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 (168 Credit_2023-2027)

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*				
BTTX 401	DCC	FIBRE SCIENCE II	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 impart knowledge about the principle and manufacturing process of high performance fibres.
2. To understand 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. Describe the manufacturing process of high performance fibers such as glass, carbon, hollow fiber, etc.
2. Explain texturing process for synthetic fiber and different methods of texturizing.
3. Explain optical behavior of the fibres.
4. Explain electrical and frictional behavior of the fibres.
5. Explain thermal behavior of the fibres.

Syllabus

Unit I Introduction to New Fibres **9 h**

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.

Unit II Introduction to Texturizing **9 h**

Texturizing - Importance, basic principle, heat setting, false twisting, process variables, development of false twist Texturizing machine. Textured yarns like stuffer box, crimping, edge

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BTTX 401	DCC	FIBRE SCIENCE II	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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crimping, knit-de-knit, gear crimping etc. properties of such yarn. Principle of air bulking and properties of air-jet textured yarn. Chemical Texturizing, production of POY, MOY, FDY and DTY yarn.

Unit-III Optical properties of Fibres **9h**

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 **9h**

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 **9h**

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.

Text Books:

1. Physical Properties of Textile Fibres, Hearle, J. W. S., Morton, W. E., Wood Head Publishing, 2008
2. Textile Science: An Explanation of Fibre Properties, Gohl, E. P. G., Vilensky, L. D., CBS Publisher, Edition 2, 2005.

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BTTX 401	DCC	FIBRE SCIENCE II	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.

3. Manufactured Fibre Technology, Gupta, V.B., Kothari, V.K., Springer, 1997.

References:

1. The Chemistry of Textile Fibres, Mather, R. R., Wardman, R. H., Royal Society of Chemistry, 2015.
2. Handbook of Textile Fibre Structure, Eichhorn, S., Hearle, J. W.S., Kikutani, T., Jaffe. M., ELSEVIER, Vol. 1, 2009.
3. Production of Synthetic Fibres, Vaidya, A. A., Prentice Hall of India, Private Limited, New Delhi, 1998.
4. Manmade Fibers, Moncrief, R.W., Halstead Press, New York, 1975.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX 402	DCC	YARN MANUFACTURING 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):
The student will learn
1. The concept of drafting and how different process parameters influence the drafting process.
2. The concept of combing operation 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 and calculations related to 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 to
1. Explain type of drafting systems/draw-frames and effectively modify the process parameters.
2. Explain the process of lap formation and its importance in combed yarn manufacturing.
3. Understand the operations of combing machines to produce high quality yarn.
4. Understand different types/models of roving-frames to produce roving.
5. Apply their knowledge for setting of machine and analyse the various faults occurring in yarn preparatory process to produce superior quality yarn in terms of cost and productivity.

Syllabus

Unit I: Draw Frame **9h**
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.

Unit II: Lap Preparation **7h**

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BTTX 402	DCC	YARN MANUFACTURING 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.

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 **11h**

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 **10h**

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 **8h**

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.

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 and its production/shift.
3. To study the passage and working of material through Comber.

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BTTX 402	DCC	YARN MANUFACTURING 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.

4. To study the gearing system of Comber and its production/shift.
5. To study the passage and working of material through Miniature Speed Frame.
6. To study the gearing system of Miniature Speed Frame and its production/shift.
7. To study the builder motion of Miniature Speed Frame.
8. To study the passage and working of material through Miniature Draw Frame.
9. To study the gearing system of Miniature Draw Frame and its production/shift.
10. To study the draft constant of Industrial Draw Frame.
11. To study the draft and twist constant of Miniature Speed Frame.

Textbooks:

1. The Rieter Manual of Spinning, Vol. I, W. Klein, Rieter Machine Works Ltd. 2016.
2. The Rieter Manual of Spinning, Vol. III, W. Klein, Rieter Machine Works Ltd. 2016.
3. Principles of Spinning: Carding and Draw frame in Spinning, A R Khare, CRC Press, 2022.
4. Principles of Spinning: Combing in Spinning, A R Khare, CRC Press, 2023.

References:

1. Fundamentals of Spun Yarn Technology, Card A. Lawrence, CRC Press, 2003.
2. Handbook of Yarn Production, P.R. Lord, Woodhead Publishing Limited, 2003.
3. Processing of Manmade and Blends on Cotton System, 3rd Edition, Salhotra K R, Textile Association (India), 2004.
4. A Practical Guide to Quality Management in Spinning, B. Purushothama, Woodhead Publishing India, 2011.
5. Process control in textile manufacturing, A Majumdar, A Das, R. Alagirusamy and V K Kothari, Woodhead Publishing Limited, 2013.
6. Process Management in Spinning, R. Senthil Kumar, CRC Press, 2015.
7. Handbook on Cotton Spinning Industry, B. Purushothama, Woodhead Publishing India, 2016.

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BTTX403	DCC	FABRIC MANUFACTURING -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 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. Identify the working principles of shedding and different shedding mechanism in a loom.
2. Identify the working principles of different picking and beating mechanism in a loom.
3. Identify the working principles of secondary motions of the loom and can manufacture fabrics as per the required quality and specifications.
4. Demonstrate the knowledge of dobby shedding mechanism and its preparation.
5. Demonstrate the knowledge of jacquard shedding mechanism and its preparation.

Syllabus

Unit I: Introduction to loom and primary motion- Shedding: **9 HRS**

Principles of weaving. primary, secondary, and auxiliary motion. Warp passage through the loom and function of various parts of it, different types of sheds - their advantages and disadvantages, positive and negative shedding, Negative tappet shedding mechanism, heald reversing motions, early and late shedding- their advantages and disadvantages, fixed and variable heald staggering.

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BTTX403	DCC	FABRIC MANUFACTURING -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.

Unit II: Primary motion – Picking and beating-up: **9 HRS**

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.

Unit-III Secondary motion: **8 HRS**

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

Unit-IV: Dobby shedding: **9 HRS**

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

Unit-V Jacquard shedding: **10 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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BTTX403	DCC	FABRIC MANUFACTURING -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.

List of Experiments (Expand it if needed):

1. To study the warp yarn passage through plain power loom and calculation of loom speed.
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.

Textbooks:

1. Plain Weaving Motions by K. T. Aswani, Publisher, Textile Trade Press, 1986.
2. Weaving Machines, Mechanisms and Management by Talukdar M. K., Ajgaonkar D. B. and Sriramulu P. K. Mahajan Publishers Pvt Ltd, New Edition, 2004.
3. Woven Fabric Production I, NCUTE,1st Ed Dobby, Jacquar; NCUTE Publication, 2002.

References:

1. Woven Fabric Production II, NCUTE,1st Ed Dobby, Jacquar; NCUTE Publication, 2002.
2. Fabric Forming by Hasmukharai B.S.S. MInstitute of Textile Technology, Komarapalayam, Ero de, 3rd revised edition, 1996.
3. Robinson & Marks, Principles of Weaving, Textile Institute Publication, U.K. revised edition, 1986.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX404	DCC	FABRIC STRUCTURE AND DESIGN – II	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 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 different types of backed fabric design.
2. Make and develop different types of double cloth design.
3. Make and develop different types of velvet fabric design.
4. Make and develop different types of gauge and leno fabric design.
5. Make and develop different types of complex design.

Syllabus

Unit I Backed Fabrics **9 hrs**

Figuring with extra warp and extra weft, backed fabrics- warp and weft backed fabrics and reversible backed fabrics.

Unit II Double cloth **9 hrs**

Classification of Double cloth and its uses. Method of preparation of double cloth self-stitch double cloth, interchanging double cloth, center stitched double cloth etc.

Unit III Pile Weaves **9 hrs**

Warp pile fabric structure its classification and construction method. Weft pile fabric structure its classification and construction method.

Unit IV Net Fabric **9 hrs**

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

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BTTX404	DCC	FABRIC STRUCTURE AND DESIGN – II	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.

of leno structure

Unit V Complex Weave **9 hrs**

Preparation and loom requirement of complex design, Point paper designing of jacquard fabrics, complex design, demask design,

Textbooks

1. Fabric Structure and Design, N. Gokarneshan, Generic publication, 2011.
2. Design and Structure of Textile Fabric, S. P. Mishra, Woodhead Publishing India in Textiles 2020.
3. Compound Fabric Structure- Simplified: A Step-by-Step Approach, Priyank Goyal, Kindle Edition, 2014.
4. Fabric Structure-Simplified, Priyank Goyal, Kindle Edition, 2014.

References:

1. Woven cloth construction, A. T. C. Robinson and R. Marks.Robinson, Springer New York, 2014.
2. Watson's Textile Design and Colour, Elementary Weaves and Figured Fabrics, Z.J Grosicki, Woodhead Publisher, 2014.
3. Textile Weaving & Design, Murphy W S, Abhishek Publications, 2007.
4. Woven Fabric Design & Structure, Alhayat Getu Temesgen, Ömer Fırat Tursucular. LAP Lambert Academic Publishing, 2019.
5. Fabric Structure and Design, Darshan Chaturvedi , Random Publication, 2014.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX405	DCC	Textile Testing 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. 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 its applicability.

Course Outcomes (COs)

Student will be able to

1. Recall and apply the statistical tools used for measurement.
2. Know the testing conditions for textile materials testing and its effects.
3. Measure and analyze the properties of various textile fibers and yarns.
4. Understand the yarn numbering system
5. Know the advance testing instruments and yarn fault classification.

Syllabus

Unit-I: Introduction to Textile Testing and statistical analysis methods **9 HRS**

Objectives of testing, fiber 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 related statistical analysis of material. Properties of normal distribution curve. Graphical presentation and interpretation of test data with quality control charts.

Unit -II: Moisture Relations Testing of textiles **09 HRS**

Terms and definitions related to humidity and moisture in textiles, measurement of atmospheric condition, regain–humidity relations of textiles calculations based on it. 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 -III: Fiber Properties **09 HRS**

Measurements of fibre length, fibre fineness, fibre-maturity and fibre strength of cotton fibre. Fibre length, fiber dispersion plot by comb sorter method, fiber fineness by gravimetric

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Choice Based Credit System (CBCS) in Light of NEP-2020
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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*				
BTTX405	DCC	Textile Testing 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.

method and air flow method, fiber maturity by caustic soda method, and fiber strength and elongation by Stelometer. Measurement of trash content and its calculation.

Unit -IV: Yarn numbering systems and yarn properties **09 HRS**

Introduction to yarn numbering system and measurement of yarn count by different systems, Definitions related to yarn twist and twist direction. Measurement of yarn twist in single and plied yarns based on various twist measurement principles.

Unit -V: Advance testing instrument for fibre and yarn testing **09 HRS**

Latest fiber testing methods such as HVI (High Volume Instruments) and AFIS (Advance Fiber Investigation System), testing of neps in card web by visual examination, cotton sliver by neps counting method concept of fiber quality index. Classification of yarn variation. Yarn faults and its classification on the basis of uster classimat system.

List of Practical:

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 test the Strength of the fiber by using Stelometer.
6. To test the moisture content in cotton fibre sample by oven dry method.
7. To Test the hank of roving, silver by using wrap block.
8. To test the count of yarn by using wrap reel.
9. To test the lea strength of yarn by using lea strength tester.
10. To test yarn imperfections by using visual method by yarn appearance board.
11. To test the yarn faults by using yarn evenness tester.
12. To identify twist direction and measure yarn twist in Single/plied yarn.

Text Books:

1. Principle of Textile Testing, Booth J. E., CBS Publishers, New Delhi, 2011.
2. Textile Testing, Angappan P. and Gopalakrishnan R, S.S.M. Institute of Textile Technology, Komarapalayam, 2017.
3. Physical testing of textiles, Savile B.P., Woodhead Publishing Ltd, Cambridge, 1999.

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References:

1. Handbook of Textile Testing & Quality Control – Grover, E. B. and Hamby D S (Revised Edition 2011).
2. Testing and Quality Management, Kothari, V. K., IAFL Publications, New Delhi, 2011.
3. Practical Statistics in Textile Industry Part I and II, G.A.V. Leaf Statistics, Das N.G. (2016)
4. A Practical Guide to Textile Testing, Amutha,K. Woodhead Publishing India PVT. Limited,(2016).

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