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

Department of Textile Technology

Evaluation Scheme & Syllabus

B.Tech. Textile Technology

Final Year

(VII & VIII SEM)

(Effective from session 2025-26)

B.TECH- TEXTILE TECHNOLOGY SEMESTER-VII

STUDY AND EVALUATIONSCHEME FOR B.TECH TEXTILE TECHNOLOGY

YEAR-4th /SEMESTER-7th

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	
UENTRTT701	Entrepreneurship Development	3	0	0	3	30	-	30	70	-	70	100
UFUNCTT702	Functional Clothing	3	0	0	3	30	-	30	70	-	70	100
UFIBRTT703	Fiber Manufacture & Process Control	3	1	0	4	30	-	30	70	-	70	100
UKNITTT704	Knitting Technology	3	1	0	4	30	-	30	70	-	70	100
UGARMTT705	Garment Manufacture Technology	3	0	0	3	30	-	30	70	-	70	100
UINDUTT706	Industrial Training	0	0	2	1	-	25	25	-	25	25	50
UKNITTT707	Knitting Technology	0	0	2	1	-	25	25	-	25	25	50
UMINOTT708	Minor Project	0	0	2	1	-	25	25	-	25	25	50
Total		15	2	6	20	150	75	225	350	75	425	650

B.TECH- TEXTILE TECHNOLOGY SEMESTER-VIII

STUDY AND EVALUATION SCHEME FOR B.TECH TEXTILE TECHNOLOGY.

YEAR-4th /SEMESTER-8th

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	
UNONCTT801	Non-Conventional Energy Resources	3	0	0	3	30	-	30	70	-	70	100
UTHEOTT802	Theory of Textile Structure	3	1	0	4	30	-	30	70	-	70	100
UMILLTT803	Mill Planning & Organization	3	1	0	4	30	-	30	70	-	70	100
UTECHTT804	Technical Textiles	3	0	0	3	30	-	30	70	-	70	100
USEMITT805	Seminar	-	0	2	1		25	25		25	25	50
UMAJOTT806	Major Project	-	0	12	7		100	100		200	200	300
Total		12	2	14	22	120	125	245	280	225	505	750

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

L	T	P
3	0	0

UENTRTT701: ENTREPRENEURSHIP DEVELOPMENT

UNIT –I: Entrepreneurship- definition. growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. 5 Government policy for small scale industry; stages in starting a small scale industry. 2 (10)

UNIT -II Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods. 8

UNIT -III Accountancy- Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

UNIT -IV Project Planning and control: The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. profit planning and programming, planning cash flow, capital expenditure and operations. control of financial flows, control and communication. 9

UNIT -V Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. 5 Role of various national and state agencies which render assistance to small scale industries.

Text / Reference Books:

1. Forbat, John, ―Entrepreneurship‖ New AgeInternational.
2. Havinal, Veerbhadrappa, ―Management and Entrepreneurship‖ New AgeInternational
3. Joseph, L. Massod, ―Essential of Management", Prentice Hall ofIndia.

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

L	T	P
3	0	0

UFUNCTT702: FUNCTIONAL CLOTHING

Unit 1: Definition of functional clothing, Classification of functional clothing, Functional finishes, ways to apply functional finishes on textile surfaces, Functional clothing market review

Unit 2: Functional Protective clothing: Nuclear biological Chemical protective clothing, extreme cold clothing; design, mechanism and applications, Fire retardant clothing, approaches to achieve fire retardancy in clothing, mechanism of fire retardancy, Soft and hard body armour , super thickening fluids (non-nutonean) for body armour, water proof breathable fabrics, ways to achieve waterproofness and breathability in textiles

Unit 3: Medical functional clothing: therapeutic and rehabilitative clothing, bio sensing clothing, wound healing promoting dressings, antimicrobial sutures

Unit 4: Sportswear clothing: moisture management in sportswear, compression textiles, Aerodynamics, Spacesuit design and development, woven and knitted sportswear,

Unit 5: Cosmeto textiles: definition, classification, mechanism to develop various cosmetic effects in textiles, various cosmeto ingredients, worldwide scene of cosmeto textiles, Smart Textiles, classification of smart textiles, Intelligent textiles, , mechanism of various types of smart textiles, Wearable electronics

Reference Books

1. Functional Finishes for Textiles: Improving Comfort, Performance and Protection (Woodhead Publishing Series in Textiles), Raushan Paul
2. Functional Textiles and Clothing, G. Thilagavathi., M. Parthiban, S.Viju
3. Woodhead Publishing
4. Electronics in Textiles and Clothing: Design, Products and Applications L. Ashok Kumar,C. Vigneswaran, CRCPress
5. Smart Clothes and Wearable Technology,J. McCann(Editor),David BrysonWoodhead Publishing Series inTextiles

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

L	T	P
3	1	0

UFIBRTT703: FIBRE MANUFACTURE & PROCESS CONTROL

Unit-1: Melt spinning line-extruder, design features of extruder screws (2) mixing of additives, Continuous polymer filter, spin pack and spinneret(2)spinning pack disassembly, cleaning of spinnerets, inspection of spinnerets (2) spinning variables and conditions for continuous spinning, special features of high speed melt spinning(2).
Total of lectures required=9

Unit-2: Quenching system and quench chamber, Different quenching system (2).High speed winder, automatic winder, metering pump (1), chips drying. (1) Effects of variable throughout rate. (2)Consequence of crystallization in chips on fibre spinning (2) structure formation during melt spinning (1).**Total of lectures required=8**

Unit-3: Introduction to solution spinning classification of solution spinning (2)wet spinning, coagulation in wet spinning, effect of coagulation conditions on fibre properties(2) dry spinning, spinning cell for dry spinning (2),Cross-section formation in dry-spinning, spin finish during dry- spinning, coagulation of viscose fibre in coagulation bath(4). Wet spinning in special context of viscose fibre manufacturing (1) **Total of lectures required=11**

Unit-4: Dry-jet-wet spinning, coagulation process (2) development of structure & morphology during dry-jet-wet spinning (2) importance of dry-jet-wet spinning (2) process control in dry-jet- wet spinning (2). Dry-jet wet spinning of high tenacity acrylic fibre (1)**Total of lectures required=9**

Unit-5: Role of spin-finish (2) introduction to spin finishes components (2) spin finish application. Different techniques of spin finish application, dipping roller method, metered finish system, quench duct lubricating system, spray technique(3). Electro spinning (1)
Total of lectures required=8
Total of lectures required(ALL UNITS) =45
Text Books & References Material:

1-Manufactured fibre technology-
V.B.Gupta&V.K.Kothari,Chapmann&Hall 2-Textile Fibre-
V.K.Kothari(vol.2) IAFL Publication
3- High speed fibre spinning-A.Ziabickey-johnwilley
4- Essential fibre chemistry-ME CarterMarcel Dekkermc.N.york
5- Handbook of Fibre Science: M Leoineli and MPearce

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

L	T	P
3	1	0

UKNITTT704: KNITTING TECHNOLOGY

Unit 1: Difference between knits and wovens, knitting terms and definitions (Course,, wale, stitch density) different type of knitting needles: bearded needle, latch needle, sinker, jack, cam arrangement, overlap, under lap, closed lap, open lap.
Total Lectures required=8

Unit 2: Comparison of warp and weft knitting, Classification of weft knitting machine, elements of knitting machine like type of needles, sinkers, etc Needle numbering system, technology of loop formation, geometry of loop structure, Elements of loop structure: needle loop, sinker loop, relation between yarn count, machine gauge and stitch density.
Total Lectures required=9

Unit 3: Classification of knit-structures, loop formation on: single jersey, Rib machines and inters look machines, socks knitting technology, Loop formation on flat bed machine
Total Lectures required=9

Unit 4: Four primary base knitting structures: Plain knitted fabric, Rib fabric, Interlock and Purl fabric, Special knitting machines: Fabric machine, garment length machine, flat machine, circular machine fabrics and Spacer fabrics.
Total Lectures required =7

Unit 5: Basic warp knitting machines, classification of warp knitting, Modern developments in weft knitting technique, calculations regarding production, GSM, stitch density etc, Causes and remedies of faults of knitted fabrics.
Total Lectures required =9
Grand total of lectures required = 42

Reference and Text Book-

1. Knitting Technology –Chamberlin
2. Knitting Technology – W.J.Spencer
3. International Textile Journel –Knitting
4. Knitting Calculation –Chamberlin
5. Wet Knitting Vol. 1&2 –Published by IIT NewDelhi.
6. Knitting –NCUTE

Laboratory work: S per Lab Syllabus

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

L	T	P
3	0	0

UGARMTT705: GARMENT MANUFACTURE TECHNOLOGY

Unit (1): Introduction to garment manufacturing technology, Sample cutting, ZFusing, Sewing, Pressing, Finishing and inspection, Line balancing concept.
Total Lectures required =8

Unit (2): Introduction to measurement of fabric dimensional properties, fabric comfort, thermal comfort, objective evaluation of fabric, low stress fabric properties, Kawabata system, fabric assurance by sample testing, fabric defects, Fabtic inspection and feedback to back process.
Total Lectures required =9

Unit (3) Introduction to garment cutting, Marker planning, Efficiency of Marker planning, methods of marker planning and marker use, spreading of the fabric, to form a lay, spreading requirements, methods of spreading, fabric packages, objective of cuttings, methods ofcuttings
Total Lectures required =9

Unit (4): Introduction to seam, stitch, stitch classification, stitch structure, seam formation, joining material, surface characteristics, seam appearance, damages (thermal and mechanical), seam performance, seam degradation, seam failure, seam puckering and seam testing. Sewing needle and sewing thread, thread consumption
Total Lectures required = 9

Unit 5: Introduction of spreading machines and cutting machines- types and functions, History of sewing machines. Sewing machinery- classification according to bed types, stitch types (hook or looper) material wise (extra light to heavy weight). Major parts of sewing machinery and functions. Parts, functions and adjustments of Over Lock: Collar turning machines, folding machinery fusing and pressing machinery, Computer controlled cutting, sewing, folding machinery. **Total Lectures required=8**
Grand total of lectures required = 42
Text Books and Reference material:

7. Introduction to Garment Manufacturing Technology By TRamchandran
8. Garment Manufacturing Technology by By TRamchandran
9. Practical Clothing Construction Part I & II by MaryMethews

Laboratory work:N

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

UINDUTT706: INDUSTRIAL TRAINING

L	T	P
0	0	2

Students shall carryout industrial training as a part of their curriculum after the completion of their 3rd year for 6 WEEKS/ 45 DAYS. After this their performance shall be evaluated during 7th semester by SUBMITTING TRAINING REPORT & CERTIFICATE taking viva of each and every student.

UKNITTT707: KNITTING TECHNOLOGY LAB

L	T	P
0	0	2

To study the path of yarn through circular and flat knitting machine, different knitting elements including the cam system, driving mechanism of plain knitting machine, cloth take-up mechanism of plain knitting m/c, rib knitting m/c including arrangement of dial and cylinder needles, cam, system and driving mechanism, Interlock knitting m/c including arrangement of dial and cylinder needle, cam system and driving mechanism, Warp knitting machine constructional details and mechanism of operation.

L	T	P
0	0	0

UMINOTT708: MINOR PROJECT

Students will carry out minor project during seventh semester as a part of curriculum .

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

L	T	P
3	0	0

UNONCTT801: NON-CONVENTIONAL ENERGY RESOURCES

UNIT-I: Introduction to various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits. 3 Solar Cells: Theory of solar cells. Solar cell materials, solar cell array, solar cell power plant, limitations. 4

UNIT-II: Solar Thermal Energy: Solar radiation, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations. 9

UNIT-III: Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations. 4 Magneto-hydrodynamics (MHD): Principle of working of MHD Power plant, performance and limitations. 2 Fuel Cells: Principle of working of various types of fuel cells and their working, performance and limitations. 3

UNIT-IV: Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations. 2 Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. Performance and limitations of energy conversion systems. 6

UNIT-V: Bio-mass: Availability of bio-mass and its conversion theory. 2 Ocean Thermal Energy Conversion (OTEC): Availability, theory and working principle, performance and limitations. Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants. 3

Text/References Books:

1. Raja etal, ―Introduction to Non-Conventional Energy Resources‖Scitech Publications.
2. John Twideu and Tony Weir, ―Renewal Energy Resources‖ BSP Publications,2006.
3. M.V.R. Koteswara Rao, ― Energy Resources: Conventional & Non-Conventional ― BSPPublications,2006.
4. D.S. Chauhan,‖Non-conventional Energy Resources‖ New AgeInternational.
5. C.S. Solanki, ―Renewal Energy Technologies: A Practical Guide for Beginners‖PHI Learning.(14)

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

UTHEOTT802:-THEORY OF TEXTILE STRUCTURE

L	T	P
3	1	0

Unit (1): Classification of yarns, Yarn geometry- idealized yarn geometry, relationship of yarn number and twist factor, packing of fibres in a yarn, ideal packing, hexagonal close packing and radial packing, packing factor and its measurement, yarn diameter, method of measurement of twist contraction. **Total Lectures required =10**

Unit (2): Fibre migration: mean fibre position, amplitude of migration and frequency of migration, mechanism of migration, spinning-in coefficient and fibre extent. estimation of strength of blended yarn. **Total Lectures required =6**

Unit 3: Mechanism of staple fibre yarns, translation of fibre properties into yarn properties, twist and strength relationship, limit of twist, spinability of textile fibres, relation with end-breakage rate. **Total Lectures required =9**

Unit (4): Elements of fabric geometry, cloth setting theories, flexible and rigid thread model, Pierce's equation and later modifications. **Total Lectures required =7**

Unit (5): Relation of fabric properties to simple geometry, crimp interchange in woven fabric, crimp balance equation, Fabric cover, cover factor and their significance, relation between cover and weight per unit area of fabric, Theoretical treatment of fabric deformation in tension
Total Lectures required =10

Grand total of lectures required = 42

Text Books and Reference material:

1. Textile Yarn- B.C. Goswami, J.G. Martindale, F.L. Scardine

2. Textile structure- J.W.S. Hearle, S. Backer, Grossberg.

3. Pierce's geometry- Textile institute

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

UMILLTT803:- MILL PLANNING & ORGANIZATION

L	T	P
3	1	0

UNIT-I: Preparation of project—

Spinning/Weaving/Processing/Composite A- Selection of product
B- Site Selection (site, location, land and cost)
C- Building (single, double and multiple)
D- Plant and Machinery **Total lecture required 09**

UNIT-II

1. Industrial hazards: i. Fire hazards, ii. Mechanical hazards, iii. Electrical etc
2. Safety rules for prevention of accidents
3. Humidification of textile mill- humidifier and humidification
4. Ventilation, floor cleaning in textile mills, lightening
5. Air conditioning and Refrigeration system

Total lecture required 08

UNIT III:

Balancing of machine (plant layout for machines-- balancing of machines, layout of different machines, calculation for balancing of machines for different processes—spinning, weaving)

Total lecture required 07

UNIT IV

Production Costing—various terms used in costing (cost volume, profit analysis, cost allocation on waste, effect on cost direct , indirect
Various elements of costing- concept of estimation for costing, break-even analysis
Total lecture required 10

UNIT V

Economic Viability
Staff organization in textile mills – daily wages, various systems
Recruitment, allocation and skill development
Management and information system MIS

Total lecture required 08

Text Books & Reference Material

1. Industrial Engineering, Organization & management by Tarachand
2. Industrial Economics & Principle of Management by T.M.Chabra
3. Industrial Economics & Principle of Management by S. KSharma

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

L	T	P
3	0	0

UTECHTT804:-TECHNICAL TEXTILES

Unit (1): Introduction to technical textile, types of technical textiles, textiles used in industry such as filtration, filter fabric construction- woven, needle felt & knitted filter fabric, finishing treatment of filter fabric, thermal and chemical properties of filter fabric, essential requirements of good filter fabric. Application of nano technology and nano materials for the improved filtration.
Total Lectures required =8

Unit (2): Manufacture and properties of protective textiles- water proof/coated and water repellent, antimicrobial, flame retardant, chemical resistance, Nuclear and biological resistance, mechanical resistance such as bullet proof, cut prof, stab proof

Total Lectures required =9

Unit (3): Medical textiles, fibres used, classification of medical textiles- non-implantable material wound dressings, bandages, plasters, etc, Extra-corporal devices – Artificial kidney, liver lung, implantable material- suture, soft tissue implant, Orthopedic implants, Cardiovascular implants, Healthcare/ hygiene products, medical cost, surgical gown, face mastetc.
Total Lectures required =8

Unit (4): Smart textiles, brief introduction of smart textiles, classification of smart textiles, passive smart textiles, active smart textiles, brief discussion of smart shirt, smart suit, musical jacket, space suit etc. automotive textiles: type cord, seat belt, air bag, seat upholstery, carpets, headliners, helmets etc, Agro textile: Shade net, green house film, Mulch net, crop cover, anti hail and bird protection net, finishing net etc.

Total Lectures required =9

Unit (5): Introduction of geo textile, classification of geo textiles, functions of geo textile-soil reinforcement, drainage (fluid transmission), filtration, separation, erosion control/ absorption, objective of geo textiles, manufacturing of geo textile, essential properties of geo textiles- Mechanical determinants, Hydraulic determinants, durability determinants
Total Lectures required =8

Grand total of lectures required = 42

Text Books and Reference material:

1. Hand book of technical textiles- A.R. Horrocks & S.C.Anand
2. Smart fibre, fabrics and clothing TaoX
3. Shears handbook of industrial Textiles

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

USEMITT805:-SEMINAR

L	T	P
0	0	2

Power Point Presentation related to Major Project

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UMAJOTT806:- MAJOR PROJECT

L	T	P
0	0	12

Project options, ranging from fabric development and dyeing to machinery design and sustainable textile practices. Students can focus on areas like technical textiles, garment manufacturing, or textile testing and quality control. The curriculum often includes hands-on experience through project work and industrial training, preparing students for various roles in the textile industry.

Possible Project Areas:

Fabric Development:

- Design and development of new fabric structures (e.g., using specific fibers, weaves, or knits).
- Investigating the properties of novel fabrics (e.g., strength, elasticity, breathability).
- Exploring the potential of different natural and synthetic fibers.

Dyeing and Finishing:

- Developing new dyeing techniques or improving existing ones.
- Investigating the use of eco-friendly dyes and dyeing processes.
- Exploring the effects of different finishes on fabric properties (e.g., wash and wear, flame tardancy).

Garment Manufacturing:

- Designing and developing new garment styles or improving existing ones.
- Investigating the impact of different sewing techniques on garment performance.
- Exploring the use of automation and technology in garment production.

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

Textile Testing and Quality Control:

- Developing new methods for testing fabric properties (e.g., strength, colorfastness, abrasion resistance).
- Investigating the factors that affect textile quality.
- Developing quality control systems for textile production.

Technical Textiles:

- Exploring the use of textiles in specific applications (e.g., geotextiles, medical textiles, sports textiles).
- Developing new technical textiles with enhanced properties.

Sustainable Textile Production:

- Investigating the environmental impact of textile production.
- Developing sustainable textile production processes.

Specific Project Titles:

- Design and Development of a Garment Dyeing Machine.
- Fabrication of a Rubbing Fastness Tester for Silk Fabrics.
- Evaluation of Treatment Plant Efficiency in Textile Industries.
- Development of a Stop Motion System for Warping Machines.
- Improvement of Wash and Wear Properties of Silk Fabrics.
- Study of Banana Fiber Usage in Textile Applications.
- Recycling Scope of Denim and Jeans in Textile Industry.

Note: Students can also explore topics related to specific types of technical textiles like agro-textiles, build-tech, or indutech.
