Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: B. TECH (Textile Engineering)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICA		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX501	DCS	YARN MANUFACTURING III	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To disseminate the theory and practice of yarn manufacturing with reference to the constructional features, working of a ring spinning machine, ring-doubler and T.F.O.
2. To outline the overall processes involved in Silk Spinning, Wool Spinning, Semi-Worsted, Worsted, Jute and Flax Spinning.
3. To deal with the theoretical and quality aspects of doubling, the influence of machine parameters on the quality of ring yarn

Course Outcomes (COs)

Student will be able

1. Comprehend the working principle for any type of ring spinning machine and manipulate the process parameters for the production of any type of ring yarn with desired quality.
2. Justify the importance of doubling for different types of yarn and will also be able to evaluate the quality aspects of doubled yarn.
3. Interpret the different processes involved in Silk Spinning, Wool Spinning, Semi-Worsted Spinning, Worsted Spinning, Jute and Flax Spinning; and also demonstrate their skills for manufacturing of good quality yarn on these spinning systems.

Syllabus

UNIT I: Ring Spinning

Objectives of Ring frame, constructional details of ring frame, theory related todrafting, twisting, winding, spinning balloon, yarn tension and selection of Ring and traveler, recent development in Ring spinning, compact spinning, calculations related to draft, speed, production.

UNIT II: Ring Spinning Process Conditions and Yarn Defects

Production of blended yarn/synthetic short and long staple fibre, spinning of natural, synthetic fibre, its blend in ring spinning.Ring spinning process parameters setting, environmental conditions and its effects, maintenance schedule and supervisory check points, Common defects in yarn, causes and remedies.

UNIT III: Twisting and Doubling

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Objectives, types of doubling, dry and wet doubling, merits and demerits, feed material preparation,constructional details and theory of ring doubling and TFO, developments in TFO and various type of doubling, calculation of production, twist for each case, selection of traveler and ring, general idea of material and package faults and their remedies, environmental condition and supervisory checkpoints.

UNIT IV: Reeling and Bundling

Reeling and bundling-objectives of reeling and bundling, brief idea about machines, working, merits and demerits of different types of reeling, production calculation and supervisory checkpoints.

UNIT V: Other Fibers Spinning Process

Introduction to woolen, semi worsted and worsted systems of spinning, Jute and flax spinning.Manufacturing of different types of fancy yarns.Polyester Recycled fibre spinning.

List of Practical (At least 10 practical experiments to be performed by each student):

1. To study the drafting, twisting and winding zone in ring frame.
2. Study and calculation of draft constant, twist constant, TPI, and production of ring frame.
3. To perform various settings and maintenance operations on ring frame such as: Ring rail leveling, spindle gauging, spindle eccentricity, lappet eccentricity.
4. Prepare a ring yarn sample by changing the draft and twist pinion.
5. To study the effect of shore hardness on yarn quality in ring frame (Mill Study).
6. To study the package building mechanism in a ring frame.
7. To study the drafting, twisting and winding zone in ring doubler.
8. Study and calculation of draft constant, twist constant, TPI, and production of ring doubler.
9. To perform various settings and maintenance operations on ring doubler such as: Ring rail leveling, spindle gauging, spindle eccentricity, lappet eccentricity.
10. To study the package building mechanism in a ring doubler.
11. To study the drafting, twisting and winding zone in TFO.
12. Study and calculation of draft constant, twist constant, TPI, and production of TFO.
13. To study the safety devices in ring frame and ring doubling machine.

References:

1. Two-For-One Technology & Technique for Spun Yarn by Kulkarni H S and Murthy HVS, Tecoya Publication, Bombay, 1992.
2. A Practical Guide to Ring Spinning by Klein W, Textile Institute, 2000.
3. Cotton Ring Spinning by Gilbert R. Merrill, Universal Publication, UK, 1959
4. Cotton Spinning by Taggart W. S, Macmillan, 1911.
5. Fancy Yarns-Their Mfg. and Application by Gong R.H.& Wright R.M., Elsevier, 2002.
6. Textile Yarns Technology,Structure& Applications byGoswami B.C.Wiley India, 2010.
7. Ring Spinning, Doubling & Twisting by Salhotra K. R., NCUE Publication, 2000.
8. Advances in Technology of Yarn Production by Chattopadhyay R.,NCUE Publication.
9. Fundamentals of Spun Yarn Technology by Lawrence Carl A. CRC press London, 2003.

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Name of Program: B.TECH (Textile Engineering)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI508	ODS	INSTRUMENTATION AND MEASUREMEN CONTROL	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge on the fundamentals of measuring instruments with common types of errors.
2. To provide a knowledge on the basics of control system theory
3. To introduce different types of sensors, transducers and strain gauges ,thermocouples, thermometers and flow meters used for measurements
4. To introduce measuring equipments used for linear and angular measurements.
5. To familiarize students with surface roughness measurements on machine components

Course Outcomes (COs):

Students will be able to

1. Understand measurement techniques and use of measuring instruments
2. knowledge for dealing with problems involving control system fundamentals
3. work in Quality control and quality assurances divisions in industries
4. Design a sensors and transducers used for analysis.
5. Design measuring equipments for the various Parameters.
6. Check and measure quality in engineering products.

Course Contents:

Unit I

Basic concepts of measurements: Introduction, idea of a generalized measurement system, basic characteristics of measuring devices - accuracy, precision, error, hysteresis, resolution, threshold, repeatability, reliability, span , dynamic accuracy; calibration. Sequential and random tests; Presenting data: Rectangular coordinate format, semi-log, full-log formats.

Measurement System Behavior: General model for a dynamic measurement system and its special cases: zero order, first order, and second order system.

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Unit II

Transducer: Introduction, classification, basic requirements. Displacement measurement: Idea of servo potentiometers, differential inductors and transformers, capacitive, shaft encoders, hall effect devices proximity devices and digital transducers. Strain gauge: basic principal, gauge factor, types of strain gauge, materials and their properties. LVDT .Measurement accessories: Brief concept of instrumentation amplifiers, signal generation and processing, data acquisition and conversion, input-output devices. General test equipments: review of general-purpose electronic test equipments - CRO, digital millimeters, counters, signal generators, regulated power supplies.

Unit III

Temperature Measurement: Temperature standards, Temperature scales; Thermometry based on thermal expansion: Liquid in glass thermometers, Bimetallic Thermometers; Electrical resistance thermometry: Resistance Temperature Detectors, Thermistors, Thermoelectric

Temperature measurement with thermocouples, standards. Pressure and Velocity Measurement: Relative pressure scales, pressure reference instruments, barometer, manometer, deadweight tester, pressure gauges and transducers, total and static pressure measurement in moving fluids Flow measurement: Pressure differential meters: Orifice meter, Venturimeter; rota meter.

Unit IV

Digital instruments: Advantages of digital instruments, Over analog instruments, DA/AD conversion, Digital voltmeter, Ramp type DVM, Integrating DVM, successive approximation DVM, Displays (LED, LCD and seven segment etc.), (Instruments used in computer controlled instrumentation, RS232C and IEEE 488, GPIB electrical interface, Interfacing transducers to electronic control).

Unit V

Introduction to control systems: Examples of control systems. Open loop and closed loop control. Transfer function, impulse response function, block diagram of closed loop system, and block diagram reduction, modeling of mechanical systems, modeling of electrical systems, signal flow graphs. Transient and steady state response analyses: First order systems, unit step and unit impulse response of first order systems, second order systems, unit step and unit impulse response of second order systems,

List of Practical (Expand it if needed):

1. Detailed study of LVDT & Measurement of distance using LVDT.
2. Learning techniques of measurement of strain using strain gauge.
3. Observe and Analysis the characteristics of NTC thermistor.
4. To observe the water level measurement
5. To analysis the Resistance Temperature Detector.
6. Learning the techniques of measurement of temperature of thermocouple.
7. Learning the techniques of measurement of pressure and characteristics of pressure transducer.
8. To observe the dead weight pressure gauge
9. To measure the distance using ultrasonic transducer
10. Demonstration and performance of CRO.

Text Books:

1. Metrology and Instrumentation - Swahney
2. Instrumentation Measurement and Analysis; TMH, - Nakra B C and Chaudhary K K
3. Instrumentation for Engineers and scientist;Oxford higher Ed - Turner J D and Hill M

Reference Books:

1. Instrumentation & Control - Rangan, Mani & Sharma,
2. Transducers & Instrumentation - Murty.
3. Control Systems Engineering - Nagrath and Gopal
4. Modern Control Engineering; 4e Pearson Education, New Delhi - Katsuhiko Ogata

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Name of Program: B.TECH (Textile Engineering)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CRDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX502	DCS	TEXTILE CHEMICAL PROCESSING - I	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Students will be able to use effectively principles and mechanisms of pre-treatment processes on textile goods.
2. Students will be able to dye different types of fabric accurately according to requirement.

Course Outcomes (COs)

Student will be able

1. Apply various principles and mechanisms of pre-treatment processes in textile wet processing.
2. Differentiate the various chemicals used in the preparatory and Dyeing processes and utilize them according to end use

Syllabus

UNIT I: Introduction of Textile Processing and Preparatory.

Sequence of chemical processing of textiles.Natural and added impurities in textiles.Introduction of various preparatory processes e.g. singeing, desizing, scouring and bleaching for different natural and synthetic materials and blends.

UNIT II: Mercerization and Heat Setting

Mercerizingof cotton, Optical whitening agents and their use, heat setting of synthetic fibre fabrics.

UNIT III: Concept & Theory of Colour.

Introduction of colour physics, Colour spectra and visible-wave, Metamerism and isomerism. Additive and subtractive theories.Primary, secondary, tertiary, complementary and contrasting colour.

Short description of colour assessment in textiles.Computer Colour-maching, Kubelka-munk equation, reflectance factor, colour-co-ordinates. Dye uptake on textiles. White index and yellowness index. Acceptability verses perceptibility.

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UNIT IV: Dyeing of Textiles

Theory of dyeing – dye-fibers interaction and free volume theory. Classification of different classes of dyes according to their chemical composition and application, Brief introduction to dyeing of natural and synthetic fibrewith various dye classes e.g. Direct, Basic, Acid, Sulphur, Vat, Solubilized vat, Azoic and Reactive.

Disperse dye: Free volume model, different methods of dyeing polyester and other synthetics fibers using disperse dye: carrier dyeing, high temperature high pressure (HTHP) dyeing. Jet-dyeing and Thermosol dyeing.

UNIT V: Dyeing of Yarn and Fabric. Dyeing Machines.

Brief introduction to dyeing of yarns and fabrics with various dye classes

Different machines involved in the dyeing processes, dyeing of blends. Colourfastness of dyed textiles, shade percentage and its measurement.Introduction of denim Processing and process flow.Calculation & mill practices.

List of Practical (At least 10 practical experiments to be performed by each student):

1. To study the process flow of textile chemical processing.
2. Scouring of cotton, bleaching of cotton with hypochlorite, sodium chlorite and Hydrogen peroxide.
3. Application of direct, Vat, sulphur, reactive and napthol dyes on cotton and necessary after treatments.
4. Scouring of cotton hank and fabric.
5. Bleaching of cotton hank and fabric.
6. Mercerization of cotton fabric.
7. Dyeing of cotton by reactive dyes.
8. Dyeing of cotton by sulphur dyes.
9. Dyeing of cotton by vat dyes.
10. Dyeing of cotton by azoic dyes.

References:

1. Scoring and Bleaching by Shennai, V. A. Sevak Publications, Wadala Mumbai, 1987.
2. Technology of Dyeing by Shennai, V. A., Sevak Publications, Wadala Mumbai, 1984
3. Textile Scoring & Bleaching by Trotman E.R., Hodder Arnold, 1968
4. Cellulosic Dyeing by Shore John, Bradford : Society of Dyers and Colourists, 1995

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SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTIC		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX503	DCS	TEXTILE TESTING-I	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – 2Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz0/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge on the fundamentals of textile testing and its Principle and to test the fiber and yarn properties accurately according to their application & requirement.
2. To assess the textile material accurately as per the requirement and the experiment standards followed in textile industry and their application.

Course Outcomes (COs)

Student will be able

1. Recall and Measure the testing conditions for textile material
2. Measure and analyze the properties of various textile fibers and yarns
3. Understand and recall the statistical tools used for measurement
4. Able to produce the desired end products by analyzing the raw material properties according to their end use and application

Syllabus

UNIT I:Introduction to Textile Testing and Statistics

Introduction to testing,objectives of testing,sampling techniques, squaring technique, cut squaring method and zoning technique for fibre sampling. Biased and Un-biased method for sample selection of yarn and fabric.Calculation of mean, mode, variance, standard deviation and coefficient of variance (CV). Properties of normal distribution curve. Significance testing of means.Graphical presentation and interpretation of test data, quality control charts.

Unit II: Fiber Properties

Measurements of fibre length, fibre fineness, fibre-maturity and fibre strength of cottonfibre.Fibre length by comb sorter, fineness by gravimetric method, optical method, and air flow method, maturity by caustic soda method and strength by Stelometer.Measurement of trash content.Testing of Man-made fibrefor linear density, tensile properties and crimp properties.

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Unit III: Moisture Relations and Testing

Various terms and definition related tohumidity and moisture in textiles, measurement of atmosphericcondition, regain–humidity relations of textiles.Factors affecting the regain of textile materials, Measurement of regain and principle of operation of equipment (Standard conditioning oven), Shirley moisture meter. Concept of correct invoice weight and official regain, factors affecting the regain of textile material.

Unit IV: Advance testing instrument for fibre and yarn testing

Latest methods of fibre testing HVI, digital fibro-graph method and AFIS testing of neps in card web by visual examination, cottonsliver by nep concept of fibre quality index.

Unit V: Yarn numbering and yarn faults classification

Introduction to yarn numbering systemand measurement of yarn count by different methods, Definition related to yarn twist and twist direction. Measurement of yarn twist in singleand plied yarns based on various principles, Yarn faults and its classification on the basis of yarn classimat fault system

List of Practical (At least 10 practical experiments to be performed by each student):

1. To test the trash percentage in bale cotton fiber sample
2. To test the Fiber fineness of fiber by using micronair tester (Air flow method).
3. To test the Fiber maturity by caustic soda method testing.
4. To test Fiber length by comb sorter method
5. To Measurement of the span length of fibreby digital-fibro-graph method.
6. To test the Strength of the fiber by using Stelometer.
7. To test the moisture content in cotton fibre sample by oven dry method.
8. To test moisture in package by using digtal moisture meter
9. To Test the hank of roving, silver by using wrap block.
10. To test the count of yarn by using wrap reel.
11. To test the lea strength of yarn by using lea strength tester.
12. To test the strength of single yarn by using instron tensile tester.
13. To test yarn faults by using visual method by yarn appearance board.
14. To test the yarn faults by using yarn evenness tester.
15. To identify twist direction and measure yarn twist in Single cotton yarn.
16. To identify twist direction and measure twist in Plied yarn.

References:

1. Principle of Textile Testing - Booth J E
2. Handbook of Textile Testing & Quality Control - Grover E B and Hamby D S
3. Progress in Textiles Science and Tech-Vol.1, Testing & Quality Mgt. - Kothari V K
4. Identification & Analysis of Textile fibre - BTRA
5. Textile Testing - Angappan P and Gopalakrishnan R

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SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTIC		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX504	DCS	APPAREL MANUFACTURING AND MERCHANDISING	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Students will be able to explain the garment process line and Different types of production process.
2. Students will be able to understand the role of the merchandiser in garment industry.

Course Outcomes (COs)

Student will be able

1. Understand and describe the garment manufacturing process with pre-production and post- production process.
2. Understand different type of machines used in garment manufacturing process.
3. Explain different type of store formats in retail business.
4. Explain different type of merchandising samples

Syllabus

UNIT I: Introduction to Garment Production Process

Production System & it's basic components, Types of production systems, Batch Production, Mass production,Continuous Production, one off Production, IT Production System. Garment Manufacturing Systems-Make Through, Conventional Bundle System, Clump System, Progressive Bundle System, Flexi Flow, Straight Line,UPS,Modular System,Flow chart of different garment production process, Capacity planning in sewing,Operation breakdown

UNIT II: Pre- production Processes of Garment Production

Pattern making,Grading, Fabric Inspection, Shade Sorting, Width Sorting, Marker Planning, Concept of one way marker & two way marker, Use of software for marker making, Fabric Spreading methods- manual & machine, correct plydirection and adequate lay stability, Alignment of piles, ply tension, fabric faults elimination, elimination of static electricity.

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UNIT III: Cutting, Sewing and Finishing

Different type of cutting machines, Precautions in cutting, Different type of Sewing Machines, Type of stitches & it's use, Finishing equipment, Garments Accessories

like sewing thread, Buttons,Labels,Packing accessories like collar bone,butterfly,brand labels, cartons. Concept of ratio packing

UNIT IV: Marketing Concepts & Merchandising

Key concepts of Marketing, Need & Want, Segmentation, Targeting & Positioning. Difference between Selling & Marketing, Merchandising, definition, Merchandiser types, role, Qualities, Buyer, Buying house, Sourcing, Time and action Calendar,Type of samples, Proto,salesman, photo-shoot,top of production, gold/silver seal etc.

UNIT V: Merchandising in Retail Firms

Retail Firm Structure, Responsibilities of fashion buyer, Responsibilities of buyer-Planning, Buying Selling and Forecasting.Range, Range planning/Development,SourcingDifferent retail formats like discount stores, factory outlets etc.

References:

1. Garment Technology for Fashion Design by CooklinGerry, Wiley-Blackwell; 2 edition, 2012.
2. Introduction to Clothing Manufacture by CooklinGerry, John Wiley & Sons, 2006.
3. Technology of Clothing Manufacture by Carr& Latham, John Wiley & Sons, 1994.
4. Introduction to Clothing Production Management by Chuter A.J., John Wiley & Sons, 1995.
5. Pattern Making byMartin Shoben, Butterworth-Heinemann, 1987.
6. Pattern Making by Armstrong and Helen Joseph, Pearson, 2009.
7. Fashion from concept to consumer by Gini Stephens Frings.Prentice Hall,1987.
8. Marketing Management by Philip Kotler,Prentice Hall,2002,8th Edition.

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Name of Program: B. TECH (Textile Engineering)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX506	DCS	ADVANCE CAD IN TEXTILES	-	-		-	50	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide the knowledge about the advance functionsof CAD in Textile
2. To impart conceptual knowledge for the Industry as a Garment Designer.
3. To understand maker planning, pattern making, style creation and fabric structure, figure designing for mass production.

Course Outcomes (COs)

Student will be able:

1. To apply their knowledge on the various functions of the CAD in textile
2. To make different garment designing
3. To identify the fabric making process, print designing for fabric.
4. To use their knowledge for different tools of advance CAD in Textile*

List of Practical (At least 10 practical experiments to be performed by each student)

1. To study the overview of Advance CAD in Textile.
2. To study installation process of Lectra software with hardware configuration.
3. To prepare Marker Plan of shirt on graph paper.
4. To study the Modaris software in detail with their tools.
5. To prepare a pattern on Modaris software with grading tool
6. To study the Diamino software in detail with their tools.
7. To prepare efficient Marker Plan on Diamino s/w with pattern placement
8. To study Kaledo Weave module in detail with tools
9. To prepare a design on Weave module & take a print out.
10. To study the KaledoKnit module in detail with tools.
11. To prepare a design on Knit module & take a print out
12. To study Kaledo Print module in details with their tools
13. To prepare a design on Print module & take a pint out
14. To study Kaledo Style module in details with tools
15. To prepare a design on Style module & take a print out

References:

1. Lectra CAD manual
2. Fabric Structure & Design - Gokarneshnan, N
3. Mens wear pattern making, AlamParwez Khan, Punkaj Pub. Delhi, 2007
4. CAD-Cam Principles and applications - Rao; TMH
5. Ten steps to fashion freedom, Mayfield

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Name of Program: B.TECH (Textile Engineering)
BTTX505 (ELECTIVE - I)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX515	DCS	KNITTING TECHNOLOGY	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge on the fundamentals of warp and weft knitting technology.
2. To understand different pattern, design & techniques of weft and warp knitting and to apply knowledge in knitting industries

Course Outcomes (COs)

Student will be able

1. Apply their knowledge on the various functions of the Knitting technologies.
2. Understand the different the knitted fabric
3. Solve the different problem & understand the quality aspects for the knitting.
4. Use their conceptual knowledge for knitting industries

Syllabus

UNIT I: Introduction of Knitting and Elements of Weft Knitting.

Introduction to knitting and its comparison with weaving. Weft Knitting classification,specification of various knitting machines, elements of machine knitting, needle gaiting, principle of operation of different single jersey and double jersey machines, knitting cycle, positive yarn feeder, production calculation.

UNIT II: Different weft Knitting Fabric Structure.

Basic single jersey and double jersey structures and their derivatives, horizontal strippingand plating, Designing by different, mechanisms e.g. pattern wheel, pattern drum and jacquard.

UNIT III: Elements of Warp Knitting

Introduction to warp knitting, application of warp knitted fabric. Comparison between warp knitting and weft knitting. Structure properties of warp knitted fabric. Classification of warp knitting and their scope and uses, element of warp knitting machine, various advantages of warp knitting machine and their area of application.

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UNIT IV: Different Warp Knitting Machines and Warp Knitting Structure

Introduction to TricotandRaschelknitting machine,knitting elements of TricotandRaschelknitting machine, working principle and pattern mechanism in TricotandRaschelknitting machine.

UNIT V: Modern Development in Knitting and Quality Control

Application of electronics and automation in knitting machines.Modern Developments in Weft Knitting Machine.Control of yarn feeding in warp knitting machines; requirement of yarn quality for knitting; dimensional stability of knitted structures.

References:

1. Knitting Technology by Ajgaonkar D. B., Universal Publication, 1998.
2. Knitting Technology by Spencer, Woodhead Publishing ,Abington Hall, Abington, 2001
3. Knitting Technology by Pitman, Tubbs, M, 1948.
4. Knitted Clothing Technology by Brackenbury Terry, Wiley India, 1992.

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Name of Program: B. TECH (Textile Engineering)
BTTX505 (ELECTIVE – I)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX525	DCS	NONWOVEN TECHNOLOGY	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge on the fundamentals of manufacturing process of nonwoven fabrics.
2. To provide knowledge on the technical requirements and the physical and mechanical properties of nonwoven fabrics

Course Outcomes (COs)

Student will be able

1. Explain the importance of the nonwoven fabrics.
2. Solve the problems occurred during manufacturing of nonwovens.
3. Develop the different structure of nonwovens.
4. Analyze the physical and mechanical behavior of nonwovens.
5. Explain the principle & manufacturing process of hydro entangled nonwoven fabrics.

Syllabus

UNIT I: Introduction of Nonwovens

Historical background of nonwovens, definition, stages in Nonwoven manufacturing, Web Forming Techniques: carding parallel laid web and cross laid web .Classification of nonwoven– on the basis of use, manufacturing process, web formation and bonding.

UNIT II: Webs Formation Techniques

Dry laid webs -fibre selection, fibre preparation, web formationand layering. Wet laid nonwoven -Raw materials, production process, special features of the wet laid process and its product. Spun laced webs

UNIT III: Nonwoven Bonding Techniques

Introduction of bonding techniques.Mechanical bonding, adhesive bonding (Chemical bonding) and Thermal bonding. Elementary idea of production of laminated and composite nonwoven material.

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UNIT IV: Mechanical and Thermal Bonded Nonwovens

Mechanically bonded webs - needle punched nonwovens, Application of needle punching, stitch bonded nonwovens, applications. Thermally bonded nonwovens - binder, binding fibers, binding powder, binding webs, methods of thermal bonding - Hot calendaring, beltCalendaring, oven bonding, ultrasonic bonding, and radiant heat bonding.

UNIT V: Hydro Entanglement and Spun Lace Nonwovens.

Hydro entangled nonwovens, advantages and disadvantages, Bonding process, water system, web drying, properties of spun laced webs, applications.

References:

1. Nonwoven Process Performance & Testing by Turbak, TAPPI Press, 1993.
2. Handbook of Non-wovens by Stephen Russell, Woodhead Publishing Ltd., UK, 2007
3. Manual of Nonwovens by R.Krecma, The Textile Trade Press, Manchester, UK, 1971.
4. Thermal Bonding of Nonwoven Fabrics, Textile Progress 26 (2), 1-38, 1995.
5. Developments in Nonwoven Fabrics, Textile Progress, Vol. 12, No. 4, The Textile Institute, Manchester, UK, 1983.

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Name of Program: B.TECH (Textile Engineering)
BTTX505 (ELECTIVE – I)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX535	DCS	MAN-MADE FIBERS TECHNOLOGY	60	20	20	-	-	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge on the fundamentals of manufacturing process of man-made fibers, polymerization and raw materials
2. To provide knowledge on the technical requirements and the physical and mechanical properties of man-made fibers.

Course Outcomes (COs)

Student will be able

1. Explain the importance of the man-made fibers.
2. Solve the problems occurred during manufacturing of man-made fibers.
3. Effects of process parameters on structure and propereties of man-made fibers.
4. Analyze the physical and mechanical behavior of man-made fibers.
5. Explain the principle & manufacturing process of Polymerisation, Melt spinning, Dry Spinning and Wet Spinning Process.

Syllabus

UNIT I: INTRODUCTION TO MAN-MADE FIBERS

Definition of made fibres.Brief history of manmade Fibres. Relative merits and demerits of manmade fibres and natural fibres. Basic production systems of the man-made fibre. Meltspinning, solution dry spinning and solution wet spinning. Factors influencing selection of a Particular process for fiber formation, Relative merits and demerits of melt, dry and wet spinning processes,

UNIT II: CONVERSION OF POLYMERS INTO FIBRES ANDMELT SPINNING

Raw material, technology of polymerization and extrusion of polyester, nylon 6, nylon 66 and polypropylene. Variables of spinning, Different components of spinning process, i.e., extruder, gear pump, filters, manifold, spinning head, quenching chamber, winders. Different Quenching/solidification techniques, spinning of Polyester staple fibres (PSF) Technology and filaments. POY, and FDY Technology. High speed spinning. Effect of process parameters on structure and properties of melt spun filament.

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UNIT III: SOLUTION DRY AND WET SPINNING

Dry spinning of cellulose acetate.Acetylation of cellulose, DopePreparation and spinning of cellulose diacetate and triacetate, Dry spinning of acrylic.

Process flow diagram and significance of each step for solution wet-spinning of viscose rayon. Chemistry of viscose rayon formation process, Influence ofvarious additives and temperature of the regeneration bath and their influence on the processand properties of viscose rayon, Various types of rayon, i.e. high wet modulus, Ten-X, etc.

Effect of process parameters on Structure and properties of solution dry and wet spun filament.

UNIT IV: DRAWING AND HEAT SETTING OF FIBRES

Object of drawing. Concept of neck drawing, Effect ofdrawing conditions on the structure and properties of fiber.Object of heat setting. Effect ofheat setting parameters on the structure and properties of fiber.

UNIT V: SPIN-FINISH

Objective, properties and application of spin finish for PSF, POY and FDY

References:

1. Vaidya A A, "Production of Synthetic Fibres", 1st Ed., Prentice Hall of India, New Delhi,1988.
2. "Manufactured Fibre Technology", 1st Ed. V B Gupta and V K Kothari, 1st Ed., Chapmanand Hall, London,1997.
3. Mark H F, Atlas S M, Cernia E, "Man Made Fibre Science and Technology", 1stEd.,Vol.1, 2, 3, Science Publishers, New York,1967.
4. Macintyre J E, "Synthetic Fibres", Wood head Fiber Science Series, UK,2003.
5. "Hand Book of Fibre Chemistry", Ed. M Lewin and E M Pearce, Mercel Dekker Inc.,1998.