Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
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Choice Based Credit System (CBCS) in Light of NEP-2020
Diploma in Textile Engineering
(2021-2024)

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*				
DTTX401	DCS	Yarn Formation Technology 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 understand the processing of card sliver into yarn in ring spinning system.
2. To demonstrate conceptual knowledge to solve the problem in yarn formation.
3. To investigate the reasons of various problems and their solution in draw frame, comber, speed frame and ring frame.

Course Outcomes (COs)

Students will be able

1. To apply their knowledge for the production, processing of various fibers and .analysethe problem of various faults occurring in draw frame, comber, speed frame and ring frame machines.
2. To apply their knowledge for setting of machine parameters for various textile fibers.

Syllabus:

Unit I: Draw Frame

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 : Comber

Objectives of combing.Lap preparation, Methods of Lap preparations and its importance, Lap former setting, and speed, Production calculations. Construction, and principle of working, Function of different motions, Combing cycles, Different types of combers, Recent developments, Assessment of comber performance. Ideaof setting, speed, and other technical parameters. Calculation related to production, noil %, draft etc.

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Unit III: Speed Frame

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 IV: Ring Frame

Objectives of Ring frame, Constructional details of ring frame, Theory related to drafting, twisting, winding, spinning balloon, yarn tension and selection of Ring and traveller, 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

Environmental condition for various fibers in draw frame, comber, speed frame and ring frame, 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, speed frame and ring frame, Maintenance schedule and important supervisory check points at draw frame, comber, speed frame and ring frame.

List of Practical (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.

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7. To study the passage and working of material through Miniature Draw Frame.
8. To study the gearing system of Miniature Draw Frame.
9. To study the passage and working of material through Ring Frame.
10. To study the gearing system of Ring Frame.

Text Books:

1. Manual of Textile Technology-Vol. III, IV &V, 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.
4. Cotton Drawing and Roving, Gilbert R. Merrill,Universal PublishingCorporation, 1999.
5. Cotton Combing, Gilbert R. Merrill,Universal PublishingCorporation, 1999.
6. Cotton Ring Spinning, Gilbert R. Merrill,Universal PublishingCorporation, 1999.
7. Cotton Spinning, Vol. II, William S Taggart, Macmillan & Co, Limited, 1930.
8. Spun Yarn Technology, Vol. III Drawing, AVenkatasubramani, 1985.
9. Processing of Manmade and Blends on Cotton System, 3rd Edition, Salhotra K R, Textile Association (India), 2004.
10. Cotton Spinning Calculations,William S Taggart, Macmillan & Co, Limited, 1930.
11. Fundamentals of Spun Yarn Technology, Carl A Lawrence, CRC Press, 2003.

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DTTX402	DCS	FABRIC FORMATION TECHNOLOGY 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 explain the working of Dobby and Jacquard Shedding Mechanisms.
2. The students will be able to describe the working of various mechanisms automatic loom.
3. The students will be able to describe the working of Various Auxiliary Motion.
4. The students will be able to describe the working of multiple box looms

Course Outcomes (COs)

Students will be able to

1. To demonstrate the knowledge of Shedding mechanism and can prepare fabric of desired weave design.
2. Demonstrate the knowledge of working mechanism of auto loom and can prepare fabric of desired quality.
3. Use the knowledge of auxiliary motions and maintain the quality of fabric.
4. Use the knowledge of multiple box looms and can prepare fabric of desired weft pattern

Syllabus:

Unit I: Dobby and Jacquard Shedding:

Dobby shedding: Objectives and classification of dobby shedding, single lift and double lift dobby and their comparison, working principles of Keighley double lift dobby, Preparation of pattern lattices.

Jacquard shedding: Objectives and classification of Jacquard shedding, single lift and double lift jacquard and their comparison, comparison of coarse pitch and fine pitch jacquard, figuring capacity of jacquard, working principle of single lift single cylinder jacquards and of double lift single cylinder jacquards.

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Unit II: Auxiliary Motions -I

warp stop motion - mechanical warp stop motion and electrical warp stop motion, comparison of mechanical and electrical warp stop motion weft stop motion side weft fork motion and center weft fork motion, comparison of side and center weft fork motion, different types of temples used in loom.

Unit III: Auxiliary Motion - II

Warp protecting motion: loose-reed warp protecting motion and fast reed warp protecting motion, comparison of loose-reed and fast reed warp protecting motion, warp easing motion and its advantages.

Unit IV: Automatic Looms

Objectives and classification of automatic loom. Different types of mechanical weft feelers, e.g. side sweep and depth feelers, two prong electrical weft feelers & photo electrical weft feelers, shuttle protecting motion, Automatic pirn-changing mechanism.

Unit V: Multiple Box Loom:

Weft patterning and mixing, working principle of Eccles 4x1 multiple box loom (Cowburn& Peck), preparation of pattern card chain for 4x1 eccles box motion for different weft pattern.

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

1. To study the working of Keighley double lift dobby.
2. To study the working of single lift single cylinder jacquard.
3. To study the working of double lift single cylinder jacquard.
4. To study the working of electrical warp stop motion.

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5. To study the working of fast reed mechanism.
6. To study the working of side sweep weft feeler mechanism.
7. To study the working of shuttle protector mechanism.
8. To study the working of the pirn change mechanism.
9. To study the working of the side weft fork mechanism.
10. To study the working of warp easing motion mechanism.
11. To study the working of 4 x 1 Eccle's drop box motion.
12. To prepare the pattern card for given weft pattern in 4 x 1 Eccle's drop box motion.

Text Books:

1. Woven Fabric Production – II (1st Edition) by NCUTE Publication, 2002.
2. Weaving Machines, Mechanisms and Management by Talukdar M. K., Ajgaonkar D. B. and Sriramulu P. K.Mahajan Publishers Pvt Ltd, 2004
3. Weaving Vol. II by Bannerjee N. N., Textile Book House, 1982
4. Fancy Weaving by Aswani K. T., Mahajan Book Distributors, 1990
5. Principle of Weaving by Marks & Robinson, Textile Institute, 1976
6. Preparation & Weaving Machinery by Ormerod A., Butterworth-Heinemann, 1983.
7. Mechanism of Weaving by Fox, Macmillan, 1894.
8. Weaving Tech. & Operations by Ormerod A. and Sondheln W.S, TheTextile Institute, 1995.
9. Welcome to Weaving: The Modern Guide by Lindsey Campbell, Schiffer Publishing, Ltd.; 1st edition, 2019.

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DTTX403	DCS	FABRIC STRUCTURE II	60	20	20		0	3	1	0	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 understand and design basic fabric structures (like plain, twill and satin structures) as per specifications.
2. To identify and differentiate different derivatives of basic weaves and their effect in fabric

Course Outcomes (COs)

Students will be able to

1. To develop new woven fabric design.
2. To make honeycomb, welt structures.
3. To solve technical problems related to basic fabric structures on the loom.
4. To provide suitable draft and peg plan for a given weave for making design.

Course Contents:

Unit I: Construction of Upholstery Fabric

Upholstery Fabrics: Types of upholstery Fabrics. Backed fabrics- warp and weft backed fabrics and reversible backed fabrics, wadded backed cloth.

Unit II: Designing of Double cloth

Double cloth : Types of Double cloths, Set up of double cloth on loom, structure and its varieties; Self Stitch double cloth manufacturing process, Centre stitch double cloth manufacturing process, Interchanging double cloth manufacturing process. Alternat single and double cloth manufacturing process

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DTTX403	DCS	FABRIC STRUCTURE II	60	20	20		0	3	1	0	4

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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.

Unit III: Designing of Pile Fabrics
Pile Fabrics: Types of pile fabrics structure and its verities.
Warp and weft pile fabrics.
Velvet, Velveteen and corduroy fabrics, real velvet, terry towel and other warp pile fabrics and their structures and applications.

Unit IV: Designing of Net Fabrics
Introduction to net fabrics, Distinguise gauze and leno structures, methods of producing leno fabric, design, draft& peg-plan of leno structure.

Unit V: Figuring with Extra Threads
Develop a motif using extra warp and weft. State the methods to select the motif and ratio of ground and figuring threads

Text Books:
1. Advanced Textile Design - GrosickiWatsons ,Woodhead Publishing, 1977
2. Grammer of Textile Design – Nisbet, Harry. Scott, Greenwood & son, 1919.

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DTTX404	DCS	Fibre and Yarn Testing	60	20	20	30	20	3	0	2	4

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Course Educational Objectives (CEOs):

1. Course will provide the knowledge about the classification of textile fibre.
2. Course will provide detail knowledge about the fibre and yarn testing methods.
3. Course will provide introductory knowledge about statistical analysis of tested sample.

Course Outcomes (COs)

Student will be able to

1. Students can perform basic fibre testing.
2. Student is able to test yarn count.
3. Students can analyze fibre properties.

Syllabus:

Unit I: Introduction to Textile Testing and Statistical Methods

Objectives of textile testing. Various sampling technique, data analysis by Mean, Mode, Median, Coefficient of Variation and Standard deviation .

Fibre Testing: Fibre length, plotting of Baer sorter diagram, Analysis of Baer sorter diagram, Analysis of Fibro graph to estimate uniformity ratio of fibre. Concept of span length. Fibre maturity, Fibre fineness, Fibre shape analysis with microscopic view. Trash analysis of cotton fibre.

Unit II: Moisture Properties of Textiles

Slandered atmospheric condition, Standard testing atmosphere, measurement of atmospheric conditions. Understand the working principle of wet and dry bulb hygrometer. Determination of moisture content and moisture regain of textile materials. Related terms & definitions about moisture content, moisture regain with respect to textiles.

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DTTX404	DCS	Fibre and Yarn Testing	60	20	20	30	20	3	0	2	4

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Unit III: Physical Properties of Yarn

Yarn twist and twist direction analysis by using untwisting method, twist contraction method and twist at break method. Tensile tester working principles CRE, CRL and CRT methods. Yarn strength testing, Estimation of yarn strength by lea strength tester and single yarn strength tester. Count strength product of yarn.

Unit IV: Yarn Count and Twit Measurement

Yarn numbering systems (Direct and Indirect). Measurement of yarn count, Hank of lap, Hank of Sliver and Hank of Roving. Twist and twist direction measurement in yarn, Estimation plied yarn twist by twist contraction method.

Unit V: Yarn Evenness

Yarn evenness .- Random and periodic variation, Short term, medium term and long term variation - Index of yarn irregularity. Methods of Assessing yarn evenness by yarn appearance board - Principle and study of Uster Evenness Tester and Uster classimate faults.

List of Practical (Expand it if needed):

1. To study of dry and wet bulb hygrometer.
2. To estimate and calculate atmospheric condition of testing lab.
3. To determine of fibre length using Baer Sorter.
4. To determine of trash content by Trash Analyzer.
5. To determine of moisture content and moisture regain of cotton fibre by hot air oven.
6. To determine of hank of Sliver/ Roving by using wrap block.

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DTTX404	DCS	Fibre and Yarn Testing	60	20	20	30	20	3	0	2	4

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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.

7. To determine of count of yarn by using wrap reel.
8. To determine of single yarn twist by using twist tester.
9. To determine of ply yarn twist by using twist contraction method.
10. To determine of single yarn strength by using yarn tensile tester.
11. To determine Lea strength and CSP of yarn sample.

Text Books:

1. Principles of Textile Testing– J. E. Booth, Butterworth Scientific publication, London,1982.
2. Hand Book of Textile Testing and Quality Control, E.B. Groover and D.S. Hamby
3. Textile Testing (4th revised edition) - P. Angappan & R.Gopalakrishnan,1997
4. A Practical Guide to Textile Testing – K. Amutha, Woodhead Publishing India Pvt. Ltd., 2016.

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DTTX405	DCS	Preparatory and Dyeing Processes	60	20	20	30	20	2	0	2	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 build an understanding about various pretreatment processes on textile materials
2. To impart knowledge about various dyeing processes of textile materials

Course Outcomes (COs)
Students will be able to
1. Select and apply various chemicals for preparation of various textile materials
2. Choose the dyes and make recipe for dyeing of different textile materials
3. Evaluate fastness properties of dyed textile materials.

Syllabus:

Unit I: Introduction to Preparatory processes of dyeing
Process flow of textile chemical processing, Singeing: Objectives, Different types of singeing machines: Construction and working, Desizing: Hydrolytic and oxidative desizing methods, Desizing machine

Unit II: Scouring
Scouring: Objectives, scouring of cotton, Kier boiling, J Box, Degumming of silk, Scouring of wool, milling, carbonization of wool

Unit III: Bleaching and mercerizing
Bleaching: hypochlorite, peroxide and chlorite bleaching; Continuous scouring and bleaching; Mercerization: Process parameters and operation, various physical and chemical changes in cotton during mercerization; Working of mercerizing machine.

Unit IV: basics of dyeing
Properties of dyes and pigments, Classification of dyes, Dyeing process: adsorption, absorption and fixation of dye on textile fibers, some calculations relating to dyeing, Dyeing machines

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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*				
DTTX405	DCS	Preparatory and Dyeing Processes	60	20	20	30	20	2	0	2	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.

Unit V: Application of dyes on textile materials

Application of direct dye, reactive dye, vat dye, sulphur dye and azoic dye on cotton and other cellulosic textile materials, Application of acid dye and reactive dye on wool, silk and nylon, application of disperse dye on synthetic textile materials

List of practical's:

1. Study of process flow of chemical processing of textile materials
2. Scouring of cotton fabric sample using sodium hydroxide
3. Bleaching of cotton fabric sample using sodium hypochlorite
4. Bleaching of cotton fabric sample using hydrogen peroxide
5. Dyeing of cotton fabric sample using direct dye
6. Dyeing of cotton fabric sample using reactive dye
7. Dyeing of silk fabric sample using reactive dye
8. Dyeing of silk fabric sample using acid dye
9. Dyeing of wool fabric sample using acid dye
10. Dyeing of polyester fabric sample using disperse dye
11. Dyeing of cotton fabric sample using azoic dye

Text Books:

1. Technology of Bleaching and Mercerizing - Vol. II - Shenai, V.A., Sevak Publications Mumbai, 1991.
2. Technology of Dyeing; V. A. Shenai, Sevak Publications, Mumbai, 1996
3. Dyeing and Chemical Technology of Textile Fibers; E. R. Trotman, Hodder Stoughton, 1984
4. Handbook of textile and industrial dyeing; M. Clerk(Editor); Woodhead publishers, 2011
5. Cellulosic Dyeing; John Shore; Bradford : Society of Dyers and Colourists; 1995
6. Textile Preparation and Dyeing; Asim Kumar Roy Choudhury, Science publishers, 2006
7. Chemical Technology in the Pre-treatment Process of Textiles -. Karmakar S. R.,Elsevier sciences B.V.,1999

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