Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: Diploma in 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*				
DTTX301	DCS	Fiber Science and Manufacturing	60	20	20	0	50	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 principle and manufacturing process of natural and manmade fibre.
2. To impart the knowledge of various properties of different natural and manmade fibre.
3. To expose the knowledge of structural properties of fibre.

Course Outcomes (COs)

Students will be able to

1. To explain the correct manufacturing process of various natural and manmade fibre.
2. To identify and evaluate the properties of different natural and manmade fibre accurately.
3. To demonstrate their knowledge on various fibres and their properties.

Syllabus:

Unit I: Introduction to Basic Polymer and Fibre science

Basic concept of polymer, their classification, methods of polymerization, morphology of fiber forming polymer. Advantages and disadvantages of natural and man-made fibres.

Basic concept of Crystallinity, Amorphous and Orientation of Fibres. Brief concept of relationship between polymer properties and morphology. Different fibre manufacturing processes: melt, dry and wet fibre spinning.

Unit II: Introduction to Natural Fibres

Physical and chemical properties of Natural fibers. Longitudinal and cross-section view of fibers. Basic Structural propertiesof natural fibers. Dyeing behaviors and their application.

Unit III: Introduction to Man-made Fibres

Manufacturing process of ViscoseRayon, Nylon, Polyester, Acrylic, Poly-olefin, and PLA fibers. Their physical properties,chemical properties.Dyeing behaviors, Dope dyeing and theirapplication. Tow to top conversion.

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Unit IV: Introduction to Texturing

Introduction to Texturing, classification, and basic principle of different texturing processes false twist texturizing, stuffer box, crimping, edge crimping, knit-de-knit, gear crimping, air jet texturing process and chemical texturing. Basic concept of POY, MOY, FDY and DTY yarn.Process parameters of DTY process. Textured yarn properties and evaluation techniques.

Unit V: Introduction to Fibre Characterization

Definitionand brief concept of Viscosity, molecular weight, solubility, density/specific gravity, moisture,colour, thermal , optical, frictional, electrical and tensile properties.

List of Practical (Expand it if needed):

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.

References:

1. Manufactured Fibre Technology, Gupta, V.B., Kothari, V.K., Springer, 1997.
2. Hand Book of Textile Fibers – Cook, J. G., Merrow Publishing Co. Ltd, England, 1968.
3. Manmade Fibers – Moncrief, R.W., Halstead Press, New York, 1975.
4. Textile Science: An Explanation of Fibre Properties, Gohl, E. P. G., Vilensky, L. D., CBS Publisher, 1984.
5. Production of Synthetic Fibres – Vaidya, A. A., Prentice Hall of India, Private Limited, New Delhi, 1998.
6. Textile Fibres, Dyes, Finishes, and Processes – Needles, H. L., Noyes Publications, New Jersey, USA, 1986.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: Diploma in 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*				
DTTX302	DCS	Yarn Formation Technology-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 understand the processing of textile fibres on Blow Room,and Card.
2. To demonstrate conceptual knowledge to solve the problem in Blow Room, and Card.
3. To investigate the reasons of various problems and their solution in Blow Room, and Card.

Course Outcomes (COs)

Students will be able

1. To apply their knowledge for the production, processing of various fibers and analyse
the problem of various faults occurring in Blow Room, and Card machines.
2. To apply their knowledge for setting of machine parameters for various textile fibers.

Syllabus:

Unit I: Ginning

Objective of ginning, Characteristic of cotton fiber, Ginning of cotton fibers, Different types of ginning, roller ginning, saw ginning, Importance of the ginning to eliminate the contamination in the yarn, The scenario ofIndian ginning industries.

Unit II: Blow Room

Objects of blow room, Principles of opening, cleaning, and blending, Preparation of uniform lap, Principal of blow room machines and blow room lines, Recentdevelopments in blow room machinery, Assessment ofblow room performance, Calculation of blow room production.

Unit III: Carding

Object of carding, Principles of working, Construction and working of differentparts of the card, Type of card clothing,Concept of chute feed, Factors influencing the design of carding machines,Elements, and effect of their speed on carding performance. Assessment of cardperformance, Production calculation, Waste % and draft etc. Concept of coiling.

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Unit IV: Manmade Fiber Processing

Characteristics of manmade fibres, Object of blending, Types of blending, Processing, and difficulties of manmade fibres in blow room, carding, and draw frame, Idea of fibre distribution in yarns, factors affecting the blend irregularity.

Unit V: General Process Parameters and Maintenance

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

List of Practical (Expand it if needed):

1. Demonstration of spinning machines for conversion of Fiber into Yarn.
2. To study the passage and working of material through Mixing Bale Opener.
3. To study the gearing system of Mixing Bale Opener.
4. To study the passage and working of material through Hopper Feeder.
5. To study the gearing system of Hopper Feeder.
6. To study the passage and working of material through Two Blade Beater.
7. To study the gearing system of Two Blade Beater.
8. To study the passage and working of material through Lap Forming Unit.
9. To study the gearing system of Lap Forming Unit.
10. To study the passage and working of material through Carding Machine.
11. To study the gearing system of Carding Machine.

References:

1. Manual of Textile Technology Vol. I, II, W. Klein, The Textile Institute, 1993.
2. Element of Raw Cotton and Blow Room, A R Khare, Sai Book Center, 1999.
3. Elements of Carding and Drawing, A R Khare, Sai Book Center, 1999.
4. Processing of Manmade and Blends on Cotton System, 3rd Edition, K R Salhotra, Textile Association (India), 2004.
5. Cotton Opening and Picking, Gilbert R. Merrill,Universal PublishingCorporation, 1999.
6. Cotton Carding, Gilbert R. Merrill,Universal PublishingCorporation, 1999.
7. Spun Yarn Technology, Vol. I Blow Room, AVenkatasubramani, 1985.
8. Spun Yarn Technology, Vol. II Carding, AVenkatasubramani, 1985.
9. Technology of Carding, R. Chattopadhyay, NCUTE Publication, Ministry of Textiles, Govt. Of India, 2003.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: Diploma in 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*				
DTTX303	DCS	FABRIC FORMATION TECHNOLOGY-I	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 the knowledge of the working principles of different weaving preparatory processes.
2. To provide the knowledge of the working principles of primary and secondary motions of the loom.

Course Outcomes (COs)

Students will be able to

1. Describe the working principles of different weaving preparatory m/c and prepare cone or cheese as per the required quality and specifications.
2. Identify and will prepare size paste recipes for natural and synthetic yarns correctly.
3. Identify the working principles of primary and secondary motions of the loom and can manufacture fabrics as per the required quality and specifications.

Syllabus:

Unit I:Weaving Preparatory Process I:

Objectives of Winding, Classification of winding machines, Passage of yarn through winding machines,Passage of yarn through pirn winding machine, Different features of Automatic high speed winding machines.Objectives of warping, Classification of warping machines.Passage of warp yarn through warping machines.

Classification of faults and their remedial measures.

Unit II:Weaving Preparatory Process II:

Objectives of sizing, classification of sizing machines, passage of warp yarn through sizing machines, various types of size ingredients used in sizing,detailed study of various drying systems. Manual and automatic drawing-in and knotting process.

Various weaving preparatory process related calculations.

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Unit III:Introduction to Weaving Process:

Objectives of weaving, classification of weaving machines, passage of warp yarn through the weaving machines, function of different parts of the loom, main shaft of the loom and their speed ratio, driving arrangement of the loom and loom speed calculation.

Unit IV:Primary Motions of the loom:

Different types of primary motions, Shedding – its various types and devices, positive and negative shedding, Negative tappet shedding mechanism,Picking classification, mechanism of Over and Under pick motions,causes of shuttle flying and shuttle trap. Beat-up motion, factors affecting sley movement, sley eccentricity and its effect.

Unit V:Secondary Motions of the loom:

Different types of secondary motions, Let-off motions: Negative and positive let-off motion.

Take- off motions: 7-wheel take-up motion, Dividend calculation,continuous take up motion,

Electronic let-off and take up motion.

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

1. To study the yarn passage through cone winding machine.
2. To study the warp passage through beam warping machine.
3. To study the warp passage through sizing machine.
4. To study the warp passage through the loom.
5. To study the working of negative tappet shedding mechanism.
6. To study the working of cone over picking mechanism.
7. To study the working of side lever under picking mechanism.
8. To study the working of cone under picking mechanism.
9. To study the working of beat-up mechanism.
10. To study the working of negative let off motion.
11. To study the working of 7 wheel take up motion mechanism.
12. To study the working of Ruti positive let off motion.

References:

1. M. K. Talukdar, An Introduction to winding and Warping Testing Trade Press, Mumbai, 1982.
2. Modern Preparation and Weaving by Ormerod, Merrow Publication Co. U.K., 1988.
3. Sizing: Material Methods and Machineries by D. B. Ajgaonkar, M. K Talukdar and Wedekar, Mahajan Publications Ahmedabad, 1999.
4. Weaving Calculation by Sengupta, D.B. Taraporevala Sons and Co; 5th rev. & enl. ed edition (January 1, 1971)

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5. Weaving Vol. II by Bannerjee N. N., Textile Book House, 1982
6. Fancy Weaving by Aswani K. T., Mahajan Book Distributors, 1990
7. Principle of Weaving by Marks & Robinson, Textile Institute, 1976
8. Preparation & Weaving Machinery by Ormerod A., Butterworth-Heinemann, 1983.
9. Woven Fabric Production – I (1st Edition) by NCUTE Publication, 2002.
10. Weaving Machines, Mechanisms and Management by Talukdar M. K., AjgaonkarD. B. and Sriramulu P. K.Mahajan Publishers Pvt Ltd, 2004
11. Mechanism of Weaving by Fox, Macmillan, 1894.
12. Fabric Forming by Hasmukharai B.S.S.M Institute of Textile Technology, Komarapalayam, Ero de, 1996.
13. On Weaving: New Expanded Edition by Anni Albers (Author), Nicholas Fox Weber (Afterword), Manuel Cirauqui, rinceton University Press; Revised edition, 2017.
14. Welcome to Weaving: The Modern Guideby Lindsey Campbell, Schiffer Publishing, Ltd.; 1st edition, 2019.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: Diploma in Textile Engineering

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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*				
DTTX304	DCS	FABRIC STRUCTURE - I	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 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: Classification of weaves and study of plain weave

Fabric classification, Weave notation and weave repeat, Introduction to design, drafting and peg-plan systems and their relationship, Plain weave and its derivatives e.g. warp rib, weft rib and hopsack/ matt.

Unit II: Twill Weave

Twill weave its different types and derivatives e.g., pointed, curved, broken, elongated, transposed, fancy and cork-screw.

Unit III: Modification of Twill weaves

Diamond, Honeycomb ordinary honeycomb and brighton honeycomb, Mockleno, Huckaback, crepe weave.

Unit IV: Sateen and satin weave

Types of sateen, Construction of sateen, Examples on weft sateen, Construction of warp satin weaves, Draft and peg plan for sateens or satins , Modification of sateen.

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Unit V: Colour-and-weave effects

Principles of colour-and-weave effects ,Examples on colour and weave effect ,Development of coloured stripe for Plain with 1:1 colouring , Development of patterns with compoundcolouring, Development of dogstooth and houndstooth ,Stepped twill , Birds eye view , Stripe and check effect.

List of Practical (Expand it if needed):

1. To study the design, draft and peg-plan of Plain weave
2. To study the design, draft and peg-plan of Satin and sateen weave
3. To study the design, draft and peg-plan of honeycomb
4. To study the design, draft and peg-plan of Brighton honeycomb
5. To study the design, draft and peg-plan of bed ford cord
6. To study the design, draft and peg-plan of welt and pique
7. To study the design, draft and peg-plan of twill
8. To study the colour and weave effects for strip weave
9. To study the colour and weave effects for check weave
10. To study the reed and heald count systems and related calculations

References:

1. Textile Design & Color. - - Grosicki Watsons , Woodhead Publishing, 1977
2. Fabric Structure and Design, N. Gokarneshan, New Age International (P) Ltd,2005
3. Woven fabric structure design and product planning, Hayavadana, J, Woodhead, Publishing India in textiles, Materialsnetbase, CRC Press,2015

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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*				
DTTX305	DCS	TEXTILE PREPARATORY PROCESSES	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 on principles and mechanisms of pre-treatment processes of textile goods.
2. To build and develop skills required to compete in the field of textile chemical processing

Course Outcomes (COs)

Students will be able to

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

Syllabus:

Unit I: Introduction to textile preparatory processes

Overview of colouration and finishing or chemical processing of textile materials, overview of different stages, preparation of cotton/cellulosic materials, prelims of preparation: grey inspection-stamping-mending-stitching.Singeing: Objectives, singeing methods-plate, roller and gas singeing machine, details of gas singeing machine.

Unit II: Desizing and Scouring

Desizing: Objectives, sizing ingredients, chemical nature and process of removal-methods of desizing-hydrolytic & oxidative desizing.

Scouring: Objective,s impurities of cotton fiber-their chemical nature and possible methods of removal, methods of scouring, different scouring equipment e.g.,kier, J-box, Vapor-Loc, their construction and working, method of evaluation of scouring efficiency.

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Unit III: Bleaching and Mercerization

Bleaching: Objectives, classification of bleaching methods, different bleaching agents, hypochlorite, chlorite, peroxide bleaching, their mechanisms, bleaching parameters, methods of bleaching, role of chemicals used in bleaching.

Mercerisation: Objectives, action of alkali on structure of cellulose, methods, relative merits and demerits, evaluation.

Unit IV: Preparation of silk, wool and jute

Preparation of wool: Impurities present, scouring of wool-Emulsion scouring, Suint scouring, Solvent scouring, Freezing, Milling of wool, bleaching of wool Preparation of silk: Impurities present, degumming of silk, weighing of silk Preparation of jute: Impurities present, scouring, bleaching

Unit V: Preparation of synthetic fibres and blends

Preparation of synthetic fibres and blends: Impurities present, heat-setting of synthetic fibers, singeing of man-made fibres and their blends; scouring, bleaching, optical whitening: objectives, methods, merits and demerit

List of Practical (Expand it if needed):

1. Study of detail process flow of textile chemical processing
2. Study of parts and functions of gas singeing machine
3. Desizing of grey cotton fabric sample
4. Scouring of desized cotton fabric sample
5. Bleaching of scoured cotton fabric sample
6. Degumming of silk fabric sample
7. Scouring of wool fiber sample
8. Study of parts and functions of scouring machine
9. Study of parts and function of continuous bleaching range
10. Study of parts and functions of chain mercerizing machine
11. Study of parts and functions of chainless mercerizing machine

References:

1. Handbook of Textile and Industrial Dyeing, Volume I - Matthew Clark, Woodhead Publishing Series, 2011
2. Textile dyes and dyeing - N.N. Mohapatra, Woodhead publishing India, 2016.
3. Textile Preparation and dyeing - Asim Kumar Roy Choudhury, Society of Dyers and Colorists, 2011.
4. Textile Scouring and Bleaching - E.R. Trotman, Willey Publishers, 1985.
5. Technology of Bleaching - V.A. Shenai, Sevak Publications, 1984.
6. Mercerisation - J.T. Marsh, B. I. Publications, 1979.
7. The Preparation and Dyeing of Synthetic Fibres - H.U. Schmidlin, Chapman and Hall Ltd, London, 1963.

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