Faculty of Engineering & Technology
P.K. University
Shivpuri (MP)

Evaluation Scheme & Syllabus
B.Tech -Textile Technology
Second Year (III & VI Sem)

(Effective from session 2025-26)

B.TECH- TEXTILE TECHNOLOGY

SEMESTER-III

STUDY AND EVALUATION SCHEME FOR B.TECH IN TEXTILE TECHNOLOGY												
YEAR2nd/SEMESTER-III												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UENGITT301	ENGINEERING MATHEMATICS-III	3	1	0	4	30	-	30	70	-	70	100
UYARNTT302	YARN MANUFACTURE -I	3	0	0	3	30	-	30	70	-	70	100
UDATATT03	DATA STRUCTURES	3	0	0	3	30	-	30	70	-	70	100
UFABRTT304	FABRIC MANUFACTURE-I	3	0	0	3	30	-	30	70	-	70	100
UTEXTTT305	TEXTILE FIBRE-I	3	1	0	4	30	-	30	70	-	70	100
UENVITT306	ENVIRONMENT & ECOLOGY	3	0	0	3	30	-	30	70	-	70	100
UYARNTT307	YARN MANUFACTURE –I LAB	0	0	2	1	-	25	25	-	25	25	50
UDATATT308	DATA STRUCTURES LAB	0	0	2	1	-	25	25	-	25	25	50
UFABRTT309	FABRIC MANUFACTURE-I LAB	0	0	2	1	-	25	25	-	25	25	50
UTEXTTT310	TEXTILE FIBRE-I LAB	0	0	2	1	-	25	25	-	25	25	50
Total		18	2	8	24	180	100	280	420	100	520	800

STUDY AND EVALUATION SCHEME FOR B.TECH IN TEXTILE TECHNOLOGY												
YEAR2nd/SEMESTER-IV												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UNANOTT401	NANO SCIENCE	3	0	0	3	30	-	30	70	-	70	100
UTEXTTT402	TEXTILE FIBRE-II	3	0	0	3	30	-	30	70	-	70	100
UCHEMTT403	CHEMICAL PROCESSING OF TEXTILES–I	3	0	0	3	30	-	30	70	-	70	100
UYARNTT404	YARN MANUFACTURE-II	3	1	0	4	30	-	30	70	-	70	100
UFABRTT405	FABRIC MANUFACTURE-II	3	1	0	4	30	-	30	70	-	70	100
UUNIVTT406	UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS	3	0	0	3	30	-	30	70	-	70	100
UTEXTTT407	TEXTILE FIBRE-II LAB	0	0	2	1	-	25	25	-	25	25	50
UCHEMTT408	CHEMICAL PROCESSING OF TEXTILES–I LAB	0	0	2	1	-	25	25	-	25	25	50
UYARNTT409	YARN MANUFACTURE-II LAB	0	0	2	1	-	25	25	-	25	25	50
UFABRTT410	FABRIC MANUFACTURE-II LAB	0	0	2	1	-	25	25	-	25	25	50
Total		18	2	8	24	180	100	280	420	100	520	800

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP
II Year Semester-III

L	T	P
3	1	0

UENGITT301
ENGINEERING MATHEMATICS-III

UNIT I

Numerical Techniques – I: Zeroes of transcendental and polynomial equations, Bisection method, Regula-falsi method, Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, Newton‟s forward and backward interpolation. Lagrange‟s and Newton‟s divided difference formula for unequal intervals**.**

UNIT II

Numerical Techniques –II: Solution of system of linear equations, Matrix Decomposition methods, Jacobi method, Gauss- Seidal method.

Numerical differentiation & Integration: Trapezoidal rule, Simpson‟s one third and three-eight rules, Solution of ordinary differential equations (first order, second order and simultaneous) by Euler‟s, Picard‟s and fourth-order Runge- Kutta methods.

UNIT III

Statistical Techniques: Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves, Correlation, Linear, non – linear and multiple regression analysis, Binomial, Poisson and Normal distributions. Tests of significations: Chi-square test, t-test.

UNIT IV

Function of Complex variable: Analytic function, C-R equations, Harmonic Functions, Cauchy‟s integral theorem, Cauchy‟s integral formula, Derivatives of analytic functions, Taylor‟s and Laurent‟s series, Singularities, Zeroes and Poles, Residue theorem.

UNIT V

Integral Transforms: Fourier integral, Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z- Transform and its application to solve difference equation.

Text Books:

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House..
2. Jain, Iyenger Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi
3. J.N. Kapur, Mathematical Statistics, S. Chand & company Ltd.

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II Year Semester-III
UYARNTT302: YARN MANUFACTURE-I

L	T	P
3	0	0

UNIT -I

Process flow chart for carded & combed yarn manufacturing. **Cotton Ginning:-** Introduction of ginning process, Functions of ginning machines, Types of Ginning machines, Pre and post ginning machines used and their objects, Factors affecting ginning performance, Influence of ginning on fibre, yarn and fabric quality, Pressing and bailing of Indian and foreign cotton, dimensions. Objects of mixing, different types of mixing & blending), Difference between mixing & blending.

UNIT- II

Objects of Blow room for natural and synthetic fibres, Principles of opening and cleaning , Principles of various opening and cleaning machines of blow room line, evolution of opening and cleaning principles. Various components & zones of blow room machines, Conventional blow room machines. Lap forming mechanism, Reasons of developments in blow room, machinery, Research findings and developments of modern blow room.

UNIT- III

Automation and concept of modern blow room line, Latest developments in Blow room machines, Automatic bale opener, Mild openers– Maxi-flow/ Uni-clean/Vario-clean, modern Blenders, Intensive openers, cleanomat, flexiclean, Waste extracted at various openers and beaters, Cleaning efficiency of different machines, nep generation.

UNIT- IV

Principle and concept of chute feed to card. Advantages and limitations, study of design details of different types of chute feeding systems, Objects of carding, detailed description of various parts of carding machine, Carding Theory – Opening of fibre mass – Carding actions – Web formation and fibre configuration – Blending – Leveling action – Fibre breakage. Calculation.

UNIT- V

Stripping and grinding, Stripping action and carding action, Card Clothing, evolution and Metallic wire details — Card wire mounting, wave defects, carding related draft and production, Tandem carding, Auto leveller used in carding, Modern development in carding made by various renewed carding machine manufacturers, Blow room & card related calculations.

References:

1. The Textile Institute Publication - Manual of Textile Technology – Short StapleSpinning Series by W.Klein
2. „The Characteristics of Raw Cotton" by P. Lord. The TextileInstitute
3. Publication, Manual of Cotton Spinning Vol.II,Part-I.
4. „Opening and Cleaning" by Shirley. The Textile Institute Publication, Manual ofCotton Spinning Vol. II,Part-II.
5. „Opening Cleaning and Picking" by Dr.Zoltan S. Szaloki, Institute of TextileTechnology,Virginia.
6. „Cotton Ginning" Textile Progress, The Textile InstitutePublication.
7. Blowroom and Carding- Training Programme conducted by NCUTE, IIT,Delhi.
8. Essential calculations of practical cotton spinning by TKPattab

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II Year Semester-III

UDATATT303: DATA STRUCTURES

L	T	P
3	0	0

UNIT- I

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade- off.

Abstract Data Types (ADT), Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations.

Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List.

UNIT- II

Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

UNIT- III

Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: In order, Preorder and Post order, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

UNIT- IV

Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm, Introduction to Activity Networks.

UNIT- V

Searching: Sequential search, Binary Search, Comparison and Analysis Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting.

Search Trees: Binary Search Trees (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees .

Hashing: Hash Function, Collision Resolution Strategies. Storage

Management: Garbage Collection and Compaction.

References:

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, “Data StructuresUsing C and C++”, PHI Learning Private Limited, Delhi India
2. Horowitz and Sahani, “Fundamentals of Data Structures”, Galgotia Publications Pvt Ltd Delhi India.
1. Lipschutz, “Data Structures” Schaum‟s Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd.
2. Thareja, “Data Structure Using C” Oxford Higher Education.
3. AK Sharma, “Data Structure Using C”, Pearson Education India.
4. Rajesh K. Shukla, “Data Structure Using C and C++” Wiley Dreamtech Publication.
5. Michael T. Goodrich, Roberto Tamassia, David M. Mount “Data Structures .

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II Year Semester-III

UFABRTT304: FABRIC MANUFACTURE-I

L	T	P
3	0	0

UNIT I
Objects of winding process, classification of winding, (manual & automatic), various latest winding machines with detailed construction and working, Description of various winding accessories.

UNIT II
Geometrical aspects: - Cone angle, angle of wind, wind per double traverse, surface speed, traverse speed, winding speed, calculations, Calculations: winding speed, production/spindle & per machine, and efficiency.

UNIT III
Objectives of pirn winding, its advantage over rewound weft, Details semi-automatic and automatic pirn winding machines w. r. t drive to spindles, traverse, tensioning yarn path. Pirn build: - length of wind, chase length, diameter, bunch, tail ends etc. their importance during weaving process. Calculations: - Average pirn diameter, winding speed, production / spindle / & per machine, efficiency, number of looms fed by spindle.

UNIT IV
Objectives of warping, precautions to be considered in the process, classification of warping process- (beam warping, sectional warping, ball warping), Latest Warping machine: - construction and working, Creel: - framing (requirements, length, height, pitch, etc.) pegs, tensioning arrangements guides, blow fan, types of creels (parallel, V, V-nose etc.), Principles of operation of beam warping and sectional warping. Sectional warping machines, Waxing attachment, computerized warping machines.

UNIT V
Objectives of sizing and sizing terminology, achieving the objectives through sizing paste constituents, concepts of sizing process: hank sizing, ball warp sizing, Slasher sizing, multi-cylinder sizing, description of sizing ingredients, Latest developments in sizing process by various sizing machine manufacturers.

References:

1. Principles of weaving By Marks A.T.C. &Robinson.
2. Weaving By Prof. DB Ajgaonkar, Prof. Sriramalu & Prof. MKTalukdar.
3. Weaving Mechanism by K.T.Aswani.
4. Winding &Warping by TalukdarMK.
5. Yarn Preparation-Vol-I bySengupta.
6. Weaving Calculation bySengupta.
7. Textile Mathematics-Vol. I by JEBooth.
8. Fibre to Fabric by PRLord

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II Year Semester-III

UTEXTTT305: TEXTILE FIBRE-I

L	T	P
3	1	0

UNIT -I
Introduction: various definitions related to textile fibres, classification of textile fibres, difference between staple & filament, essential & desirable properties of textile fibres, advantages & disadvantages of natural and man made fibres.

UNIT- II
Cotton cultivation and harvesting, development of cotton fibres in seed, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications.

UNIT- III
Jute cultivation, retting and extraction process, structure of jute fibre, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like flax, hemp, ramie, banana, bamboo fibre etc. and their applications.

UNIT- IV
Types of wool and its grading, Morphological structure, chemical composition, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc. and their applications.

UNIT- V
Types of silk and its production, chemical composition and morphological structure of silk, physical & chemical properties of silk and its applications.

References:

1. WE Morton & JWS Hearle, Physical properties of textile fibres, Textile Institute, U.K.
2. Progress in textiles: Science and technology Vol.-2 by Dr. VK Kothari, IITDelhi.
3. Hand book of textile fibres by J. GordonCook
4. Fibre Science and Technology, SPMishra

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II Year Semester-III

UENVITT 306: ENVIRONMENT & ECOLOGY

L	T	P
3	0	0

UNIT-I

Definition, Scope & Importance, Need For Public Awareness• Environment definition, Eco system - Balanced ecosystem, Human activities - Food, Shelter, Economic and social Security.

Effects or human activities on environment Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.

UNIT-II

Natural Resources• Water Resources· Availability and Quality aspects. Water borne diseases, Water Induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles-- Carbon, Nitrogen and Sulpher Cycles.

Energy - Different types of energy, Electro-magnetic radiation. Conventional and Non-Conventional sources – Hydro-Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio.gas. Hydrogen as an alternative future source of Energy.

UNIT-III

Environmental Pollution and their effects. Water pollution, Land
pollution. Noise pollution, Public Health aspects, Air Pollution, Solid waste management, e-waste management

Current Environmental Issues of Importance: Population Growth, Climate Change and Global warming- Effects, Urbanization, Automobile pollution. Acid Rain Ozone Layer depletion, Animal Husbandry,

UNIT-IV

V Environmental Protection- Role of Government, Legal aspects, initiatives by Non-Governmental organizations (NGO), Environmental Education, Women Education,

Text Books

l. Environmental Studies -Benny Joseph- Tata Mcgraw Hill-2005
2. Environmental Studies- Or. D.L. Manjunath, Pearson Education-2006.
3. Environmental studies - R, Rajagopalan -Oxford Publication • 2005.
4. Text book of Environmental Science & Technology- M. Anji Reddy- US Publication .

Reference Books

l. Principles of Environmental Science and Engineering -P. Venugoplan Rao, Prentice Hall of India.
2. Environmental Science and Engineering- Meenakshi, Prentice Hall India

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
Semester-III

UYARNTT307: YARN MANUFACTURE-I LAB

L	T	P
0	0	2

Practice in handling and operation of blow room, study of constructional details of machinery in blow room, calculating speed of different machine parts, Blows per inch of Krishner beater, Production calculation of blow room, various controls points and changes Places, Practice in checking the quality of laps, Study of driving mechanism and calculation of speed of different parts & production of card, Study of different setting points on card.

UDATATT308: DATA STRUCTURE USING C LAB

L	T	P
0	0	2

Program in C or C++ for following:

1. To implement addition and multiplication of two 2D arrays.
2. To transpose a 2D array.
3. To implement stack using array.
4. To implement queue using array.
5. To implement circular queue using array.
6. To implement stack using linked list.
7. To implement queue using linked list.
8. To implement circular queue using linked list.
9. To implement binary tree using linked list.
10. To implement binary search tree using linked list.
11. To implement tree traversals using linked list.
12. To implement BFS using linked list.
13. To implement DFS using linked list.
14. To implement Linear Search.
15. To implement Binary Search.
16. To implement Bubble Sorting.
17. To implement Selection Sorting.
18. To implement Insertion Sorting.
19. To implement Merge Sorting.
20. To implement Heap Sorting.

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II Year/ Semester-III

UFABRTT309: FABRIC MANUFACTURE-I LAB

L	T	P
0	0	2

1. Study of weaving preparatory and weaving Processes
2. Study of loom drive, loom timing, passage of material and primary motions.
3. Study of precision and drum winding machine.
4. Study of cheese winding machine.
5. Study of auto conerc its functions
6. Study of pirn winding machine
7. Study of sectional warping machine
8. Study of beam warping machine

UTEXTTT310: TEXTILE FIBRE-I LAB

L	T	P
0	0	2

1.Principle of microscopy

2. Microscopic identification of natural fibres.

3. Preparation and mounting of specimen for longitudinal view.

4. Standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods,

5. Preparation of reagents used for chemical analysis.

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
II year Semester-IV

UNANOTT401: NANO SCIENCE

L	T	P
3	0	0

UNIT I

Introduction: Definition of Nano-Science and Nano Technology, Applications of Nano-Technology.

Quantum Theory for Nano Science: Particle in a box, Potential step: Reflection and tunneling (Quantum leak). Penetration of Barrier, Potential box (Traped particle in 3D: Nanodot).

Physics of Solid State Structures: Size dependence of properties, crystal structures, face centered cubic nanoparticles; Tetrehedrally bounded semiconductor structures; lattice vibrations.

Energy Bands: Insulators, semiconductor and conductors; Reciprocal space; Energy bands and gaps of semiconductors; effective masses; Fermi Surfaces.

Localized Particles: Acceptors and deep taps; mobility; Excitons.

UNIT II

Quantum Nanostructure: Preparation of quantum wells, Wires and Dots, Size and Dimensionality effect, Fermi gas; Potential wells; Partial confinement; Single electron Tunneling, Infrared detectors; Quantum dot laser superconductivity.

Properties of Individual Nano Particles: Metal nano clusters; Magic numbers; Theoretical modeling of nano particles; geometric structure; electronic structure; Reactivity, Fluctuations, Magnetic clusters; Bulk to nanostructure, semiconducting nanoparticles, Optical Properties, Photo fragmentation, Coulombic Explosion. Rare Gas & Molecular clusters; Inert gas clusters; Superfluid clusters; Molecular clusters.

UNIT III

Growth Techniques of Nanomaterials: Litho and Nonlithograpahic techniques, RF Plasma, Chemical methods, Thermolysis, Pulsed laser method, Self-assembly, E-beam evaporation, Chemical Vapour Deposition, Pulsed Laser Deposition.

UNIT IV

Methods of Measuring Properties: Structure: X-ray Diffraction Technique, Particle size determination, surface structure. Microscopy: Scanning Probe Microscopy (SPM), Atomic Force Microscopy (AFM), Field Ion Microscopy, Scanning Electron Microscopy, Transmission Electron Microscopy(TEM). Spectroscopy: Infra red and Raman Spectroscopy, X-ray Spectroscopy, Magnetic resonance, Optical and Vibrational Spectroscopy, Luminescence.

UNIT V

Carbon Nano Materials: Bucky Ball and Carbon Nano- Tubes: Nano structures of carbon (fullerene), Fabrication, Structure. Electrical, Mechanical and Vibrational properties and applications. Nano Diamond, Boron Nitride Nano-tubes, Single Electron Transistors, Molecular Machine, Nano-Biometrics, Nano Robots.

Text/Reference Books:

1. CP Poole Jr, FJ Owens, “Introduction to Nanotechnology”.

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
Semester-IV

UTEXTTT402: TEXTILE FIBRE-II

L	T	P
3	0	0

UNIT I
Classification of man made fibers, definition of regenerated and synthetic fibers, Concepts of molecular weight, Degree of polymerization, Orientation and Crystallinity, Characteristics of fiber forming polymer.

UNIT II
Introduction to methods of fiber formation by melt spinning, dry spinning, & wet spinning, Polyethylene terepthalate fiber (PET) – History of development, Brief manufacturing process, Polymer production by DMT & PTA route, Chips drying, , physical & chemical properties of polyester fibers, applications.

UNIT III
Polyamide Fibers – History of development, Different types of polyamide fibers, Nylon polymer production by continuous polymerization in VK Tube, Manufacturing of Nylon 6 fibre by melt spinning, Properties of nylon 6 fiber, Polymer production of Nylon 66, Nylon 66- fibre formation by melt spinning, Physical & chemical properties and, applications.

UNIT IV
Polyacrylonitrile fibers, Polyurethane fibers brief manufacturing process by wet and dry spinning, physical and chemical properties of acrylic fibers & its applications, Properties of polyethylene fiber, Type of polypropylene (PP), Properties of polypropylene fiber. Introduction of High Performance fibers.

UNIT V
Introduction to regenerated fiber, Raw material for viscose rayon, Manufacturing sequence of viscose fiber, Steeping and pressing, Cutting and shredding, Ageing, Xanthation of sodium cellulose, Mixing and filtration, Ripening, Wet spinning of viscose rayon, Introduction to Acetate, Triacetate fibers and Lyocell fibers.

References:

1. Textile Fibers – Vol.-I by VA Shenai, Sevak Publications, Bombay,1971.
2. Textile Fibers – H V S Murthy, Textile Association Publication,1995.
3. ATextbookofFibreScienceandTechnologybyS.P.Mishra,NewageInternational (p) limited, 2000.
4. Hand book of Textile Fibres Vol. I & II by Gorden & Cook, Merrrow Publication Ltd, England
5. Man Made Fibres – RW Moncrieff, HeywoodBooks.

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
Semester-IV

L	T	P
3	0	0

UCHEMTT403: CHEMICAL PROCESSING OF TEXTILES-I

UNIT- I

PRETREATMENTS: Introduction of pretreatments in wet processing. Introduction to shearing and cropping machines. Objects, working principle, types of shearing, Objects of singeing, Methods of singeing - gas singeing for woven & knitted fabrics, Introduction to efficiency of singeing, Evaluation & efficiency of singeing.

UNIT -II

DESIZING: Objects of desizing, Mechanism of desizing. Inter-relation of desizing with singeing and sizing, Variousmethods of desizing: Hydrolytic & oxidative method of desizing, Evaluation of efficiency of desizing.

UNIT- III

SCOURING: Object of scouring, Scouring with alkali & solvent assisted desizing, Interrelation between desizing and scouring, Study of batch-wise & continuous methods of scouring, Concept of bio-scouring, Evaluation of efficiency of scouring.

UNIT- IV

BLEACHING: Objects of bleaching, Introduction to bleaching agents like sodium hypochlorite ,hydrogen peroxide & per-acetic acid, Bleaching of cotton, polyester & its blends, Batch-wise & continuous machinery for bleaching, Bleaching of wool ,silk, Concept of AOX, Evaluation of efficiency of bleaching. Continuous scouring and bleaching: Pretreatment Range

UNIT- V

MERCERIZATION: Introduction & objects of mercerization, Effect of mercerization on structure of cellulose, Machinery used for yarn, woven and knit fabrics, Concept of hot mercerization & liquid ammonia mercerization, testing methods to evaluate efficiency of mercerization like Barium Activity, Number, Axial Ratio & Luster index. Objects of finishing, classification of finishes. Heat setting principle & mechanism & machines stenter.

References:

1. Chemical technology of fibrous materials by F. Sadov.
2. Chemical processing of polyester I cellulosic blends by RM Mittal & SS Trivedi.
3. Chemical processing of synthetic blends by KV Datye& AA Vaidya.
4. Mercerization by JT Marsh.
5. Introduction to Textile Bleaching by JT Marsh.
6. Bleaching, Dyeing & Chemical technology of textiles fibres by S. R. Trotman.
7. Technology of Bleaching by VA Shenai.
8. Bleaching & mercerizing by BTRA Silver Jubilee Monograph Series.
9. Chemical Technology in the pretreatments of textiles by SR Karmarkar

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
Semester-IV

L	T	P
3	1	0

UYARNTT404: YARN MANUFACTURE-II

UNIT- I

Functions of draw-frame, principles of drafting and doubling, Study of constructional details and design of drafting systems, weighting in draw frame, draft distribution, doubling and blending, drafting force, details of drafting system, evolution of drafting systems at draw-frame (Shirley 4/4 drafting, platts, pressure bar, Whiten accu drafting, Rieter polar drafting systems etc.

UNIT- II

Coiling system and stop motion, calculations relating to speeds, drafts, production etc, design, Suction at draw-frame. Automatic can handling, Auto leveling at draw-frame. On-line quality monitoring and control, Study of draw-frames available in the market. Blending at draw-frame, Study of maintenance aspects and design developments such as rollers, roller weightings, drafting systems etc. Developments in draw frame drafting, Suction at draw-frame, Automatic can handling, Auto leveling atdraw-frame.

UNIT - III

Objects of combing process, Requirements of good lap – importance of number of passages, importance of good lap, linear density of lap, etc., Methods of comber lap preparation – Different sequences of comber lap preparation, study of sliver lap machine, ribbon lap machine, unilap machine, Developments in lap preparation machines.

UNIT- IV

Constructional details of Comber- feeding, nipper assembly, cylinder and detaching rollers, cylinder needles, web and sliver transport, drafting and coiling at comber, Study of combing cycle, Semi combing, normal combing, super combing and double combing., Forward and backward combing, Comber Settings, Norms for production, speed, Combing efficiency, Fractionating efficiency of comber. Influence of combing operation on quality, Automatic and centralized noil extraction, Automatic materials handling. Stop motions in comber, Technical specifications of modern combers available in the worldmarket.

UNIT- V

Objects of speed frame, Concepts of drafting, twisting and winding process. Constructional aspects of Speed-frame – Creel, Top arm apron drafting system, Spindle & Flyer assembly, Bobbin building, stop motions. Study of mechanisms like – differential motion, building mechanism, semi-automatic and automatic doffing, Performance assessment of Speed-frame – norms, Zero break concept, block creeling, Materials handling. Link –mechanism, Features of modern speed-frame machines.

References:

1. The Textile Institute Publication –Manual of Textile Technology-Short Staple Spinning Series Vol. I to V by W.Klein
2. The characteristics of Raw Cotton by P. Lord. The Textile Institute Publication, Manual of Cotton Spinning Vol II,Part-I.
3. Fundamentals of Spun Yarn Technology, By Carl Lawrence.
4. Blow room and carding –Training program conducted by NCUTE, IITDelhi.
5. Carding by F. Charanlay. The Textile Institute publication, Manual of cotton spinning series Vol - III.
6. Drawing, Combing and roving and speed frame by Zoltan, S. Szaloky, The Institute of Textile Technology,Verginia.
7. Drawing, Combing and roving and speed frame by Zoltan, S.Szaloky, The Institute of Textile Technology,Verginia

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
Semester-IV
IV SEMESTER

L	T	P
3	1	0

FABRTT405: FABRIC MANUFACTURE-II

UNIT I

Drawing-in: Objectives, process description, reed count system, manual drawing-in, semi- automatic drawing-in process, Knotting process and its limitations. Various methods of fabric manufacture and automatic weaving: - Weaving, knitting, braiding, non-woven, brief description of all methods and processes involved in it, Different kinds of fabrics: Grey, mono-colour, multi-colour, warp or weft stripes, checks etc.

UNIT II

General description of plain power looms, introduction to weaving process, primary, secondary and auxiliary motion of plain power looms, Various ways of shedding, over and under pick motion, tappet shedding, Temples and its utility, idea about healds count and reed count in different system, Negative and positive take up motion, negative five wheel and seven wheel take up motion and positive let-off motions, Calculations: -Production and efficiency of machine.

UNIT- III

Scope & limitation of dobby, negative and positive dobby, cross border dobby, Development in dobby, Scope and limitations dobby, brief description of Cromption and Knowles dobby cross border dobby, method of pegging for dobby, methods of pegging, heald reversing motion. Warp protective devices, side and center weft fork motion.

UNIT- IV

Jacquards shedding, types of jacquards and their principle of working, size and figuring capacity of jacquard, cross border jacquards. Single lift single cylinder Jacquard, Double lift single cylinder, Double lift double cylinder, split harness, Different system of harness tie-up, terry mechanism, Recent developments in jacquard weaving.

UNIT -V

Limitations of automatic loom, objectives for developing automatic loom, scope for automation, design features of automatic loom, drives- loom motions, accessories and other critical features of automatic looms, weft feelers- construction & working of side sweep, electrical & electronic weft feelers, their merits, demerits & applications.

Automatic let-off motion: Principles and requirements of automatic let-off mechanism, types of Automatic loom: pirn change, shuttle change loom, detailed study of various motions of automatic looms, warp stop motion- types, construction and working of mechanical & electrical warp stop motion, centre weft fork motion, construction and working of centre weft fork motion and its advantages.

Construction & working Multiple box motion, their types, two colours and four-colour drop box motion, brief description of pick-at will, pick and pick motion, Pick finding, heald leveling, light indicators; pick counters need, functions & use, i) Auto loom fabric defects, causes and remedies, Calculations pertaining to dobby, jacquard and automatic looms production and efficiency.

References:

1. Yarn preparation by R.Sengupta
2. An introduction to winding & warping by M.K.Talukdar
3. Modern preparation & weaving machinery by A Ormerod, Textile Institute,U.K.
4. Sizing by Prof. D. B. Ajgaonkar, Dr. M. K. Talukdar & V. R.Wadekar.
5. The Technology of Warp Sizing by J.B.Smith.
6. Modern Preparation & Weaving by A.Ormerod

Department of Textile Technology
(Faculty of Engineering &Technology)
P.K.University,Shivpuri (MP)
Semester-IV

UUNIVTT406
UNIVERSAL HUMAN VALUE & PROFF. ETHICS

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UNIT 1:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education 1. Understanding the need, basic guidelines, content and process for Value Education

2. Self Exploration–what is it? - **its content and process; „Natural Acceptance‟ and Experiential** Validation- as the mechanism for self exploration

3. Continuous Happiness and Prosperity- A look at basic Human Aspirations

4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority

5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario

6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT 2:

Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-**existence of the sentient „I‟ and the material „Body‟**

8. Understanding the needs of Self („I‟) and „Body‟ - Sukh and Suvidha

9. Understanding the Body as an instrument of **„I‟ (I being the doer, seer and enjoyer)**

10.Understanding the characteristics and activities of „I‟ and harmony in „I‟

11.Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail

12.Programs to ensure Sanyam and Swasthya - Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 3:

Understanding Harmony in the Family and Society- Harmony in HumanHuman Relationship

13.Understanding Harmony in the family – the basic unit of human interaction

14.Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship

15.Understanding the meaning of Vishwas; Difference between intention and competence

16.Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship

17.Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals

18.Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family! - Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 4:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence 19.Understanding the harmony in the Nature

20.Interconnectedness and mutual fulfillment among the four orders of naturerecyclability and self-regulation in nature

21.Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space

22.Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 5:

Implications of the above Holistic Understanding of Harmony on Professional Ethics

23.Natural acceptance of human values

24.Definitiveness of Ethical Human Conduct

25.Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

26.Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order

b) Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems,

c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

27. Case studies of typical holistic technologies, management models and production systems

28.Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b) At the level of society: as mutually enriching institutions and organizations

Books and References:

1.R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

2. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.

3. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.

4. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986,

5.A.N. Tripathy, 2003, Human Values, New Age International Publishers.

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Semester-IV

UTEXTTT407:
TEXTILE FIBRE-II LAB

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Principle of microscopy, microscopic identification of man-made fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.

UCHEMTT408:
CHEMICAL PROCESSING OF TEXTILES -I LAB

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The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing:

1. Desizing of cotton material.
2. Scouring of cotton material.
3. Bleaching of cotton material:

(a) hypochlorite bleaching (b) chlorite bleaching (c) peroxide bleaching

4. Blueing /optical whitening of cotton material.
5. Degumming of silk material.
6. Bleaching of silk material.
7. Optical whitening of silk material.
8. Mercerisation of cotton material.

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UYARNTT409:
YARN MANUFACTURE-II LAB

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List of Practicals-:

1. Study of constructional details of draw-frame,
2. Driving arrangement and calculation of sp peds, draft and production of D/F.
3. Processing of Material on Draw frame and evaluating performance.
4. Study of constructional details & Driving arrangement and calculation of Speed Frame.
5. Study of sliver lap machine and calculation of speeds of different parts and production calculations of sliver lap.
6. Study of sliver lap machine and calculation of speeds of different parts and production calculations of Ribbon lap.
7. Study of sliver lap machine and calculation of speeds of different parts and production calculations of comber.

UFABRTT410:
FABRIC MANUFACTURE-II LAB

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List of Practicals-:

1. General study of drop box motion.
2. General study of mechanical Jacquard and method of card cutting.
3. Study of Cam dobby and paper card cutting.
4. Study & working of weft feeler motion.
5. Study & working of auto let-of fmotion.
6. Study and working of pirn change motion.
7. Study and working of shuttle change motion.
8. Study of various dobby mechanics.
9. Study the mechanism of multiple box motion.
10. Study of various jacquard looms.