



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Textile Technology**  
**Choice Based Credit System (CBCS) in Light of NEP-2020**  
**B. Tech. in Textile Engineering**  
**(2021-2025)**

COURSE CODE	CATEGORY	COURSE 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*					
BTTX401	DCC	FIBRE SCIENCE II	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 impart knowledge about the principle and manufacturing process of high performance fibres.
2. To understand accurately the optical, Electrical and Thermal properties of different synthetic fibres.

**Course Outcomes (COs):**

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to:

1. Identify and evaluate the properties of synthetic fibres accurately.
2. Explain the correct manufacturing process of various synthetic fibres.
3. Solve technical problems related to fibres behavior on the machine.
4. Explain optical and thermal behavior of the fibres.

**Syllabus:**

**Unit-I Introduction to New Fibres**

**12 HRS**

New Fibres Glass, Carbon, Aramid, Spandex, Spectra, Nano fibres and Teflon etc. Basic concept of bi-component, hollow and tri-lobal fibres, High speed extrusion, Tow conversion process.

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BTTX401	DCC	FIBRE SCIENCE II	60	20	20	30	20	3	0	2	4

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**Unit-II Introduction to Texturing**

**9 HRS**

Texturing-Importance, basic principle, heat setting, false twisting, process variables, development of false twist texturing machine. Textured yarns like stuffer box, crimping, edge crimping, knit-de-knit, gear crimping etc. properties of such yarn. Principle of air bulking and properties of air-jet textured yarn. Chemical texturing, production of POY, MOY, FDY and DTY yarn.

**Unit-III Optical properties of Fibres**

**8 HRS**

Optical properties - refraction, absorption, dichroism, reflection and luster. Birefringence and orientation, specific index of birefringence and its measurement.

**Unit-IV Electrical and Frictional Properties of Fibres**

**8 HRS**

Electrical properties - dielectric properties, electrical resistance of fibres and its measurement, static electricity, measurement and explanation of static phenomena. Frictional properties - nature of friction and application to fibres, static and dynamic friction of yarn on ceramics, metals.

**Unit-V Thermal properties of Fibres**

**8 HRS**

Thermal properties thermal parameters, structural changes in fibres on heating, concept of heat setting and its usefulness, factors affecting the heat setting behavior of textile materials, first and second order transition.

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<b>BTTX401</b>	<b>DCC</b>	<b>FIBRE SCIENCE II</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>	

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\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Text Books:**

1. Physical Properties of Textile Fibres, Hearle, J. W. S., Morton, W. E., Wood Head Publishing, 2008
2. 4th Edition Manufactured Fibre Tech., Gupta, V.B., Kothari, V.K., Springer, 1997.
3. Textile Science: An Explanation of Fibre Properties, Gohl, E. P. G., Vilensky, L. D., CBS Publisher, 1984.

**References:**

1. Manmade Fibers - Moncrief, R.W., Halstead Press, New York, 1975.
2. Production of Synthetic Fibres - Vaidya, A. A., Prentice Hall of India, Private Limited, New Delhi, 1998.

**List of Experiments:**

1. Identification of Natural fibres by optical microscope for longitudinal view: Cotton, Jute, Wool, Silk.
2. Identification of Synthetic fibres by optical microscope for longitudinal view: Viscose, Polyester, Nylon.
3. Identification of Natural fibres by optical microscope for cross sectional view: Cotton, Jute, Wool, Silk.
4. Identification of Synthetic fibres by optical microscope for cross sectional view: Viscose, Polyester, Nylon.
5. Identification of Natural fibres by burning test: Cotton, Jute, Wool, Silk.
6. Identification of Synthetic fibres by burning test: Viscose, Polyester, Nylon.
7. Identification of Natural fibres by chemical test: Cotton, Jute, Wool, Silk.
8. Identification of Synthetic fibres by chemical test: Viscose, Polyester, Nylon.
9. Identification of Natural fibre blend components from yarn.
10. Identification of Synthetic fibre blend components from yarn.

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<b>BTTX402</b>	<b>DCC</b>	<b>YARN MANUFACTURING II</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

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**Course Educational Objectives (CEOs):**

The student will learn:

1. The concept of drafting and how the different process parameters influence the drafting process with technical process parameters.
2. The concept of combing operation, working and constructional features of a modern rectilinear comber, technical process parameters and calculations related to production, noil % etc.
3. The constructional features, principle of operation and objectives of a modern speed frame. Calculations of speeds, drafts, production.

**Course Outcomes (COs):**

After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes. The students will be able:

1. To work for any type of drafting systems/draw-frames and effectively alter or modify the process parameters, so as to meet the desired level of outcome.
2. To interpret the operations of different types of combing machines and calculate their performance level to produce superior quality combed yarn in terms of cost and productivity.
3. To work for the different types/models of roving-frames to produce the desired quality of roving.

**Syllabus:**

**Unit-I Draw Frame**

**10 HRS**

Objectives of drawing, Constructional details of draw frame, Concept of perfect drawing, Different drafting systems, Monitoring and auto levelling of irregularities. Draw frame blending, Recent developments, Performance assessment, Idea of setting, speed, and other technical parameters. Calculations related to draft, production etc.

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BTTX402	DCC	YARN MANUFACTURING II	60	20	20	30	20	3	1	2	5

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**Unit-II Lap preparation**

**6 HRS**

Object of lap preparation for combing, Factors affecting lap preparation, Methods of Lap preparations and its importance, Recent developments, Setting, speed, draft, and production calculations.

**Unit-III Comber**

**12 HRS**

Objectives of combing, Construction, and principle of working, Function of different motions, Combing cycles, Different types of combers, Recent developments, Assessment of comber performance, Idea of setting, speed, and other technical parameters, Calculation related to production, noil %, draft etc.

**Unit-IV Speed Frame**

**10 HRS**

Objectives of speed frame, Construction, and principle of working, Drafting, twisting, and winding, Building mechanism, Different types of flyers, Latest developments, Performance assessment, Idea of setting, speed, and other technical parameters. Calculation related to production, draft etc.

**Unit-V General Process Parameters and Maintenance**

**7 HRS**

Environmental condition for various fibers in draw frame, comber, and speed frame section. Process parameters of different machines for different materials, General idea of speed, setting and their impact on both natural and manmade fibre processing, General idea of defects and remedies in draw frame, comber, and speed frame, Maintenance schedule and important supervisory check points at draw frame, comber, and speed frame.

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**Text books:**

1. Manual of Textile Technology-Vol. III, IV, W Klein, The Textile Institute, 1993.
2. Elements of Carding and Drawing, A R Khare, Sai Book Center, 1999
3. Elements of Combing, A R Khare, Sai Book Center, 1999.

**References:**

1. Cotton Drawing and Roving, Gilbert R. Merrill, Universal Publishing Corporation, 1999.
2. Cotton Combing, Gilbert R. Merrill, Universal Publishing Corporation, 1999.
3. Cotton Ring Spinning, Gilbert R. Merrill, Universal Publishing Corporation, 1999.
4. Cotton Spinning, Vol. II, William S Taggart, Macmillan & Co, Limited, 1930.
5. Spun Yarn Technology, Vol. III Drawing, A. Venkatasubramani, 1985.
6. Processing of Manmade and Blends on Cotton System, 3<sup>rd</sup> Edition, Salhotra K. R., Textile Association (India), 2004.
7. Cotton Spinning Calculations, William S Taggart, Macmillan & Co, Limited, 1930.
8. Fundamentals of Spun Yarn Technology, Carl A Lawrence, CRC Press, 2003.

**List of Experiments (Expand it if needed):**

1. To study the passage and working of material through Industrial Draw Frame.
2. To study the gearing system of Industrial Draw Frame.
3. To study the passage and working of material through Comber.
4. To study the gearing system of Comber.
5. To study the passage and working of material through Miniature Speed Frame.
6. To study the gearing system of Miniature Speed Frame.
7. To study the passage and working of material through Miniature Draw Frame.
8. To study the gearing system of Miniature Draw Frame.

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BTTX403	DCC	FABRIC MANUFACTURING II	60	20	20	30	20	3	0	2	4

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**\*Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/

**Course Educational Objectives (CEOs):**

1. To provide the knowledge of the working principles of primary and secondary motions of the loom.
2. To explain the working of Dobby and Jacquard Shedding Mechanisms.

**Course Outcomes (COs):**

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to:

1. To identify the working principles of primary and secondary motions of the loom and can manufacture fabrics as per the required quality and specifications.
2. To demonstrate the knowledge of Shedding mechanism and can prepare fabric of desired weave design.

**Syllabus:**

**Unit-I Introduction to shuttle loom**

**10 HRS**

Principles of weaving, primary, secondary an auxiliary motion. Warp passage through the loom and function of various parts of it, speed ratio of different shaft of the loom and loom speed calculations. Different types of sheds - their advantages and disadvantages.

**Unit II Primary motions**

**9 HRS**

classification of shedding motion, Negative tappet shedding mechanism, heald reversing motions, early and late shedding- their advantages and disadvantages, fixed and variable heald staggering. classification of picking motions, mechanism of over and under pick motions, shuttle speed, shuttle checking devices, causes of shuttle flying and shuttle trap. Beat-up mechanism, sley eccentricity and its effect, factors affecting sley movement, Timing diagram of primary motions.

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**Unit-III Secondary motion**

**9 HRS**

Classification of take-up motion, 7-wheel take-up motion, calculation of dividend of 7 wheel take up motion, negative let-off motion and its advantages and disadvantages, Causes of pick spacing variation. Temples-object of temples, various types of temples and their uses.

**Unit-IV Dobby Shedding**

**8 HRS**

Dobby shedding and its advantages over tappet shedding, Right hand and left hand dobbies, single lift and double lift dobbie and their comparison, working Principles of Keighley, cam dobbie and paper dobbie, preparation of pattern lattices and methods for preparation of punch cards in modern dobbies.

**Unit-V Jacquard Shedding**

**9 HRS**

Coarse pitch jacquard, single lift and double lift jacquard and their comparison, working principle of single lift single cylinder and double lift single cylinder jacquard, working of double lift double cylinder jacquards. Various types of harness tie-ups - London tie and Norwich tie. Introduction to fine pitch jacquard, difference between fine pitch and course pitch jacquard, casting out of harness, figuring capacity of jacquard.

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**Text Books:**

1. Plain Weaving - Aswani K T.
2. Woven Fabric Production II, 1st Edition, NCUTE Publication (2002).
3. Fancy Weaving - Aswani K T.
4. Principle of Weaving - Marks & Robinson.
5. Weaving - Machines, Mechanisms and Management - Talukdar MK et al.

**References:**

1. Fox; Mechanism of Weaving.
2. BTRA Silver Jubilee Monograph Series - BTRA; Loom Shed.
3. Fabric Forming - Hasmukharai B.
4. Weaving - Tech. & Operations - Allan Ormerod, Walter S. Sondhel.
5. Weaving Vol. I - Bannerjee N.N.

**List of Experiments:**

1. To study the warp yarn passage through plain power loom.
2. To study the working of negative tappet shedding motion.
3. To study the working of over picking mechanism.
4. To study the working of side lever under picking mechanism.
5. To study the working of beat-up mechanism.
6. To study the working of negative let-off mechanism.
7. To study the working of take-up mechanism and also calculation of dividend.
8. To study different types of Temples.
9. To study the working of Keighley Dobby mechanism.
10. To study and observe the working of Jacquard shedding mechanism.

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BTTX404	DCS	FABRIC STRUCTURE AND DESIGN II	60	20	20	0	0	3	0	0	3	

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**Course Educational Objectives (CEOs):**

1. To provide knowledge on the design of compound fabric structures (like Double cloth, backed cloth, velvet structures, terry pile structures and leno structures) and jacquard designs as per specifications.
2. To identify and differentiate simple and compound fabric structures accurately.

**Course Outcomes (COs):**

Student will be able to

1. Make and develop new woven fabric design
2. Make double cloth, backed cloth and velvet structures.
3. Solve technical problems related to compound fabric structures on the loom.
4. Provide suitable draft and pegplan for a given weave & utilise available resources for making designs.

**Syllabus:**

**Unit-I Backed Fabrics**

**10 HRS**

Definition, features, classification, and uses. Backed fabrics- warp and weft backed fabrics and reversible backed fabrics. Figuring with extra warp and extra weft

**Unit-II Double Cloth**

**10 HRS**

Double cloth and its varieties. Different designs etc. Method of preparation of self-stitched and center stitched double cloths.

**Unit-III Pile fabrics**

**9 HRS**

Definition, classification, process of formation of pile, graphical representation of terry weaves, Velveteen and corduroy fabrics, real velvet terry and warp pile fabric structure.

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**Unit IV: Net Fabric**

**7HRS**

Introduction to gauge and leno structures, methods of producing leno fabric, design, draft and peg-plan of leno structure.

**Unit-V Complex fabrics**

**9 HRS**

Point paper designing of jacquard fabrics, complex design, preparation of various design on point paper such as Damask, Brocade, Tapestry carpet design.

**References:**

1. Advanced textile design - Grosicki Watsons.
2. Grammer of textile design - Nisbet.

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BTTX405	DCC	Textile Testing I	60	20	20	30	20	3	0	2	4	

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**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**

**12 HRS**

Introduction to testing. Objectives of testing, various sampling techniques, squaring technique, cut squaring method and zoning technique for fibre sampling. Biased and Un-biased method for selection of yarn and fabric samples. 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**

**12 HRS**

Measurements of fibre length, fibre fineness, fibre-maturity and fibre strength of cotton fibre. Fibre length and dispersion 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.

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**Choice Based Credit System (CBCS) in Light of NEP-2020**  
**B. Tech. in Textile Engineering**  
**(2021-2025)**

COURSE CODE	CATEGORY	COURSE 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*					
<b>BTTX405</b>	<b>DCC</b>	<b>Textile Testing I</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>	

**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.

**Unit -III: Moisture Relations and Testing**

**10 HRS**

Various terms and definition related to humidity and moisture in textiles, measurement of atmospheric condition, 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**

**11 HRS**

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

**Unit -V: Yarn numbering and yarn faults classification**

**10 HRS**

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

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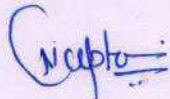
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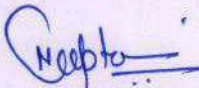
**List of Practical (At least 10 practical experiments to be performed by each student):**


1. To test the trash percentage in bale cotton fiber sample
2. To test the Fiber fineness of fiber by using micronaire tester (Air flow method).
3. To test the Fiber maturity by caustic soda method testing.
4. To test dispersion and length by comb sorter method
5. To Measurement of the span length of fibre by 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 the hank of roving, silver by using wrap block.
9. To test the count of yarn by using wrap reel.
10. To test the lea strength of yarn by using lea strength tester.
11. To test the strength of single yarn by using instron tensile tester.
12. To test yarn faults by using visual method by yarn appearance board.
13. To test the yarn faults by using yarn evenness tester.
14. To identify twist direction and measure yarn twist in Single cotton yarn.
15. To identify twist direction and measure twist in Plied yarn.

**References:**

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2. Physical testing of textiles, Savile B.P., Woodhead Publishing Ltd, Cambridge, 2002.
3. Handbook of Textile Testing & Quality Control - Grover E B and Hamby D S
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7. Practical Statistics in Textile Industry Part I and II, G.A.V. Leaf Statistics, Das N.G.

  
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