leading spinning technologies. Possibilities and limitations of different spinning technologies.
Module 4	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 5	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 6	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 7	Other Spinning system: Self twist, twistless, wrap spinning, Core spinning, Siro spinning, Bobtex yarn manufacture, Compact spinning. New Developments.

Text Book:

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. Lawrence C A, Fundamentals of Spun Yarn Technology, 1st Ed; CRC Press LLC, Florida, USA (2003)

Recommended Reading:

1. 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
Course Code	TT3003P
Course Title	Advance Yarn Manufacture Lab
Course Objective	To make students aware of processes for making doubled yarns and advanced yarns
Course Outcomes	After completing this course, students will be able to: <ol style="list-style-type: none"> 1. Explain the technological aspects of doubling and fancy doubling of yarns. 2. Recall the processing parameters on carding and combing. 3. Summarize technical details, passage of material and settings of unconventional spinning
Prerequisite	Students should be conversant with basic operations of spinning industry.

Course Content

Modules	Description
Module 1	General study of Doubling Frame – passage, building mechanism, threading methods, dray & wet doubling. Gearing calculations.
Module 2	Study of a Fancy Doubler – threading, slub forming mechanism & production of fancy yarn.
Module 3	Estimation of FQI and spinning limit
Module 4	Investigation of fibre migration in blended yarns
Module 5	Microscopic study of unconventional yarn structure
Module 6	Study of features of high speed comber
Module 7	Running comber and calculation of improvement in combing.
Module 8	Calculation of fractionating efficiency (2 turns.).
Module 9	Experiment for calculation of comber waste & head to head variation.
Module 10	Study of rotor spinning machine
Module 11	Study of DREF spinning machine
Module 12	Evaluation of evenness characteristics of yarns through USTER tester

Recommended References:

1. Spinning Blowroom and Card, NCUTE Publication, 1998.
2. W. Klein, The Technology of Short staple spinning, The Textile Institute Publication, 1998.
3. W. Klein, Manual of Textile Technology: A Practical Guide to Combing and Drawing Vol. 3, The Textile Institute, Manchester, 1987.
4. A practical guide to opening and carding, W. Klein, The Textile Institute Publication, 1987.

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Title	Advance Fabric Manufacturing		
Course Code	TT3004T		
Course Objective	To make students aware of advances in 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 		
Prerequisite	Student should have background of engineering Physics, Mathematics and Mechanics and basics of Fabric Manufacture		

Course Content

Modules	Description
Module 1	Shuttleless Looms: Introduction, weft velocity, Comparison of various weft insertion systems, selvedges, weft storage units, 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 : Principles of weft insertion, sequence of weft insertion, classification, Tip to tip and loop transfer, Rapier drives.
Module 4	Airjet Loom : Principles of weft insertion, sequence of weft insertion, Air jet nozzles, relay nozzles, methods of air jet control ,quality of air for air jet looms. Factors affecting pneumatic weft propulsion, motion of weft, nozzle design.
Module 5	Water Jet Looms : Nozzles, principle, sequence of weft insertion, Quality of water for water jet looms.
Module 6	Energy consumed, timings, drive to sley and healds, fabric quality and productivity of projectile, rapier, air-jet and water-jet looms. Theoretical analysis of weft insertion in shuttleless looms.
Module 7	Multiphase 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.
Module 8	Leno weaving, Triaxial weaving, Denim manufacturing, Filament weaving., Weaving of slit yarn fabrics

Text Book::

1. Robinson & Marks, Principles of Weaving, Textile Institute Publication, U.K.1986.
2. Talukdar, Sriramulu & Ajaonkar, Weaving Machines Mechanism & Management, Mahajan Publishers, Ahmedabad.
4. A. Ormerod, Weaving, Technology and Operations, Woodhead Publishing Ltd.

Recommended Reading:

1. NCUTE, Filament Weaving

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	TT3004P		
Course Title	Advance Fabric Manufacturing – Lab		
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. 3. Compare conventional and unconventional weaving techniques.		
Prerequisite	Students should be aware of basics of weaving preparatory processes and weaving technology.		

Course Contents

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

Recommended References:

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

Programme Name	Bachelor of Technology in Textiles	Semester	V
Course Code	TT3005T		
Course objective	To provide comprehensive knowledge about evaluation of fabric characteristics and its properties		
Course Title	Textile Testing		
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 for 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 testing
Module 2	Fabric porosity and air-permeability. Relationship between fabric porosity and air permeability. Air, water and water-vapour transmission through fabrics, thermal resistance of fabrics
Module 3	Serviceability testing parameters such as abrasion resistance, and as pilling, crease and wrinkle recovery, fabric handle, assessment of barre and other form of fabric defects.
Module 4	Fabric wettability, Water repellency and waterproof testing
Module 5	Fabric Flammability, testing of flame retardancy
Module 6	Fabric mechanical properties like strength, tear strength, bursting strength testing
Module 7	Fabric low stress mechanical properties such as smoothness, stiffness, softness and shear, drape behaviour.
Module 8	Chemical Testing of Textiles: Colour fastness, Rubbing fastness, Laundering fastness

Text Books:

1. Saville B P, "Physical Testing of Textiles", Woodhead Publishing Ltd, Cambridge, 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 Reading:

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

Course Code	TT3005P
Course Title	Textile Testing Lab
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 testings of fibres and yarns.

Course Contents

Modules	Description
Module 1	Measurement of specific gravity of raw material for fabric formation
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 :	TT3006L		
Course Title :	Advance Cloth Structure Analysis		
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. Analyse structure of various fabrics. 2. Evaluate the yarn dimensions and fabric sett particular for making a fabric structure. 3. Depict 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 :	Knowledge of Basic Cloth Structure		

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 References:

- 1 .Groszicki Z J, "Watsons Textile Design and Colour", NewnesButtersworth, 1988.
2. Groszicki Z J, "Watsons Advanced Textile Design", NewnesButtersworth, 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.

Programme Name	Bachelor of Technology in Textiles	Semester V
Course Code	HM 3001L	
Course Title	Presentation and Communication Skills	
Course Objective(s)	<ul style="list-style-type: none"> • To develop the communicative abilities of students making them industry-ready. • To apply the knowledge of professional communication principles for work place communication. 	
Course Outcomes	<p>After completing this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Apply the principles of business communication for communicating in a professional environment. 2. Design a technical document with correctness of language, appropriate vocabulary and style. 3. Deliver formal presentations employing effective range of verbal and nonverbal skills. 4. Recognize the attributes of a suitable candidate for job, through participation in group discussion, interview and resume writing. 	
Prerequisite	Students must have knowledge of basic English language.	

Course content

Modules	Description
Module 1	Basics of Business Communication <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 e. Role of communication in the age of information technology
Module 2	Professional grooming and etiquette; cross-cultural communication
Module 3	Grammar, vocabulary and summarization techniques <ol style="list-style-type: none"> a. Common errors b. Use of articles, prepositions, subject - verb agreement c. Punctuation and capitalization d. Technical vocabulary: business idioms, phrasal verbs e. Summarization
Module 4	Speaking <ol style="list-style-type: none"> a. Intonation b. Modulation c. Basics of public speaking d. Gaining confidence
Module 5	Presentation Skills <ol style="list-style-type: none"> a. Public speaking b. Oral presentation c. Graphic presentation
Module 6	Career Oriented Communication <ol style="list-style-type: none"> a. Resume, Language and format of job application

	<ul style="list-style-type: none"> b. Job Interviews <ul style="list-style-type: none"> i. Purpose and process ii. How to prepare for interviews iii. Language and style to be used in interview iv. Types of interview questions and how to answer them c. Group Discussion: structure, dynamics and techniques of effective participation
Module 7	Technical Writing <ul 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 paper
Module 8	Language Laboratory <ul style="list-style-type: none"> a. Listening and comprehension skills b. Reading Skills c. Sound Structure of English d. Intonation patterns

Text book:

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

Recommended Reading:

1. Basic Managerial Skills for All - E.H. McGrath, PHI Learning Pvt Ltd
2. Professional Ethics - R. Subramanian, OUP

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	TT3007S	
Course Title	Man Made Fibre Production	
Course Objective	To impart knowledge of synthetic and regenerated fibre spinning	
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Summarize the fundamental polymerization process and pre-requisites & raw materials used for man-made fibre production 2. Compare synthetic and regenerated fibres. 3. Differentiate between various fibre spinning techniques 4. Select appropriate quality control techniques in man-made fibre production 5. Illustrate the manufacturing of high performance fibres. 	
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	Raw Material in Manmade Fibre production: Commercial routes to produce Man-made Fibre raw materials e.g. Hexamethylene diamine, caprolactum, TPA, MEG, ACN etc.
Module 3	General discussion on various methods of spinning of man-made fibres: Melt, dry, Wet spinning. Stages, speed, product –comparison, Man made fibres vs. synthetics vs regenerated fibres, Role of various additives used in spinning dope , spinning bath for man-mades.
Module 4	Rayon fibres: study of manufacturing of regenerated cellulosic fibre with specification of raw materials, chemical principle involved in regeneration & modification, special additives, Process flow chart- significance of the steps, Coagulation & Coagulation bath composition & variables, HWM fibres, Lyocell, Cellulose acetate fibres, introduction to raw materials, reactions, manufacturing
Module 5	Spinning of polyester, Nylon and Acrylic and Rayon: PET: Esterification & polycondensation, DMT, TPA routes, Melt spinning variables, structure formation during spinning, quenching & related parameters, study of catalyst used & bi-products, Industrial process for chip forming- extrusion- - staple fibre formation. LOY, MOY, POY, HOY, High speed spinning. Melt spinning of poly-olefines. Melt spinning of poly-amides. Dry spinning of acrylics & modacrylics. Fibres from addition polymers- PE, PP, PVA, PVC, Elastomeric fibres
Module 6	Spin Finishes in manmade fibre production: Chemical constitution, Desirable properties, Functions, Method of Application of Spin finishes. Spin finishes for Staple fibre, Texturising purpose and effect on coloration
Module 7	Quality control in manmade fibre production:

	Production Testing of Raw material, Polymers, Filament yarn and Staple Fibres. Testing of Raw material, Polymers, Filament yarn and Staple Fibres, Economical and Environmental aspect in mammade fibre
Module 8	Introduction to manufacturing of High Performance fibres And their industrial application: Carbon fibre, Polycarbonate, Sulphur, Polyimide, Polybenzimidazole fibre, Development of High Performance Fibre time to time

Text book:

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 Reading:

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

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	TT3008S		
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: <ol style="list-style-type: none"> 1. Differentiate between conventional and technical textiles. 2. Comprehend the various classification 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, comparison with conventional fabrics, A brief idea about technical fibres, role of yarn and fabric construction, composite material. Various technologies for making of technical textiles
Module 2	Geotextiles: Brief idea about geosynthetics 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 defence including ballistic protection materials and parachute cloth.
Module 6	Sports and recreation textiles: Functional requirement of different type of product and their construction.
Module 7	Automotive Textiles: Application of textiles in automobiles, requirement and design for different tyres, airbags and belts, methods of production and properties of textiles used in these applications.
Module 8	Sewing threads, cords and ropes: Types, method 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., Cambridge, 2000.
2. "Wellington Sears Handbook of Industrial Textiles", Ed. SabitAdanaur, Technomic Publishing Company, Inc., Pennsylvania, USA, 1995.
3. "Industrial Textile", Ed., J Svedova, Elsevier, New York, 1990.

Recommended Reading:

1. "Engineering with Geosynthetics", Ed. G V Rao and G V S Raju, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1990.
2. "Modern Textile Characterization Methods", Ed. M Raheel, Marcel Dekker, Inc., 1996.
3. Mukhopadhyay S K and Partridge J F, "Automotive Textiles", Vol. 29, No. ½, The Textile Institute, 1999.
4. 'Sewing Threads' (Textile Progress, Vol. 30, No. 3/4, 2000) J. O. Ukponmwan,

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	TT3009S		
Course Title	Design of Textile Structures		
Course Objective	To impart knowledge on designing different textile structures		
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Recognize the concept of product designing 2. Extrapolate the inter-relationship between fibre, yarns and fabrics and their influence on properties. 3. Discover the concept of fabric comfort and handle 4. Develop the concept of fabric simulation using image analysis 		
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 materials as a factor affecting production : Inter relation between fibre -yarn –fabric property, mechanics of Fibrous structure, Tensile – bending- shear behavior
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
Module 4	Elements of fabric Structures - Classification and comparison based on consolidation mechanism, Introduction to geometry of woven and knitted fabrics, theoretical treatment of fabric tensile- bending - shear behavior, Concept of drape deformation.
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 , evaluation techniques
Module 7	Techniques of characterizing behavior of fibrous structure : Concept of modeling and simulation - Image analysis method

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 reading:

1. Chemical Finishing of Textiles – W.D.Schindler & P.J.Hauser, Woodhead 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. Relevant papers from journals.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	TT30010T		
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	Knitting: Process, 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	Classification of weft knitting machines. Weft Knitting Elements: Knitting needles, sinkers, cam systems, type of feeding systems, tensioning devices, stop motions. 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 4	Flat Knitting Machines: Process of loop formation, cam track, features, and structures produced.
Module 5	Patterning: Devices for patterning in circular knitting machine Electronic needle selection.
Module 6	Warp Knitting: Machines and mechanism. Study of let-off and take up mechanism. Lapping diagrams. Various warp knitted structures like pillar, tricot, satin, velvete, atlas and locknit fabrics
Module 7	Latest developments: Knitting machines, other structures in knitting, blanket manufacturing.
Module 8	Science of Knitting: Concept of loop length, knitting tension, spirality, production calculations, fabric faults in weft knitting

Text Books:

1.S.C.Ray, Fundamentals and Advances in Knitting Technology, ISBN 9789380308166, Woodhead Publishing India.

2. Spencer D J, "Knitting Technology", 2nd edition, Pergamon Press, 1989

3. Ajaonkar D B, "Knitting Technology", Universal Publishing Corporation, 1998.

Recommended Reading:

1. Booth J E, "Textile Mathematics", Vol. 3, Textile Institute, Manchester, 1977.

2. 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	TT3010P		
Course Title	Knitting Technology Lab		
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: <ol style="list-style-type: none"> 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 References:

1. Spencer D J, "Knitting Technology", 2nd edition, Pergamon Press, 1989
2. Ajaonkar D B, "Knitting Technology", Universal Publishing Corporation, 1998.
3. Booth J E, "Textile Mathematics", Vol. 3, Textile Institute, Manchester, 1977.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	TT3011T		
Course Title	Apparel Manufacturing and Merchandising		
Course Objective	To impart knowledge on conversion of fabrics into garment		
Course Outcomes	After completing this course, the students will be able to: <ol style="list-style-type: none"> 1. Give overview of garment industry and learn the criteria for selection of fabrics 2. Describe the process sequence for converting fabric into garment 3. Assess the various stitching parameters and seam types 4. Summarize the various trimming and finishing for garment making 5. Criticize possible faults in garment making 6. Record the concept of fabric merchandising for garments 		
Prerequisite	Student must have knowledge of different fabric structures and fabric properties		

Course Contents

Modules	Description
Module 1	Garment Manufacturing: Introduction, Indian apparel industry. Different garment production systems.
Module 2	Selection of Fabrics: Garment from Woven and knitted fabrics, Various fabrics available in market, their characteristics and applications to suit to different purposes.
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, cutting methods and their merit demerits. Bundling system
Module 6	Garment Sewing: Introduction to sewing m/c and its parts, sewing room processes and working details. Different types of sewing m/c and its suitability, Different sewing m/c driving system. 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	Merchandising: Export houses, star trading export houses, Outsourcing, Merchandise buying and handling process, Merchandise plans, determining merchandise sources, demand analysis, evaluating merchandise, merchandise forecasting and budgeting, planning inventory levels, development of relationship between the textile and retailing industry, setting up the dealers and merchandisers

Text Books:

1. Carr H and Lantham B, "The Technology of Clothing Manufacture", Om Book Service, Delhi.
2. Mehta P V and Bhardwaj S K, "Managing Quality in apparel industry", Om Book Service, New Delhi
3. Aldrich W, "Metric Pattern Cutting", OM Book Service, New Delhi, 1998.

Recommended Reading:

1. Cooklin Gerry, "Garment Technology for Fashion Designers", OM Book Service, New Delhi, 1997.
2. Eveleyn M and Ucas, "Clothing Construction", 2nd Edition Hughton Mifflin Co, Boston 1974.
3. Rosenau J A & Wilson D L, "Apparel Merchandising", Amazon, USA, 2001.

Programme Name	Bachelor of Technology in Textiles	Semester	VI
Course Code	TT3011P		
Course Title	Apparel Manufacturing and Merchandising Lab		
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.
Module2	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	Testing of the zippers, sewing threads.
Module 11	Inspection of finished apparels for quality.
Module 12	Study of garment defects.

Recommended References:

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	TT3010T	
Course Title	Post Spinning Operations for Manmade fibres	
Course Objective	To give exposure on post spinning processing of manmade fibres	
Course Outcomes	After completing this course, student will be able to: 1. Explain the concept of fibre drawing and process parameters that influence it 2. Outline post spinning processes like spin finish application and heat setting 3. Assess the process of texturing of made made filaments and tow to top conversion 4. Test textured yarns	
Prerequisite	Basic knowledge of manmade fibre spinning	

Course Content

Module	Description
Module 1	Synthetic yarns and their production : Outline of various manufacturing processes, concept of drawing and draw warping, necking phenomenon , variables, machines
Module 2	Spin finish and it's application : Properties, components, spin finish for staple fibre and filament, application technique, problems encountered
Module 3	Heat setting: Temperature – polymer interaction , Nature of set , implication, heat setting behavior of thermoplastic and thermo set fibers , Evaluation of settability and degree of set.
Module 4	Textured yarns and texturing techniques : Types, special features , Properties of yarn and fabric made, uses
Module 5	Process – feed material – variables- machines for : False twist texturing, Draw texturing, Stuffer box, Knife edge, Gera mesh, Knit –de- knit , Air jet , Inert mingling
Module 6	Tow to top conversion – Material , method , Machines , Variables
Module 7	Evaluation of textured yarn

Text Books:

1. Synthetic Filament Yarn Texturing Technique – A. Demir & H.M.Beherey
2. Manufactured Fibre Technology – Edited by V.B.Gupta & V.K.Kothari (Chapman & Hall Publication)
3. Modern Yarn Production from Manmade Fibres - Edited by G. R. Wray (Columbine Press)

Recommended References:

1. Textile Yarns Technology , Structure and Applications –B.C Goswami, J.G.Martindale & F.L.Scardino (Wiley Interscience pub.)

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	TT3101P	
Course Title	Post Spinning Operations For Manmade fibres Lab	
Course Objective	To impart practical knowledge on post spinning processing of manmade fibres	
Course Outcomes	After completing this course, student will be able to: <ol style="list-style-type: none"> 1. Criticize the process parameters that influence man-made fibre drawing 2. Demonstrate post spinning processes like spin finish application and heat setting 3. Recognize process of texturing of made made yarns and tow to top conversion 4. Assess the quality of textured yarns 	
Prerequisite	Basic knowledge of manmade fibre spinning	

Course Content

Module	Description
Module 1	Evaluation of effect of drawing on properties of synthetic yarn
Module 2	Study of effect of additives on properties of manmade yarn
Module 3	Study of textured and intermingled yarn
Module 4	Study of crimp rigidity of textured yarn
Module 5	Study of shrinkage of textured yarn
Module 6	Study of bulk of textured yarn
Module 7	Determining spin finish content in yarn

Recommended References:

Relevant standards (IS-ASTM-AATCC-HATRA etc.) and industrial codes

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	TT3102T	
Course Title	Advanced Garment Designing and Quality Control	
Course Objective	To give exposure on principles in designing value added garments and quality control techniques followed in the garment sector	
Course Outcomes	After completing this course, student will be able to: 1. Associate with the concept of fashion designing 2. Utilize computer – aided designing concepts 3. Recognize the skills required in assessing different fabrics, embellishments and quality of finishing of garments 4. Analyze the finishes and trims for garments 5. Summarize quality control techniques prevalent in garment manufacturing	
Prerequisite	Basic knowledge of spinning, weaving, chemical processing and garment designing	

Course content

Module	Description
Module 1	Fashion Design, Introduction, analyzing the requirements, Key elements, situational elements, distracting elements, innovation process, innovation cycle-concept generation incubation- process of promoting innovation
Module 2	Method of quick starting the design process, inspiration , trends and concepts in fashion - analyzing the direction (fashion prediction, fashion cycle, fashion and art), theme Designing
Module 3	Textile Designing and development using computer, garment design development, study of figure faults and solutions - fashion styling – design promotion – portfolio development for different themes and seasons
Module 4	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 5	Trimming and Garment accessories: Definition, types, trimming methodologies and accessories application.
Module 6	Garment finishing: Fasteners, thread tucking, care and size labeling system, checking, pressing, folding and packing, packing standards for domestic and export markets
Module 7	Quality Control in Garment manufacturing: Control in pattern making, grading, fabric laying, marking, sewing and finishing, control of garment defects.

Text Books:

1. McKelvey Kathryn and Munslow Janine, "Fashion Design: Process, Innovation and Practice", Blackwell Science Ltd, 2003
2. Tate, Sharon and Lee, "Inside Fashion Design", Pearson Education Asia, 5th Edition, 2005
3. Waddell Gavin, "How to Fashion Works Couture, Ready to Wear and Mass Production", Om Books Services, 2005

Recommended Reading:

1. Goworek, Helen, "Fashion Buying", Om Books Services, 2002
2. Frings and Stephens Gini, "Fashion: From Concepts to Consumer", Prentice-Hall of India, 7th Edition.1997

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	TT3102P	
Course Title	Advanced Garment Designing and Quality Control Lab	
Course Objective	To give hands on experience on designing of advance garments and testing of the same	
Course Outcomes	After completing this course, student will be able to: <ol style="list-style-type: none"> 1. Utilize different methods of pattern making- viz. Drafting, Flat pattern, Draping. 2. Develop the skill and ability to design and develop draft patterns for different garments based on body measurements and adaptations. 3. Develop skills in handling different fabrics, embellishments and quality of finishing of garments 	
Prerequisite	Basic knowledge of spinning, weaving, chemical processing and garment designing	

Course Content

Module	Description
Module 1	Using Drafting method - 1) Gents full sleeved shirt with fusible lining 2) Jeans
Module 2	Construct garments using following theme - Ethnic wear or Party wear <ul style="list-style-type: none"> • Salwar / Chudidar and Kameez / Kurta or • Chaniya Choli
Module 3	Western or Indo-Western outfit <ul style="list-style-type: none"> • Trousers and Top or • Skirt and Top or • Dress
Module 4	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 5	To construct a garment using commercial pattern

Recommended References:

- 1) Practical Dress Design-Erwin, Mable, New York, Macmillan Co., 1964.
- 2) A Tailoring Manual-Strickland Gertue, New York, Macmillan, 1976.
- 3) Pattern Making for Fashion Designing-Armstrong, H. (1987), New York Harpes and Row Publishers.
- 4) Concepts in Clothing-Grate and Strom, Mc Graw Hill Book Co., New York.
- 5) Fabric Sewing Guide-Claire Shaeffers, Chilton Book Co., Radont, Pennsylvania.

Programme Name	Bachelor of Technology in Textiles	Semester VI
Course Code	HM3002A	
Course Title	Advanced Business Communication	
Course Objective	<ul style="list-style-type: none"> • To develop the specific, managerial communicative abilities of students, making them industry- ready. • To enable students apply the principles of inter personal communication for development of self and for others. 	
Course Outcomes	<p>After completing this course, student will be able to:</p> <ol style="list-style-type: none"> 1. Draft technical documents for specific purposes. 2. Create various types of technical reports. 3. Analyse standard practices of business ethics and culture for development of self and for the organization. 4. Conduct effective meetings with proper documentation. 	
Prerequisite	Basic knowledge of technical communication and presentation	

Course Content

Module	Topics
Module 1	<p>Technical Writing</p> <ol style="list-style-type: none"> a) Framing definitions writing instructions b) description of objects c) explaining a process
Module 2	<p>Report Writing</p> <ol style="list-style-type: none"> a) Objectives of report writing b) Language and Style in a report. c) Types of reports d) Formats of reports: Memo, letter, project and survey based
Module 3	<p>Work Culture</p> <ol style="list-style-type: none"> a) Corporate ethics/Ethical codes of conduct in business and corporate activities b) Etiquette in social and business settings c) Email etiquette d) Telephone Etiquette e) Cross-cultural awareness
Module 4	Strategies for conducting effective meetings

	<ul style="list-style-type: none"> a) Notice b) Agenda c) Minutes of the meeting
Module 5	<p>Interpersonal Skills</p> <ul style="list-style-type: none"> a) Emotional Intelligence b) Leadership and team-building c) Assertiveness d) Conflict Resolution e) Negotiation Skills f) Time Management
Module 6	Writing Research Paper.

Text Book:

1. Report writing for Business - Lesikar and Petit
2. Effective Technical Communication - Asharaf Rizvi, The McGraw Hill
3. Professional Ethics - R. Subramanian.
4. Business Communication - Hory Shankar Mukharjee, OUP
5. Effective Technical Communication - Anne Eisenberg.

Recommended Reading:

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