

# RAJASTHAN TECHNICAL UNIVERSITY, KOTA



## SYLLABUS & SCHEME OF EXAMINATION

### **B. TECH. (Textile Engineering)**

# THIRD SEMESTER

## B. TECH. (Textile Engineering)

## MECHANISMS OF YARN MANUFACTURING – I

[3TE1A]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<ul style="list-style-type: none"> <li>System of expressing yarn linear density.</li> <li>Object of ginning</li> <li>Description and working of knife-roller, Mearthy and Saw gin</li> <li>Objects of mixing.</li> <li>Principles underlying the selection of cotton for mixing. Different methods of mixing</li> </ul>
II	<ul style="list-style-type: none"> <li>Study of different blending methods, their advantages and disadvantages.</li> <li>Problems in blending of man-made fibre with cotton</li> <li>Objects of blow-room</li> <li>Various types of openers, their construction and working</li> </ul>
III	<ul style="list-style-type: none"> <li>Lap forming mechanisms</li> <li>Objects and arrangements of calendar roller and their weighing</li> <li>Selection of machinery according to the type of cotton and their suitable combinations</li> </ul>
IV	<ul style="list-style-type: none"> <li>Nature of waste extracted in various openers and beaters</li> <li>Lap rejection causes of lap defects and their remedies.</li> <li>Processing parameters for working different varieties of cotton in blow room.</li> <li>Calculations pertaining to production of blow-room machinery under normal mill conditions.</li> </ul>
V	<ul style="list-style-type: none"> <li>Blow room accessories e. g; Shirley analyzer, Lap meter, Varimeter, V-signal, moisture indicator .</li> <li>Introductory idea about cleaning efficiency and opening efficiency of blow room machinery</li> <li>Brief outline of setting the blow room line for man-made fibers</li> <li>Measurement of blow room performance . Lap quality parameteras.</li> </ul>
<b>Books &amp; Author's</b>	<b>Cotton Ginning, Textile Progress Vol.24 No.2 I Doraiswamy, P Chellamani</b> <b>Spun Yarn Technology Eric Oxtoby</b> <b>The Technology of Short Staple Spinning Part-I,II,II W Klein</b> <b>Spinning of Manmade &amp; Blends on Cotton KR Salhotra</b>

**MECHANISMS OF FABRIC MANUFACTURING – I****[3TE2A]**

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<ul style="list-style-type: none"> <li>• Introduction to weaving</li> <li>• Process and type of Looms, Plain, Hand Loom, Power Loom</li> <li>• Loom: Primary, secondary and auxiliary motions</li> <li>• Loom drive</li> <li>• Production and efficiency calculations</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>• Various ways of shedding &amp; types of sheds</li> <li>• Tappet shedding mechanism, different types &amp; idea of construction of tappet</li> <li>• Early &amp; late shedding calculation of lift of tappet</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>• Various type of picking mechanism-Under &amp; over pick mechanism</li> <li>• Early &amp; late picking concept</li> <li>• Reason of shuttle fly &amp; shuttle trap</li> <li>• Shuttle speed calculations</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li>• Sley beating up motion types of temple &amp; utility on loom.</li> <li>• Negative and continuous take –up motion (advantages and disadvantages)</li> <li>• Five &amp; seven wheel take up motion and their calculation</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>• Objects of let-off motion</li> <li>• Negative let-off motion</li> <li>• Warp protecting motion: Loose reed-fast reed</li> <li>• Brake motion</li> </ul>
<b>Books &amp; Author's</b>	<b>Principles of Weaving</b> <b>Weaving Mechanism, Part I, II</b> <b>Weaving</b> <b>Woven Fabric Production – I, II</b>
	<b>R Marks &amp; ATC Robinson</b> <b>NN Banerjee</b> <b>Talukdar, Azgaonkar and Sriramulu</b> <b>NCUTE Publications</b>

**TEXTILE FIBERS**

[3TE3A]

[Common with 3TC1, 3TT3]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
I	<ul style="list-style-type: none"> <li>• Definition and classification of textile fibers on the basis of their sources. Essential and desirable properties of textile fibers.</li> <li>• Advantages and disadvantages of natural and manmade fibres</li> <li>• Polymerization , degree of polymerization, inter –polymer forces of attraction , requirements of fibre forming polymers and general considerations with regard to fibre properties</li> </ul>
II	<ul style="list-style-type: none"> <li>• Geographical distribution, cultivation practices, fiber morphology, properties and uses of cotton.</li> <li>• Cultivation and retting practices, fiber morphology, properties and uses of jute, flex, rammie, hemp, sisal and coir fibers.</li> </ul>
III	<ul style="list-style-type: none"> <li>• Classification , varieties, sorting and grading of wool, morphological structure ,properties and uses of wool fiber.</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Varieties of silk</li> <li>• Rearing of silk worm, cocooning, silk reeling, throwing and weighting</li> <li>• Varieties of silk yarns and fabrics</li> <li>• Morphology, properties and uses of silk fiber</li> </ul>
V	<ul style="list-style-type: none"> <li>• Brief outline of manufacturing process and properties of regenerated fibers viz. viscose rayon, acetate -rayon, cupra-ammonium rayon.</li> <li>• Brief manufacturing process and properties of important synthetic fibers viz. Polyester, Nylon, Acrylics.</li> </ul>
<b>Books &amp; Author 's</b>	<p><b>Handbook of Textile Fibres</b> <b>A Text Book of Fibre Science</b> <b>Manmade Fibres</b></p> <p><b>J Gordon Cook</b> <b>Dr. S P Mishra</b> <b>RW Moncriff</b></p>

Class B. TECH. (Textile Engineering)	Evaluation
Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Foundry:</b> <ul style="list-style-type: none"> <li>• Moulding Material Moulding Sands;</li> <li>• Properties and Methods testing. Core materials and core making.</li> <li>• Moulding Process: Green dry and loam sand moulding, various moulding processes - shell moulding, permanent moulding, carbon moulding.</li> </ul>
II	<b>Casting:</b> <ul style="list-style-type: none"> <li>• Die Casting, Centrifugal casting, Investment casting and continuous casting, Slush casting, casting defects and their smelting furnaces, rotary, H.electric, lifting and constructional features and operation of cupola, furnace, principal of casting design</li> <li>• Welding: Atomic hydrogen, ultrasonic, laser beam special welding processes e.g. TIG, MIG, friction and explosive welding</li> </ul>
III	<b>Powder metallurgy:</b> <ul style="list-style-type: none"> <li>• Powder manufacturing mechanical pulverization electrolytic process, chemical reduction, atomization properties of metal powder, compacting of powders, sintering</li> <li>• Application, advantage and disadvantage of powder metallurgy.</li> </ul>
IV	<b>Press tools:</b> <ul style="list-style-type: none"> <li>• Classification of processes and presses: shearing, bending, drawing and forming operation and dies.</li> <li>• Compound and progressive dies: calculation of bank size: high velocity forming of metals.</li> </ul>
V	<b>Machine Tools:</b> <ul style="list-style-type: none"> <li>• Constructional details and main operation lathes,</li> <li>• Capston and turret lathes: shaper and planner, drilling and boring machines.</li> <li>• Milling machine, indexing methods.</li> <li>• Grinding</li> </ul>
Books & Author's	<b>ENGINEERING MANUFACTURING PROCESSES</b> <ol style="list-style-type: none"> <li>1. Hazara Choudhary Voi. I &amp; II</li> <li>2. R. K. JAIN</li> <li>3. P.C. SHARMA VOL. I &amp; II</li> <li>4. RAO, SINGIRESHEL</li> </ol>

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Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	Introduction: Review of structures in C, accessing members of structures using structure variables, pointer to structures, passing structures to functions, structures as user defined data types.
<b>II</b>	Introduction to programming paradigms- Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public Basics of C++: Structure of C++ programs, introduction to defining member functions within and outside a class, keyword using, declaring class, creating objects, constructors & destructor functions, Initializing member values with and without use of constructors, simple programs to access & manipulate data members, cin and cout functions. Dangers of returning reference to a private data member, constant objects and members function, composition of classes, friend functions and classes, members of a class, data & function members. Characteristics of OOP- Data hiding, Encapsulation, data security.
<b>III</b>	Operator overloading: Fundamentals, Restrictions, operator functions as class members v/s as friend functions. Overloading stream function, binary operators and unary operators. Converting between types.
<b>IV</b>	Inheritance: Base classes and derived classes, protected members, relationship between base class and derived classes, constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding.
<b>V</b>	Multiple inheritance, virtual base classes, and class members, multiple class members. Templates, exception handling
<b>Books &amp; Author's</b>	<b>OBJECT ORIENTED PROGRAMMING C++</b> <b>OBJECT ORIENTED PROGRAMMING C++</b> <b>OBJECT ORIENTED PROGRAMMING C++-</b>  <b>A Balagurswamy</b> <b>Schaum Series</b> <b>Robert Lafare</b>

**ADVANCED ENGINEERING MATHEMATICS- I**

<b>Class B. TECH. (Textile Technology)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	Fourier transform: Discrete and Fast Fourier transform, Complex form of Fourier transform and its inverse, Fourier sine and cosine transform and their inversion. Properties of F-transform, Convolution theorem for F-transform, Parse Val's identity of for F-transforms Applications of Fourier transform for the solution of partial differential equations having constant coefficients with special reference to heat equation and wave equation.
<b>II</b>	Laplace transform, Inverse transform, properties, Transforms of derivatives and integrals, Unit step function, Dirac's delta function, Differentiation and integration of transforms, Applications to differential equations.
<b>III</b>	<b>Statistical Techniques:</b> Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and

	Normal distributions, Moments, Moment generating functions, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc., Correlation, Linear, non –linear.
<b>IV</b>	Numerical Analysis: Finite differences, Difference operators, forward, Backward, central & average operators. Newton’s forward and backward interpolation formula, Stirling’s central difference formula Lagrange’s interpolation formula for unequal interval. Solution of non linear equations in one variable by Newton Raphson’s and Regula falsi’s method .
<b>V</b>	Numerical solution of simultaneous algebraic equation by Gauss elimination and Gauss seidel method. Numerical differentiation, Numerical integration trapezoidal rule, Simpson’s one third and three eight rule. Numerical solution of ordinary differential equation of first order: Picards method, Euler’s, and modified Euler’s,method, Milne’s methods and Runga Kutta fourth order method.
<b>Books &amp; Author’s</b>	<ol style="list-style-type: none"> <li>1. Chandrika Prasad, Mathematics for Engineers, Prasad Mudralaya</li> <li>2. Jeffrey, Advanced Engineering Mathematics , ELSEVIER</li> <li>3. Chandrika Prasad , Advanced Mathematics for Engineers, Prasad Mudralaya</li> <li>4. Grewal B. S., Higher engineering Mathematics, Khanna Publication, New Delhi</li> <li>5. Keyszig E., Advanced Engineering Mathematics, Wiley Eastern Publication</li> <li>6. Peter V. O. Neil, Advanced Engineering mathematics, Thomson Publication</li> <li>7. Gerald, C.F., and Wheatley, P.O., Applied Numerical Analysis, Addison Wesley.</li> <li>8. Jain, M.K., Iyengar, S.R. and Jain, R.K., Numerical Methods for Scientific and Engineering Computation, Wiley Eastern.</li> <li>9. Kandasamy, P., Thilagavathy, K., and Gunavathy, S., Numerical Methods, S Chand and Company.</li> <li>10. J. Douglas Faires, Richard L. Burden, Numerical Methods, Cengage Learning.</li> </ol>



## PRACTICALS:

### 3TE7A Spinning Practical – I

hrs/week-4

Max marks-100

Practice in handling and operations of blow room. Study of constructional details of machinery: Various controls, change place etc. Practice in checking of the quality of lap. Calculation pertaining to blow-room. Sequence of machines in a modern blow room line settings of blow-room for processing cotton and man-made fibres. Maintenance schedules of blow room. Designs of a modern opener, beater.

### 3TE8A Weaving Practical – I

hrs/week-4

Max. marks-100

Pirn winding machine special mechanism of Hacoba Pirn winding machine . Various type of clears. Supply packages like Cone ,Chese, cone winding machine. Calculation of speed and production . Primary motions, i.e. shedding , picking beating . Secondary motion i.e. take-up , let –off (positive & negative ). Drawing in process type of heald frame and Reed.

### 3TE9A Textile Fiber Identification& Analysis Practical

hrs/week-2

Max marks-50

Principle of microscopy ,microscopic identification of fibres, preparation and mounting of specimen for longitudinal view. Microscopy. Standard scheme of analysis of homogenous fibre and blends by physical and chemical methods Qualitative and Preparation of reagents used for chemical analysis

### 3TE10A Engineering Manufacturing Practical

hrs/week-2

Max marks-50

1. To prepare mould of a given pattern requiring core and to cast it in Aluminium.
2. Moisture test and clay content test.
3. Strength test (compressive, tensile; in green and dry conditions) and Hardness test (Mould and Core).
4. Permeability test.
5. A.F.S. Sieve analysis test.
6. Study of lathe machine, lathe tools cutting speed, feed and depth of cut.
7. To perform step turning, knurling and chamfering on lathe machine as per drawing.
8. To study shaper machine, its mechanism and calculate quick return ratio.
9. Study mechanical press and perform various operations.
10. To study drilling machine.

### 3TE11A Object Oriented Programming Lab

hrs/week-2

Max marks-50

Practical based on C++ programming and application in textile.

### 3TEDC Discipline & Extra Curricular Activities

Max marks-50

# FOURTH SEMESTER B. TECH. (Textile Engineering)

## MECHANISMS OF YARN MANUFACTURING – II

[4TE1A]

Class B. TECH. (Textile Engineering)	Evaluation
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject																		
I	<ul style="list-style-type: none"> <li>• Objects of carding</li> <li>• Introduction to roller &amp; clearer card</li> <li>• Detailed study of revolving flat card</li> <li>• Constructional features and working details of liker- in, cylinder, doffer and flats.</li> </ul>																		
II	<ul style="list-style-type: none"> <li>• Elementary idea about Carding theories.</li> <li>• Flexible and metallic card clothing, stripping and grinding.</li> <li>• Processing parameters for different materials</li> <li>• Carding defects and their remedies</li> </ul>																		
III	<ul style="list-style-type: none"> <li>• Fiber neps, their assessment and control</li> <li>• Introductory information about modern developments in carding</li> <li>• Control of waste and cleaning in carding</li> <li>• Calculations pertaining to draft and production of the machines dealt with course</li> </ul>																		
IV	<ul style="list-style-type: none"> <li>• Objects of drawing. Working principle of draw frame including constructional details</li> <li>• Systems of drafting, weighing in draw frames</li> <li>• Mechanical and electrical stop-motions</li> <li>• Draft distribution: various types of drafting rollers and their construction</li> </ul>																		
V	<ul style="list-style-type: none"> <li>• Coiling systems: over coiling; under coiling and bicoiling</li> <li>• Concept of ideal draft and formation of drafting waves</li> <li>• Principles of roller setting</li> <li>• Introduction to modern developments in draw frames</li> <li>• Calculations pertaining to draft and production of the machine dealt with course</li> </ul>																		
Books & Author's	<table> <tbody> <tr> <td><b>Spun Yarn Technology</b></td> <td><b>Eric Oxtoby</b></td> </tr> <tr> <td><b>Wool Handbook</b></td> <td><b>Werner Von Bergen</b></td> </tr> <tr> <td><b>The Technology of Short Staple Spinning</b></td> <td><b>W Klein</b></td> </tr> <tr> <td><b>Part I,II,III &amp; IV</b></td> <td></td> </tr> <tr> <td><b>Spinning of Manmade &amp; Blends on Cotton System</b></td> <td><b>KR Salhotra</b></td> </tr> <tr> <td><b>Cotton Combing</b></td> <td><b>GR Merill</b></td> </tr> <tr> <td><b>Cotton Spinning</b></td> <td><b>WS Taggart</b></td> </tr> <tr> <td><b>Cotton Drawing &amp; Rolving</b></td> <td><b>GR Merrill</b></td> </tr> <tr> <td><b>Drawing &amp; Roving</b></td> <td><b>RH Hill</b></td> </tr> </tbody> </table>	<b>Spun Yarn Technology</b>	<b>Eric Oxtoby</b>	<b>Wool Handbook</b>	<b>Werner Von Bergen</b>	<b>The Technology of Short Staple Spinning</b>	<b>W Klein</b>	<b>Part I,II,III &amp; IV</b>		<b>Spinning of Manmade &amp; Blends on Cotton System</b>	<b>KR Salhotra</b>	<b>Cotton Combing</b>	<b>GR Merill</b>	<b>Cotton Spinning</b>	<b>WS Taggart</b>	<b>Cotton Drawing &amp; Rolving</b>	<b>GR Merrill</b>	<b>Drawing &amp; Roving</b>	<b>RH Hill</b>
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<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<ul style="list-style-type: none"> <li>Types of dobbies, Keighly, Climax, dobe cross doobby, cross border doobby</li> <li>Preparation of chain for different kinds of design used in dobbies.</li> <li>Negative and positive dobbies with setting</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>Detail of let-off motion, type</li> <li>Roper and barlet let-off motion with special reference to Cimmco, Ruti and their setting</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>Multiple box motion</li> <li>Ecles drop box motion</li> <li>Pick and pick loom</li> <li>Preparation of pattern chain pertaining to above dobbies and multi box motion</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li>Side and center weft fork motion</li> <li>Filament weaving used on loom (Timing and setting)</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>Fabric defects, causes and remedies</li> <li>Calculation pertaining to above mechanism</li> <li>Some loom shed, average production, efficiency and loom chart</li> </ul>
<b>Books &amp; Author's</b>	<b>Principles of Weaving</b> <b>Weaving Mechanism, I &amp; II</b> <b>Weaving</b> <b>Woven Fabric Production – I, II</b>
	<b>R Marks &amp; ATC Robinson</b> <b>NN Banerjee</b> <b>Talukdar, Azgaonkar &amp; Sriramulu</b> <b>NCUTE Publications</b>

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Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<ul style="list-style-type: none"> <li>Warp winding – objects of winding, Tensioners and tension setting Yarn clearers and its settings, Yarn classifying systems</li> <li>Traverse mechanism for cross wound packages.</li> </ul>
II	<ul style="list-style-type: none"> <li>Concept of precision winding, Classification of winding machines, Rotoconer winding, machine. Auto-coner – passage and, Hacoba Pirn winding machine and technical details.</li> <li>Production calculation of various winding machines.</li> </ul>
III	<ul style="list-style-type: none"> <li>Warping- object, classification of warping machines</li> <li>Calculation of production and efficiency warping machine, passage</li> <li>Traverse mechanism and its calculation</li> </ul>
IV	<ul style="list-style-type: none"> <li>Objects of sizing.</li> <li>Sizing machine passage</li> <li>size ingredients</li> <li>Properties of size paste</li> <li>Cylinder drying, hot air drying</li> <li>Size box and its developments</li> </ul>
V	<ul style="list-style-type: none"> <li>Calculation of concentration, Viscosity and speed of sizing machine</li> <li>Factors affecting size take up Accessories like reed, healds and drop pins</li> <li>Manual drawing-in, semi auto and fully auto drawing-in</li> <li>Knotting-in process and its developments</li> </ul>
<b>Books &amp; Author's</b>	<b>Modern Preparation &amp; Wvg Machine</b> <b>Textile Mathematics Vol. III</b> <b>Weaving</b> <b>Yarn Preparation I &amp; II</b>
	<b>Ormerod</b> <b>JE Booth</b> <b>Ormerod</b> <b>R. Sengupta</b>

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<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<ul style="list-style-type: none"> <li>• Classification of fabrics , definition and methods of construction of weave, draft , lifting plan and denting order . Weave repeat unit and its requirements. Heald and reed calculations, and types of drafts viz: straight, skip, pointed and sateen.</li> <li>• Plain weave</li> <li>• Derivatives and ornamentation.</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>• Twill weave , classification of twill weave</li> <li>• Derivatives of twill weave</li> <li>• Effect of twist on prominence of twill lines</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>• Sateen &amp; satins, their extensions</li> <li>• Crepe weave</li> <li>• Diamond and diaper</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li>• Mock leno</li> <li>• Honey comb</li> <li>• Huck-a- back</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>• Cork screw</li> <li>• Bedford cords</li> <li>• Welt and pique fabrics</li> </ul>
<b>Books &amp; Author's</b>	<p><b>Textile Design and Colour</b> <b>Grammer of Textile Design</b></p> <p style="text-align: right;"><b>W Watson</b> <b>H Nisbet</b></p>

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Units	Contents of the Subject
I	<b>Strength of materials</b> <ul style="list-style-type: none"> <li>• Behavior of common materials in tension &amp; compression</li> <li>• Characteristic strain-stress curves of engineering materials</li> <li>• Hook's law</li> <li>• Elastic-limit working stress, ultimate stress, factor of safety</li> <li>• Poisson ratio</li> <li>• Elastic constants &amp; their relationship</li> </ul>
II	<b>Shearing &amp; Bending</b> <ul style="list-style-type: none"> <li>• Center of gravity, Moment of Inertia of area of symmetrical, un-symmetrical &amp; built-up sections</li> <li>• Simple beams subjected to transverse loading</li> <li>• Shear force and bending moment diagram</li> <li>• Theory of bending</li> <li>• Normal stress due to bending</li> </ul>
III	<b>Torsion of shaft:</b> <ul style="list-style-type: none"> <li>• Torsional shear stresses in solid, hollow &amp; stepped circular shafts</li> <li>• Angular deflection &amp; power transmission capacity</li> <li>• Application to close coil helical spring</li> </ul>
IV	<b>Fluid Mechanics – I:</b> <ul style="list-style-type: none"> <li>• Basic definitions &amp; fluid properties: definition of fluid, incompressible and compressible fluids</li> <li>• Mass density, specific weight, relative density, specific volume</li> <li>• Ideal fluid, viscosity, Newtonian &amp; Non-Newtonian fluids</li> <li>• Kinematics &amp; conservation of mass: flow classification, fluid velocity &amp; acceleration</li> <li>• Continuity equation for one dimensional and three dimensional fluid flow</li> </ul>
V	<b>Fluid Mechanics – II:</b> <ul style="list-style-type: none"> <li>• Fluid momentum: momentum theorem, application of momentum equation</li> <li>• Bernoulli equation</li> <li>• Application of Bernoulli equation: orifice meter, venturi meter</li> <li>• Flow through pipe</li> <li>• Head losses due to sudden enlargement, contraction, entrance, exit, obstruction, bend and pipe fitting</li> <li>• Power transmission by fluid</li> </ul>
Books & Author's	<b>Strength of Material Vol. I</b>  <b>Fluid Mechanics &amp; Hydraulics Dynamics</b>  <b>Dr. B. C. Punmia</b> <b>R.S. KHURAMI</b> <b>R.S.LAHRI</b> <b>D. S. KUMAR</b>  <b>D. S. KUMAR</b> <b>P.K.BANSAL,</b> <b>R.J.GARDE,</b> <b>GUPTA(PEARSON)</b>

**APPLICATION OF ELECTRONICS & MICROPROCESSOR IN TEXTILE MACHINES**

[4TE6A]  
[Common with 4TT6,4TC6]

<b>Class B. TECH. (Textile Technology)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 2	Theory Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
I	<p><b>Semiconductor Diodes:</b> Introduction, characteristics and their applications</p> <ul style="list-style-type: none"> <li>• Ideal diode</li> <li>• PN semiconductor diode</li> <li>• Diode equivalent circuits</li> <li>• Zener diode</li> <li>• Light diodes</li> </ul>
II	<p><b>Field Effect Transistors:</b></p> <ul style="list-style-type: none"> <li>• Introduction, Construction and characteristics of JFETS</li> <li>• Transfer characteristics,</li> <li>• BJT, their characteristics and applications.</li> </ul> <p><b>Transistor Amplifiers:</b></p> <ul style="list-style-type: none"> <li>• Classification of amplifiers</li> <li>• Biasing and compensation techniques</li> <li>• R-C coupled amplifier, tuned amplifier, operational amplifier their characteristics and applications</li> <li>• Digital to analog and analog to digital conversion</li> </ul>
III	<p><b>Operational Amplifiers (OpAmp):</b></p> <ul style="list-style-type: none"> <li>• Introduction, Block diagram, parameters of OpAmp IC 741</li> <li>• OpAmp in inverting and non-inverting configuration</li> <li>• Some applications of OpAmp</li> </ul> <p><b>Semiconductor Devices:</b></p> <ul style="list-style-type: none"> <li>• Introduction of silicon controlled rectifier</li> <li>• GTO</li> <li>• TRIAC, DIAC</li> <li>• Injunction transistors, IGBT</li> </ul>
IV	<p><b>Cathode Ray Oscilloscope:</b></p> <ul style="list-style-type: none"> <li>• Introduction, Cathode ray tube – theory and construction</li> </ul> <p><b>Transducers:</b></p> <ul style="list-style-type: none"> <li>• Introduction, resistive, Inductive, capacitive transducers.</li> <li>• Construction and working principle of strain gauge, LVDT, RVDT</li> <li>• Summing devices, measurement of linear displacement</li> <li>• Pressure measuring using transducers</li> <li>• Construction and working of thermocouple and thermistor, measurement of temperature using them</li> </ul> <p><b>Data Acquisition Systems:</b></p> <ul style="list-style-type: none"> <li>• Introduction, Components and uses</li> </ul>
V	<p><b>Process control:</b></p> <ul style="list-style-type: none"> <li>• Application of microprocessors in process control with special emphasis on textiles</li> <li>• Minimum microprocessor based system requirement</li> <li>• Examples of process control from textile and garment manufacturing engineering</li> </ul>
<b>Books &amp; Author's</b>	<p><b>Electronic Devices &amp; Circuit Theory</b> Robert Boylestad &amp; Louis Nashelsky  <b>Basic Electronics Principle</b> Milliman &amp; Halkias  <b>Electrical &amp; Electronics Measurement and Instrumentation</b> Sawhney AK  <b>Industrial Electronics and Control</b> S. K. Bhattacharya</p>



## PRACTICALS

### 4TE7A Spinning Practical – II

hrs/week-4

Max marks-100

Familiarity with carding machine, constructional details, change, effects of various machine parameters in production and quality of sliver. Checking the quality of sliver. Calculations pertaining to card. Card dropping and wastes and their analysis including cleaning efficiency. Practice i checking the quality of lap; and sliver, methods of rectifying defects there in. calculation pertaining to card gearing.

T. study different card room accessories. Speeds and setting of card for processing cotton and man-made fibres, maintenance schedule of card.

### 4TE8A Weaving Practical – II

hrs/week-4

Max marks-100

Secondary motion take –up & Let off motion . Speed calculation & \* production 5 wheel & 7 wheel take –up, motion. Warp protecting motion side & centre weft fork motion. Sectional warping m/c passage & Road speed calculation, Negative climax dobbling & eules drop box.

### 4TE9A Fabric Designing Practical

hrs/week-2

Max marks-50

Basic principles of woven fabric analysis and estimation of data for cloth reproduction. Recognition of fabric and yarns and materials used in their construction, weave analysis, sett, cover factor count and weight calculations for single and compound woven structures. Specifications for standard woven fabric.

### 4TE10A Applied Mechanics Lab

hrs/week-2

Max marks-50

1. To perform Tensile test
2. To perform Compression test
3. To perform Bending test on UTM.
4. To perform Torsion test
5. To perform Hardness test
6. To study of Fatigue testing machine.
7. Verify Bernoulli's theorem.
8. Determine flow rate of water by venturi meter
9. Determine flow rate of water by orifice meter
10. Determine head loss of given length of pipe.

### 4TE 11A Application of Electronics & Microprocessor in Textile Machines Practical

hrs /week-2

Max marks-50

Study of CRO  
Study of Lab components  
Study of VI characteristics of DIODE  
Study of VI Characteristics of Zener Diode  
Study of VI Characteristics of Transistor in CB Configuration.  
Study of VI Characteristics of FET SCR.  
Study of OpAmp in Inverting Mode  
Study of OpAmp of non-inverting mode  
Study of OpAmp as Adder, Subtractor, Integrator, Differentiator  
Study of working of Data Acquisition System  
Study of LVDT  
Study of VI Characteristics of RTD, Thermistor  
Study of Stain gauge.

### 4TEDC Discipline & Extra Curricular Activities

Max marks-50

# FIFTH SEMESTER

## B. TECH. (Textile Engineering)

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Combing</b> <ul style="list-style-type: none"> <li>• Object of combing</li> <li>• Systems of lap preparation</li> <li>• Study of various lap preparation systems -sliver lap, ribbon lap and supper-lap machines .</li> <li>• Configuration of fibre feed and its effect on the quality of product, noil percentage and fractionation efficiency of comber</li> </ul>
II	<b>Comber</b> <ul style="list-style-type: none"> <li>• Types of combers</li> <li>• Detailed study of the old and modern comber</li> <li>• Timing and setting of comber for different classes of cotton</li> <li>• Control of comber waste</li> </ul>
III	<ul style="list-style-type: none"> <li>• Calculation pertaining to draft, production and noil percentage</li> <li>• Introduction to the recent developments in combing and simplex. Changes in design of comber and simplex</li> </ul>
IV	<b>Speed frame</b> <ul style="list-style-type: none"> <li>• Objects of speed frame</li> <li>• Conventional and modern roving processes</li> <li>• Mechanisms involved in drafting, twisting and winding</li> <li>• Basic principles of designing of essential mechanisms of simplex</li> <li>• Differential motions and their working principles</li> <li>• Building motions, their objects and types, working principle of English type builder motions</li> <li>• Drafting systems (Ordinary and high draft)</li> </ul>
V	<ul style="list-style-type: none"> <li>• Processing parameters for different materials.</li> <li>• Common defects in roving packages, their causes and remedies</li> <li>• Calculations pertaining to gearing, constants, drafts, tpi and production</li> <li>• Twist multiplier and roving twist</li> <li>• Introduction to the changes to be made on roving frame to run man-made fibers.</li> </ul>
Books & Author's	<b>Cotton Ring Spinning</b> GR Merrill <b>Cotton Spinning</b> WS Taggart <b>Manual of Cotton Spinning</b> DeBarr & Catling <b>Process Control in Spinning</b> ATIRA <b>Essential Elements of Practical Cotton Spinning</b> TK Pattabhiram <b>Textile Mathematics</b> JE Booth <b>Cotton Ginning, Textile Progress Vol.24 No.2</b> I Doraiswamy, P <b>Chellamani</b> <b>Spun Yarn Technology</b> Eric Oxtoby <b>The Technology of Short Staple Spinning Part-I,II,III &amp; IV</b> W Klein <b>Spinning of Manmade &amp; Blends on Cotton System</b> KR Salhotra

### Mechanisms of Fabric Manufacture –III

[5TE2A]

Class B. TECH. (Textile Engineering)	Evaluation
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Jacquard shedding</b> <ul style="list-style-type: none"> <li>• Classification of jacquards</li> <li>• Single Lift Single Cylinder, Double Lift Single Cylinder, Double Lift Double Cylinder</li> <li>• Shed forming element, drive &amp; timing of above Machine</li> </ul>
II	<ul style="list-style-type: none"> <li>• Self twilling, pressure harness, cross border jacquard, card cutting operation for mechanical jacquard</li> <li>• Electrical jacquard</li> <li>• electronic jacquard</li> <li>• Warp stop motion &amp; its setting</li> </ul>
III	<b>Terry weaving</b> <ul style="list-style-type: none"> <li>• Essential feature of terry weaving loom</li> <li>• Various principle of terry pile formation</li> <li>• Terry let- off-heading , fringing-motion</li> <li>• Modern development in terry structure</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Automatic weft replacement device on loom</li> <li>• Pirn changing</li> <li>• Shuttle changing</li> <li>• setting &amp; timing of above mech.</li> </ul>
V	<ul style="list-style-type: none"> <li>• Basic concept of Unifil loom winder</li> <li>• Basic concept of Bobbine lodder</li> <li>• Introduction to shuttleless weaving machine, projectile, rapier with reference to picking</li> </ul>
Books & Author's	<b>Principles of Weaving</b> <b>Weaving Mechanism</b> <b>Weaving Mechanism</b> <b>Fancy Weaving</b> <b>Woven Fabric Production – I, II</b> <p style="text-align: right;"> <b>R Marks &amp; ATC Robinson</b>  <b>T. FOX</b>  <b>Talukdar, Azgaonkar &amp; Sriramulu</b>  <b>K. T. Ashwini</b>  <b>NCUTE Publications</b> </p>



<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject										
I	<b>Polymers</b> <ul style="list-style-type: none"> <li>• Defination of polymer, Classification of polymers, Different kinds of polymer materials, Fibrous polymers and their Morphology.</li> <li>• Molecular weight of polymer molecule, different types of molecular weight averages , Polydispersity, Molecular weight measurement methods.</li> <li>• Concept of micro-structure of chain molecules, crystallinity, orientation</li> </ul>										
II	<ul style="list-style-type: none"> <li>• Basic principle of fluid flow during fibre spinning</li> <li>• Introduction to Melt spinning. melt spinning variables and conditions for continuous spinning.</li> </ul>										
III	<ul style="list-style-type: none"> <li>• Introduction to solution spinning processes and process variables, preparation of the dope and process of dry spinning, preparation of the spinning solution and process of wet spinning, coagulation</li> <li>• Comparative study of spinning processes.</li> </ul>										
IV	<b>Post extrusion processes</b> <ul style="list-style-type: none"> <li>• Introduction of spin finish, functions of spin finishes, properties of spin finishes, spin finish components, methods of spin finish application, spin finish for staple fibres, filaments, yarns and other processes, problems associated with the use of spin finish.</li> </ul>										
V	<b>Drawing and setting process</b> <ul style="list-style-type: none"> <li>• Introduction to drawing, drawing machines, the drawing behaviour of thermoplastic fibres, influence of drawing on structure and properties of fibres, draw warping.</li> <li>• Introduction to heat setting, nature of set, heat setting behaviour of polyamide and polyester fibres, measurement of degree of set.</li> </ul>										
<b>Books &amp; Author's</b>	<table border="0"> <tr> <td><b>Textile Yarn</b></td> <td><b>Martindle and Goswami</b></td> </tr> <tr> <td><b>Man Made Fibres</b></td> <td><b>RW Moncrieff</b></td> </tr> <tr> <td><b>Man Made Fibre; Science &amp; Technology</b></td> <td><b>F Mark, M Atlas &amp; E Cernia</b></td> </tr> <tr> <td><b>Polyester Fibres Chemistry and Technology</b></td> <td><b>Harman Ludewig</b></td> </tr> <tr> <td><b>Synthetic Fibres</b></td> <td><b>Vaidya</b></td> </tr> </table>	<b>Textile Yarn</b>	<b>Martindle and Goswami</b>	<b>Man Made Fibres</b>	<b>RW Moncrieff</b>	<b>Man Made Fibre; Science &amp; Technology</b>	<b>F Mark, M Atlas &amp; E Cernia</b>	<b>Polyester Fibres Chemistry and Technology</b>	<b>Harman Ludewig</b>	<b>Synthetic Fibres</b>	<b>Vaidya</b>
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<b>Synthetic Fibres</b>	<b>Vaidya</b>										

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>MECHANISMS AND MACHINES</b> <ul style="list-style-type: none"> <li>Introduction, Mechanism and machine, Rigid and Resistant body, Link, Kinematics pair, Types of motion, Degrees of Freedom (Mobility), Classification of Kinematics pairs, kinematics Chain, Linkage, Mechanisms, Kinematics Inversion, Inversions of Slider-Crank Chain, Double Slider-Crank Chain, Problems.</li> </ul>
II	<b>BELTS, ROPES &amp; CHAINS :</b> <ul style="list-style-type: none"> <li>Introduction, Belt and Rope Drives, Open and Crossed Belt Drives, Velocity Ratio, Slip, Materials for Belts and Ropes, Law of Belting, Length of Belt, Ratio of Friction Driving Tensions, Power Transmitted, Centrifugal, Effect on Belts, Minimum power Transmitted by a Belt, Initial Tension, Creep, Chains, Chain length, Angular speed Ratio, Classification of Chains.</li> </ul>
III	<b>GEARS &amp; GEAR TRAINS:</b> Introduction, Classifications of gears, gear terminology, law of gearing, velocity of sliding, introduction to Helical, Spiral, Worm gear, Bevel gears, simple, compound and epi-cyclic trains, study of epi-cyclic gear train used in speed train, carding and comber.
IV	<b>CAMS:</b> <ul style="list-style-type: none"> <li>Introduction, Types of Cams, Types of followers, Cam Terminology, Displacement Diagrams, Motions of the Follower, Graphical Construction of Cam profile.</li> </ul>
V	<b>Balancing:</b> Static & dynamic Balancing of rotary masses, balancing of rotating masses in one & different plane, balancing of reciprocating , masses.
<b>Books &amp; Author's</b>	<b>THEORY OF MACHINES</b>  <b>S.S.RATAN R.S. KHURAMI RAO, J,S BALANY</b>

## ELECTIVES

### PRACTICAL APPLICATION OF STATISTICS

[5TE6.1A]

[Common with 5TC6.1 5TT6.1]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Sampling and Estimation</b> <ul style="list-style-type: none"> <li>Repeated Sampling, the mean and variance of a function of random variables, linear functions</li> <li>The central- limit theorem, sampling distribution of the mean</li> <li>The Chi-square test. Point estimates, interval estimation, confidence limit</li> </ul>
II	<b>Some standard significance tests</b> <ul style="list-style-type: none"> <li>Test for a single mean</li> <li>Large sample available the significance level</li> <li>The interpretation of significance test, single- tail test</li> <li>The interpretation of significance test, double tail test</li> <li>Error and the choice of the sample size</li> <li>Test for a single mean: small sample available</li> <li>Test for the difference between two means :independent sample</li> <li>Test for the difference between two means: matched sample</li> <li>Test for the difference between two variances</li> </ul>
III	<b>Probability</b> <ul style="list-style-type: none"> <li>Definition of probability</li> <li>Introduction to geometrical, Binomial, Poission and normal distribution</li> </ul> <b>Analysis of ranking data</b> <ul style="list-style-type: none"> <li>Rank co-relation</li> <li>Coefficient of concordance</li> </ul>
IV	<b>Quality control</b> <ul style="list-style-type: none"> <li>Control charts</li> <li>Action and warning limits</li> <li>The interpretation of control chart</li> <li>Control charts for defectives</li> <li>Control charts for defects</li> <li>Control charts for averages</li> </ul>
V	<b>Analysis of variance</b> <ul style="list-style-type: none"> <li>An introduction</li> <li>The design of experiments , random variation in experiments</li> <li>The test of significance</li> <li>The ANOVA table case (a) comparison with a control (b) Global comparisons</li> <li>Tukey's procedure, differences among treatments and Blocks</li> </ul> <b>Linear regression</b> <ul style="list-style-type: none"> <li>Relation between variables</li> <li>Fitting a straight line</li> <li>Variation about the regression line</li> </ul>
<b>Books &amp; Author 's</b>	<b>Statistics for Engineers</b> <b>Statistics</b> <b>Mathematical Statistics</b> <b>Business Statistics</b> <b>Theory &amp; Problems of Probability &amp; Statistics</b> <p style="text-align: right;"> <b>William Mandenhall</b>  <b>N. L. Garg and S. G. Sharma</b>  <b>Ray &amp; Sharma</b>  <b>Gupta &amp; Gupta</b>  <b>Murray P Spiegel</b> </p>



**FINANCE, MATERIAL AND HUMAN RESOURCE MANAGEMENT****[5TE6.2A]****[Common with 5TC6.2,5TT6.2]**

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	Accounting procedure: Definition of accounting, book keeping and accounting, Double Entry book keeping and financial statement Meaning and Importance of double entry book-keeping, Accounting principles, accounting conventions. Specimen and purpose of balance sheet, Trading and Profit and Loss Account. Presentation of cash flow statements and its benefits. Journal and ledger rules.
<b>II</b>	Financial Management: Objectives and scope, sources of finances.  Capital Structure: Meaning: Essentials of an ideal/optimum Capital Structure, Difference between capital, Capitalisation and Capital Structure.
<b>III</b>	Management of Working Capital: Definition; Nature Classification of Working Capital – (i) Permanent working Capital and (ii) Variable Working Capital; Factors affecting requirement of working capital.
<b>IV</b>	Personal Management and HRD. Job Analysis: Meaning and Importance; Processes of Job Analysis. Job Description and Job Specification.
<b>V</b>	Materials Management: Definition and Objectives: Inventory Management.  Inventory Control: Techniques of Inventory control- ROL, FOR Value Analysis, ABC Analysis, VED Analysis; Factors affecting Inventory Control, Ordering Costs, Carrying
<b>Books &amp; Author's</b>	<b>Strategies of Developing Human Resource</b> <span style="float: right;"><b>T. V. Rao</b></span>

## PRACTICALS

### 5TE7A SPINNING PRACTICAL- III

hrs/week-4

Max marks-100

Practice in handling, operations, setting and gauging draw frame. Lap former and comber. Study of constructional details of machines; various controls, change places, etc. Practice in checking the quality of comber lap, sliver and waste analysis; common faults and remedies. Calculations pertaining to gearing: speeds, constants, drafts and production etc.

Study features of modern drafting system in draw frame Cots mounting and buffing. Waste control at comber, maintenance schedules of draw-frame and comber

### 5TE8A WEAVING PRACTICAL - III

hrs/week-4

Max.marks-100

Practice in handling and operating beam and sectional warping machine and slasher sizing machine. Practice in drawing in of warp threads. Practice in handling and operating machine.

Practice in handling and operating loom fitted with dobby, jacquard, drop-box and automatic looms. Calculations pertaining to above mentioned machines.

### 5TE9A TEXTILE TESTING PRACTICAL - I

hrs/week-2

Max marks-50

Measurement of fiber length and its distribution, fineness, maturity, moisture content and strength using conventional methods and instruments. Fibre diameter and its variability, Measurement of Hank of sliver roving, and count of yarn and their variability. Single yarn strength and elongation, lea strength measurement by conventional instruments. Twist of yarn. Crimp of fabric. Use of statistical techniques for evaluation of experimental results.

### 5TE10A THEORY OF MACHINE LAB.

hrs/week-2

Max marks-50

1. To study inversion of four bar chain
  - Coupling Rod
  - Beam Engine
  - Steering Mechanism
2. To study of quick return mechanism (Crank and Slotted lever mech.).
3. To study of inversion of double slider chain,
  - Oldham Coupling
  - Scotch Yoke
4. To study of various cam-follower arrangements.
5. To determine co-efficient of friction.
6. To perform static and dynamic balancing on balancing set up.
7. To determine mass moment of inertia of a flywheel.
8. To study of a lathe gear box.
9. To study of a sliding mesh automobile gear box.

### 5TE11A PROFESSIONAL ETHICS & DISASTER MANAGEMENT

hrs/week-2

Max marks-50

### 5TEDC Discipline and extra Curricular activity

Max marks-50

# SIXTH SEMESTER

## B. TECH. (Textile Engineering)

## Mechanisms of Yarn Manufacture-IV

[6TE1A]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<p><b>Objective of ring frame</b></p> <ul style="list-style-type: none"> <li>Principle and mechanism involved in drafting, twisting and winding</li> <li>Ordinary and high draft systems</li> </ul> <p><b>Yarn twist</b></p> <ul style="list-style-type: none"> <li>Terminology, twist levels</li> <li>Concept of twist multiplier</li> <li>Propagation of twist</li> <li>Yarn contraction due to twisting</li> </ul>
II	<p><b>Types of build</b></p> <ul style="list-style-type: none"> <li>Builder motions warp, filling and combined builds for common package sizes</li> <li>Limitations to large package spinning</li> <li>Types of rings and travelers and their common uses</li> <li>Design of various essential mechanisms of ring spinning</li> <li>Balloon control rings, living rings</li> </ul>
III	<ul style="list-style-type: none"> <li>Systems of waste collection at ring frame and types of spinning wastes</li> <li>Limitations in ring spinning and factors responsible for loss in efficiency</li> <li>Introduction to the recent developments in ring spinning</li> <li>Calculations pertaining to gearing, constants, drafts and production of ring frame</li> <li>Concepts of average mill count and 20's conversion</li> <li>Reason and remedies of end breaks on ring- frame</li> <li>Changes to be done in ring frame to run man-made fibre</li> </ul>
IV	<p><b>Objects of doubling</b></p> <ul style="list-style-type: none"> <li>System of doubling(dry and wet)</li> <li>Study of ring doublers</li> <li>Two for one twister</li> <li>Reasons and remedies of end breaks in doubling frame</li> <li>Calculations pertaining to gearing constants and production</li> </ul> <p><b>Fancy yarns</b></p> <ul style="list-style-type: none"> <li>Objects and production of fancy yarns</li> <li>Ply cable and core spun yarns</li> <li>Sewing threads and tyre cords</li> </ul>
V	<p><b>Objects of yarn reeling and doubling</b></p> <ul style="list-style-type: none"> <li>Types of reeling</li> <li>construction and working of reel</li> <li>Yarn bundling</li> <li>Package defects, Yarn faults and their remedies</li> </ul>
<b>Books &amp; Author's</b>	<p><b>Spun Yarn Technology</b> Eric Oxtoby  <b>The Technology of Short Staple Spinning Part-I,II,II &amp; IV</b> W Klein  <b>Spun Yarn Technology</b> A.Venkatsubramaniam</p>

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Mechanics of Scutcher and Speed frame</b> <ul style="list-style-type: none"> <li>• Designing of cone drums for scutcher and speed frame</li> <li>• Roller weighting at different stages of spinning</li> <li>• Inertia of a carding machine</li> <li>• Epicyclic wheel trains used in textile machinery</li> <li>• Differential motion used in speed frames</li> </ul>
II	<b>Mechanics of Spinning Machine</b> <ul style="list-style-type: none"> <li>• The physics and theory of spinning balloons</li> <li>• Yarn tension in ring spinning</li> <li>• Power requirements for operating various motions and for machines as a whole, at various stages of spinning</li> </ul>
III	<b>Mechanics of winding</b> <ul style="list-style-type: none"> <li>• Winding rate, relationship between bobbin diameter and winding rate, relationship between bobbin diameter and spindle speed</li> <li>• Angle of wind and coil angle, Wind and traverse ratio</li> <li>• Drum-driven packages, develop the surface of cheeses</li> <li>• Gain in winding, linear gain, revolution gain</li> <li>• Cone-winding</li> </ul> <b>Tension in winding</b> <ul style="list-style-type: none"> <li>• Tension generators to control yarn tension</li> <li>• Yarn tension and its measurement</li> </ul>
IV	<b>Mechanics for Textile Machine</b> <ul style="list-style-type: none"> <li>• Warp tension and its measurement</li> <li>• Simple harmonic motion, displacement, velocity and acceleration</li> <li>• Determination of Tappet lift</li> <li>• Design of cam and tappet profile for textile machinery</li> <li>• Velocity of shuttle during acceleration and retardation, calculation for velocity of shuttle</li> </ul>
V	<b>Mechanics for Weaving Machine</b> <ul style="list-style-type: none"> <li>• An expression for sley eccentricity</li> <li>• Kinematics of sley I, e. displacement, velocity and acceleration of sley sword pin, Force, torque, power required to drive the sley</li> <li>• Kinematics of sedding i.e. an expression for shed opening at shuttle front</li> <li>• Power requirements for operation of various motions and for machine a whole, at various stages of weaving</li> </ul>
<b>Books &amp; Author's</b>	<b>Textile Mathematics Vol. I. II. III</b> <b>Principles of Weaving</b> <b>Publications on Weaving Mechanism</b> <p style="text-align: right;"> <b>J.E. Booth</b>  <b>R Marks &amp; ATC Robinson</b>  <b>Prof. G. S. Bhargava</b> </p>

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject		
I	<b>Mechanical behavior of textiles</b> <ul style="list-style-type: none"> <li>• Terms and definitions, expressing the results, quantities and units</li> <li>• Introduction to visco-elasticity, creep and relaxation phenomenon</li> <li>• Mechanical conditioning and recovery properties of textile</li> </ul>		
II	<b>Experimental methods</b> <ul style="list-style-type: none"> <li>• Principle of CRL, CRT and CRE type</li> <li>• Tensile testing machines- various Instruments</li> <li>• Factors affecting the results of tensile experiments</li> <li>• Evaluation and interpretation of tensile experiments</li> <li>• Evaluation and interpretation of tensile test results</li> <li>• Tension winding test for yarns</li> </ul>		
III	<b>Fabric strength testing</b> <ul style="list-style-type: none"> <li>• Tensile, tearing and bursting strength tests</li> <li>• Principle and operation of equipment, fabric bending, shearing and draping properties: terminology, quantities and units, Experimental method</li> </ul>		
IV	<b>Evenness testing of yarns</b> <ul style="list-style-type: none"> <li>• Nature and cause of irregularities</li> <li>• Principle and methods of evenness testing ,evaluation and interpretation</li> </ul>		
V	<b>Yarn faults</b> <ul style="list-style-type: none"> <li>• Classification</li> <li>• Measurement</li> <li>• Causes and their remedies</li> </ul>		
Books & Author's	<table> <tr> <td> <b>Principles of Textile Testing</b>  <b>Handbook of Textile Testing &amp; Quality Control</b>   <b>Physical Properties of Textile Fibres</b>  <b>Textile Fibres, Yarns and Fabrics</b>  <b>Textile Testing</b>  <b>Physical Testing of Textiles</b> </td> <td> <b>JE Booth</b>  <b>Elliot B Grover &amp;</b>  <b>DS Hamby</b>  <b>WE Morton &amp; JWS Hearle</b>  <b>ER Kaswell</b>  <b>JH Skinkle</b>  <b>B P Savelle</b> </td> </tr> </table>	<b>Principles of Textile Testing</b> <b>Handbook of Textile Testing &amp; Quality Control</b>  <b>Physical Properties of Textile Fibres</b> <b>Textile Fibres, Yarns and Fabrics</b> <b>Textile Testing</b> <b>Physical Testing of Textiles</b>	<b>JE Booth</b> <b>Elliot B Grover &amp;</b> <b>DS Hamby</b> <b>WE Morton &amp; JWS Hearle</b> <b>ER Kaswell</b> <b>JH Skinkle</b> <b>B P Savelle</b>
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Class B. TECH. (Textile Engineering)	Evaluation
Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Introduction of Wet Processing</b> <ul style="list-style-type: none"> <li>• Impurities in raw cotton, wool and silk.</li> <li>• Adventitious impurities in Grey fabrics made out of cotton, wool and silk.</li> <li>• Elementary knowledge of processing.</li> <li>• Objects of different processes involved e.g., singeing, desizing, scouring, bleaching.</li> </ul>
II	<b>Pretreatments:</b> <ul style="list-style-type: none"> <li>• Processing sequence in conversion of Grey cotton goods into semi bleached, full bleached and color bleached fabrics</li> <li>• Chemical used in these processes</li> <li>• Introductory knowledge of machinery used in scouring and bleaching of cotton fabric</li> </ul>
III	<b>Dyeing:</b> <ul style="list-style-type: none"> <li>• General method of dyeing by important classes of dyes on natural and man-made fibers e.g., direct, acid, basic, vat, azoic, sulphur and disperse dyes</li> <li>• Chemicals/auxiliaries used in dyeing</li> <li>• Introductory knowledge of dyeing machines</li> </ul>
IV	<b>Printing:</b> <ul style="list-style-type: none"> <li>• Introduction to various methods of printing of textiles, instruments and machinery used</li> <li>• Introduction to various styles of printing viz. direct, discharge, resist etc.</li> </ul>
V	<b>Finishing:</b> <ul style="list-style-type: none"> <li>• Object of finishing and application of various type of finishes</li> <li>• Elementary knowledge of finishing machines</li> </ul>
Books & Author's	<b>Technology Of Dyeing</b> <b>Chemical Technology of Fibrous Materials</b> <b>Textile Processing and properties</b> <b>Dyeing and Chemical Technology of Fibres</b> <p style="text-align: right;">V. A. Shehnai, Vol. 6 Sadov Vigo E.R. Trotman</p>

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	Manufacturing aspects in Design: Selection of manufacturing processes on the basis of design and economy, Influence of rate of production, standard size, Influence of limits, fits tolerances and surface finish. Change in the shape of the designed element to facilitate its production. Fatigue Considerations in Design: variable load, loading pattern, Endurance stresses and influence of size, surface finish, notch sensitivity & stress concentration. Goodman line method, Soderberg method, Design of machine members subjected to combined, steady and alternating stresses.
<b>II</b>	Materials: Properties and IS coding of various materials, Selection of material from properties and economic aspects. Design of members in Bending: Beams, levers and springs. Design of members in torsion Shafts and shaft couplings.
<b>III</b>	Design of machine elements subjected to direct stress; Knuckle Joints, Riveted joints, Welded joints.
<b>IV</b>	Design of belt, rope and chain, pulley drive system, selection of chain & sprocket drive systems.
<b>V</b>	Design of spur gear, Design of Screw fastening. Design of power screws: lead screw and screw jack.
<b>Books &amp; Author's</b>	<b>Machine Design R. S. KHURAMI , P. C. SHARMA &amp; AGRAWAL, SIGLORY</b>



**ELECTIVES**

**KNITTING TECHNOLOGY**

[6TE6.1A]

[Common with 6TC6.1, 6TT5]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>		
<b>I</b>	<ul style="list-style-type: none"> <li>• Definition of Knitting</li> <li>• Knitted fabrics</li> <li>• General description of knitting machines (Flat and Circular and their classification)</li> <li>• Differences between woven and knitted fabric properties</li> </ul>		
<b>II</b>	<ul style="list-style-type: none"> <li>• Type of different needles used in knitting process (Latch, Beard and Compound).</li> <li>• Knitting cycles</li> <li>• Classification of weft knitting machines</li> <li>• Basic weft knitted structures (Plain, Rib, Interlock, Purl). Their properties</li> </ul>		
<b>III</b>	<ul style="list-style-type: none"> <li>• Circular machine used for plain knitted fabrics</li> <li>• Rib and Interlock double jersey</li> <li>• Purl knitting machine along with knitting cycle, design of cams</li> </ul>		
<b>IV</b>	<ul style="list-style-type: none"> <li>• Classification of warp knitting machines</li> <li>• Description of Raschal and Tricot machines</li> <li>• Knitting cycle of these machines</li> </ul>		
<b>V</b>	<ul style="list-style-type: none"> <li>• Knitting geometry</li> <li>• Knit, Tuck and Float Stitches, their formation in machine and applications</li> <li>• Derivatives and ornamentation of weft knitted fabrics</li> <li>• Knitted fabric faults, their causes and remedies</li> </ul>		
<b>Books &amp; Author's</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <b>Knitting Technology</b>  <b>Warp Knitting Production</b>  <b>Knitting Technology</b> </td> <td style="width: 50%; border: none;"> <b>Ajgaonkar</b>  <b>S Ray, Melliand</b>  <b>David J Spencer</b> </td> </tr> </table>	<b>Knitting Technology</b> <b>Warp Knitting Production</b> <b>Knitting Technology</b>	<b>Ajgaonkar</b> <b>S Ray, Melliand</b> <b>David J Spencer</b>
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<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>								
I	<ul style="list-style-type: none"> <li>• <b>Production and Operations Management</b> – Introduction history, Production system, functions of production planning and control, production and process planning, production control.</li> <li>• <b>Patents &amp; copyright:</b> Introduction to patent laws; GATT, IPR, TRIPS .</li> </ul>								
II	<ul style="list-style-type: none"> <li>• <b>Routing, sequencing, loading, scheduling</b> – master scheduling – short term scheduling – Johnson method.</li> </ul>								
III	<ul style="list-style-type: none"> <li>• <b>Demand forecasting</b> – product life cycle, demand forecasting techniques: judgmental, Delphi, time series analysis, regression &amp; correlation, exponential smoothing.</li> </ul>								
IV	<ul style="list-style-type: none"> <li>• <b>Inventory management</b> – inventory costs, inventory management systems, inventory models-classical EOQ model, EOQ with price breaks, EOQ model for production runs, EOQ with shortage stock, ABC analysis.</li> </ul>								
V	<ul style="list-style-type: none"> <li>• <b>Network analysis</b> – drawing of network, errors in network critical path, cost aspects in network, crashing, PERT analysis.</li> <li>• <b>Japanese management techniques:</b> total quality emphasis TQM waste reduction, value – added manufacturing, KANBAN, push v/s pull systems, flexible manufacturing</li> </ul>								
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## PRACTICALS

### 6TE7A SINNING PRACTICAL IV

hrs/ week-4

Max marks-100

Practice in handling, operations, setting and gauging draw frame. Lap former and comber. Study of constructional details of machines; various controls, change places, etc. Practice in checking the quality of comber lap, sliver and waste analysis; common faults and remedies. Calculations pertaining to gearing: speeds, constants, drafts and production etc.

Study designs of a modern drafting systems at speed frame and ring frame. Design of spindle, ring and traveller, setting, speeds for processing man-made fibre as speed frame, ring frame. Maintenance schedule of speed frame, ring frame, doublers.

### 6TE8A WEAVING PRACTICAL IV

hrs/week-4

Max.marks-100

Jacquard shedding , automatic cap & shuttle change mechanism, Jacquard card cutting warping machine-drive, traverse, beaming brake mechanism. Calculation of speed & production.

### 6TE9A TEXTILE TESTING PRACTICAL - II

hrs/week-2

Max marks - 50

Use of microscopes for testing of yarns for appearance, and diameter. Measurement of evenness by conventional and modern testing instruments. Classification of yarn faults, hairiness of yarn interpretation of results and construction of X& R Charts.

Fabric testing for dimensions, construction, weight, thickness, stiffness, crease, drape, busting, cover, shrinkage and air permeability.

Strength testing of fibre, yarn fabric using modern instruments.

Fabrics testing for load elongation, tensile, bursting and tearing strength , abrasion, flexural rigidity, crease recovery and draping qualities of fabrics.

### 6TE10A TEXTILE CHEMICAL PROCESSING LAB

hrs/week - 2

Max marks-50

Pre-treatments such as desizing, scouring and bleaching. Dyeing of cotton, wool, silk and rayon fibres.

### 6TE11A Machine Design Lab

hrs/week-2

Max marks-50

1. Selection of materials and IS Coding.
2. Selecting fit and assigning tolerance.
3. To study splines and coupling.
4. To study different types of joints.
5. Springs, Beams and Shafts under static and fatigue loading.

### 6TEDC Discipline and extra Curricular activity

Max marks-50

# SEVENTH SEMESTER

## B. TECH. (Textile Engineering

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<ul style="list-style-type: none"> <li>• Causes leading to the advent of unconventional systems of spinning</li> <li>• Classification of unconventional methods of yarn production</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>• Mechanism of yarn formation on rotor spinning</li> <li>• Effect of rotor machine variables and fibre properties on the properties of rotor spun yarns</li> <li>• Designing features of opening roller and rotor assembly</li> <li>• Limitation of rotor spinning</li> <li>• Advances in rotor spinning</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>• Study of other open-end spinning systems</li> <li>• Friction spinning</li> <li>• Designing aspects of feed device, opening roller and spinning drum</li> <li>• Electrostatic spinning</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li>• Mechanism of yarn formation on Air-jet spinning</li> <li>• Designing aspects of nozzles</li> <li>• Structure, properties and end uses of yarns spun on Air-jet spinning</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>• Principle of wrap spinning</li> <li>• Twist less spinning</li> <li>• Self-twist spinning</li> <li>• Compact spinning</li> <li>• Ring spinning</li> <li>• Structure, properties and end uses of these yarns</li> <li>• Potential and limitations of various spinning technologies</li> </ul>
<b>Books &amp; Author's</b>	<p><b>Spinning in 70's</b>  <b>Spun Yarn Technology</b>  <b>Short Staple Spinning</b>  <b>Textile Research Journal</b>  <b>Journal of Textile Institute</b>  <b>Textile Progress</b></p> <p><b>PR Lord</b>  <b>E Oxtoby</b>  <b>W Klein</b></p>

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3 Practical : 4	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>										
I	<p><b>Projectile Weaving Machine</b></p> <ul style="list-style-type: none"> <li>• Basic principle of projectile weaving machine</li> <li>• Sequence of weft insertion i.e.: weft supply system, feeding of yarn to projectile</li> <li>• Toggle-Torsion bar picking mechanism</li> <li>• Cam driven shedding (Rotatory dobby, card cutting, card reading, card welding and card pasting)</li> <li>• Double cam Beat-up</li> <li>• Weaving machine timing</li> </ul>										
II	<p><b>Air-jet Weaving Machine</b></p> <ul style="list-style-type: none"> <li>• Principle of weft insertion</li> <li>• Sequence of weft insertion i.e.: weft supply system, feeding of yarn to main nozzle</li> <li>• Picking mechanism</li> <li>• Problems in air-jet weaving machine, its remedies by machine design like relay nozzles, confusers &amp; profile reed and suction</li> <li>• Design of nozzle. Nozzle parameters affecting characteristics of air-jet</li> <li>• Quality of air required</li> <li>• Weaving machine timings</li> <li>• Air drag force, factors affecting air drag force</li> <li>• Blowing sequence of relay nozzles and timing control</li> </ul>										
III	<p><b>Water-jet Weaving Machine</b></p> <ul style="list-style-type: none"> <li>• Principle of weft insertion</li> <li>• Path of yarn on weaving machine</li> <li>• Sequence of weft insertion i.e.: weft supply system, feeding of yarn to main nozzle</li> <li>• Picking mechanism, Nozzle pump design. Problems encountered</li> <li>• Drying of fabric on weaving machine</li> <li>• Quality of water required</li> </ul>										
IV	<p><b>Rapier Weaving Machine:</b></p> <ul style="list-style-type: none"> <li>• Classification of rapier Weaving Machine</li> <li>• System of weft insertion and number of rapiers.</li> <li>• Sequence of weft insertion i.e.: weft supply system, feeding of yarn to rapier</li> <li>• Picking mechanism</li> <li>• Driving mechanism for flexible and rigid rapiers</li> <li>• Weaving machine timing, Velocity and time calculations</li> </ul>										
V	<p><b>Multiphase Weaving Machine</b></p> <ul style="list-style-type: none"> <li>• Principle and Classification, Warp-wise and weft wise multiphase looms</li> <li>• Different methods of shedding, Picking and beat-up picking mechanism</li> <li>• Advantages and disadvantages</li> <li>• Circular Multiphase Weaving Machine</li> <li>• Positive let-off mechanisms like, Electronic let off, their advantages</li> <li>• Positive continuous take up mechanisms like Sulzer take-up, Picanol take-up and their advantages</li> <li>• Different selvages: Tucked-in, leno, fused. Their mechanism of formation, their characteristics and uses</li> <li>• Modern developments in shuttle less weaving</li> </ul>										
<b>Books &amp; Author's</b>	<table border="0"> <tr> <td><b>Weaving</b></td> <td><b>Ormerod</b></td> </tr> <tr> <td><b>Weaving Mechanisms, Management</b></td> <td><b>Ajgaonkar etal.</b></td> </tr> <tr> <td><b>Weaving Mechanisma</b></td> <td><b>Duxbury</b></td> </tr> <tr> <td><b>Shuttleless Weaving</b></td> <td><b>Swaty</b></td> </tr> <tr> <td><b>Manual of Manufacturing Company</b></td> <td><b>SULZER, NISSAN</b></td> </tr> </table>	<b>Weaving</b>	<b>Ormerod</b>	<b>Weaving Mechanisms, Management</b>	<b>Ajgaonkar etal.</b>	<b>Weaving Mechanisma</b>	<b>Duxbury</b>	<b>Shuttleless Weaving</b>	<b>Swaty</b>	<b>Manual of Manufacturing Company</b>	<b>SULZER, NISSAN</b>
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<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<b>Yarn geometry</b> <ul style="list-style-type: none"> <li>• Idealized yarn geometry</li> <li>• Relationship of yarn number and twist factor</li> <li>• Actual structure of Ring, Rotor and Air-jet yarns</li> </ul>
II	<b>Packing of fiber in yarn</b> <ul style="list-style-type: none"> <li>• Ideal packing, hexagonal close packing and to other forms</li> <li>• Packing factor and its measurement</li> <li>• Yarn diameter</li> </ul>
III	<b>Methods of measurement of twist contraction</b> <ul style="list-style-type: none"> <li>• limit of twist</li> <li>• Fiber migration</li> <li>• Mechanism of migration</li> <li>• Condition for migration to occur</li> <li>• Frequency of migration</li> <li>• Migration in blended yarns</li> </ul>
IV	<b>Translation of fibers properties into yarn properties</b> <ul style="list-style-type: none"> <li>• Extension of continuous filament yarn for small strains and large strains</li> <li>• Prediction of breakage</li> </ul>
V	<b>Mechanics of staple fibre yarns</b> <ul style="list-style-type: none"> <li>• The practical and experimental studies</li> <li>• Mechanics of staple fibre yarns</li> <li>• Hambureger model and later modifications</li> <li>• Spin ability of and and torsional behavior of Fibres and yarns</li> </ul>
<b>Books &amp; Author's</b>	<b>Structural Mechanics of Fibre, Yarn, Fabrics</b> <b>JWS Hearle, P Grosberg &amp; S Backer</b> <b>Structure of Yarn</b> <b>Witold Zurek</b>

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject												
I	<ul style="list-style-type: none"> <li>Growth and production of man made fibres in the World and India.</li> <li>The method of manufacture and mechanism of polymerization techniques of polyesters and nylon. Manufacturing process of staple fibres and multi filament yarn. Their properties and application areas.</li> </ul>												
II	<ul style="list-style-type: none"> <li>The method of manufacture and mechanism of polymerization techniques of Acrylics, Mod-acrylics, polyolifins. Manufacturing process of staple fibres and multi filament yarn. Their properties and application areas.</li> </ul>												
III	<ul style="list-style-type: none"> <li>The methods of manufacture and production techniques of regenerated cellulosic fibres, viscose rayon and modified viscose rayons, properties and application areas.</li> </ul>												
IV	<ul style="list-style-type: none"> <li>Newly developed elastomeric and high performance fibres like lycra, aramids, ordered polymeric PBO, high density polyethylene like spectra .</li> </ul>												
V	<ul style="list-style-type: none"> <li>Principle of texturing, false twist texturing process and machines, process variables like temperature, twist, tension and time, structural geometry of textured yarn, draw texturing machines.</li> <li>Air jet texturing process and variables such as over feed, air pressure temperature and water content.</li> <li>Stuffer box crimping, gear crimping, knife edge crimping, hi-bulk acrylic yarns.</li> </ul>												
<b>Books &amp; Author's</b>	<table border="0"> <tr> <td><b>Man Made Fibres</b></td> <td><b>RW Moncrieff</b></td> </tr> <tr> <td><b>Man Made Fibre; Science &amp; Technology</b></td> <td><b>F Mark, M Atlas &amp; E Cernia</b></td> </tr> <tr> <td><b>Polyester Fibres Chemistry and Technology</b></td> <td><b>Harman Ludewig</b></td> </tr> <tr> <td><b>Journal of Applied Polymer Science</b></td> <td></td> </tr> <tr> <td><b>Manufactured Fibre Technology</b></td> <td><b>Gupta, Kothari</b></td> </tr> <tr> <td><b>Acrylic Fibres</b></td> <td><b>J.C.Masson</b></td> </tr> </table>	<b>Man Made Fibres</b>	<b>RW Moncrieff</b>	<b>Man Made Fibre; Science &amp; Technology</b>	<b>F Mark, M Atlas &amp; E Cernia</b>	<b>Polyester Fibres Chemistry and Technology</b>	<b>Harman Ludewig</b>	<b>Journal of Applied Polymer Science</b>		<b>Manufactured Fibre Technology</b>	<b>Gupta, Kothari</b>	<b>Acrylic Fibres</b>	<b>J.C.Masson</b>
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<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>														
I	Production Information: Production Information of the entire unit, product range and quantity.  Production Information systems : feeding and retrieval of data  Productivity Planning: Production Capacity and the productivity obtained from each machine. Analysis of the data and planning of production. Output of human resource: analysis and strategy.														
II	Production Planning: Study of market demand and supply analysis. Technology and product design for various textile products and forecasting future trends. Work study, method study and work measurement. Application of time study in a textile mill. Importance and use of snap study. TPM.														
III	Production planning in spinning and weaving: Plans for various counts and yarns, production rates, waste, efficiency level of m/c. Balancing of machines. Production rate, efficiency etc. for preparatory and weaving shed. Balancing of weaving machines. Preparation of weaving plan.														
IV	Concept of Total Quality: Quality Management systems as a means of achieving total quality. TQM.  Quality Management Systems: ISO 9000, quality policy, data, records and traceability, documenting the quality system, quality manual, quality audit, design and change control, ISO 9000 registration, ISO 14000.														
V	Linkage of Quality and Environment Management System: Strategic concern for environment, need for proper environment management systems and their economic implications, environment management systems, green products and strategies, environment assessment, environment protection.														
<b>Books &amp; Author's</b>	<table border="0"> <tr> <td><b>Operations Management : Strategy And Analysis</b></td> <td><b>Krajewski, Lee J, Ritzman &amp; Larry P</b></td> </tr> <tr> <td><b>Production and Operations Management</b></td> <td><b>Chary, S.N.</b></td> </tr> <tr> <td><b>Production and Operation Management</b></td> <td><b>Nair NG</b></td> </tr> <tr> <td><b>Production and Operation Management</b></td> <td><b>Chase, Aquilano and Jacobs</b></td> </tr> <tr> <td><b>Quality Management Handbook</b></td> <td><b>Walsh Oren</b></td> </tr> <tr> <td><b>ISO 14000 Guide: the new Environmental Management Standards</b></td> <td><b>Cascio Joseph</b></td> </tr> <tr> <td><b>ISO 9000</b></td> <td><b>Roopthery Brian</b></td> </tr> </table>	<b>Operations Management : Strategy And Analysis</b>	<b>Krajewski, Lee J, Ritzman &amp; Larry P</b>	<b>Production and Operations Management</b>	<b>Chary, S.N.</b>	<b>Production and Operation Management</b>	<b>Nair NG</b>	<b>Production and Operation Management</b>	<b>Chase, Aquilano and Jacobs</b>	<b>Quality Management Handbook</b>	<b>Walsh Oren</b>	<b>ISO 14000 Guide: the new Environmental Management Standards</b>	<b>Cascio Joseph</b>	<b>ISO 9000</b>	<b>Roopthery Brian</b>
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**ELECTIVES**

**COMPLEX TEXTILES**

[7TE6.1A]  
[Common with 7TT6.1]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>														
I	<ul style="list-style-type: none"> <li>Gauge and leno structure with their mechanism</li> <li>Madras Muslin structures</li> </ul>														
II	<ul style="list-style-type: none"> <li>Type of Carpets and classification, Hand knitted carpets, tufted Carpets, Knitted Carpets, Stitch Bonded Carpets, Electrostatic flocking Carpets</li> </ul>														
III	<ul style="list-style-type: none"> <li>Some common fabrics like Lappets, Swivels, Ondule Fabrics, Tuck fabrics, woven pile fabrics produced by thermal shrinkage</li> </ul>														
IV	<ul style="list-style-type: none"> <li>Industrial fabrics especially kind of canvases, Belts, Parachute Fabrics and umbrella cloth. Lycra Fabric</li> </ul>														
V	<ul style="list-style-type: none"> <li>Narrow fabrics production methods and their calculation: Laces, bandage, ribbons and niwar. Introduction of non-woven fabrics, classification and uses</li> </ul>														
<b>Books &amp; Author's</b>	<table> <tr> <td><b>Watson's Textile Design &amp; color</b></td> <td><b>W Watson</b></td> </tr> <tr> <td><b>Watson's Advanced Textile Design</b></td> <td><b>W Watson</b></td> </tr> <tr> <td><b>Grammer of Textile Design</b></td> <td><b>Nisbet</b></td> </tr> <tr> <td><b>Narrow Fabric Weaving</b></td> <td><b>Verlag Sauerlander</b></td> </tr> <tr> <td><b>Process Control in Weaving</b></td> <td><b>AITRA</b></td> </tr> <tr> <td><b>Manual of Nonwoven</b></td> <td><b>R Krcma</b></td> </tr> <tr> <td><b>Nonwoven Fabric Technology</b></td> <td><b>M Mc Donald</b></td> </tr> </table>	<b>Watson's Textile Design &amp; color</b>	<b>W Watson</b>	<b>Watson's Advanced Textile Design</b>	<b>W Watson</b>	<b>Grammer of Textile Design</b>	<b>Nisbet</b>	<b>Narrow Fabric Weaving</b>	<b>Verlag Sauerlander</b>	<b>Process Control in Weaving</b>	<b>AITRA</b>	<b>Manual of Nonwoven</b>	<b>R Krcma</b>	<b>Nonwoven Fabric Technology</b>	<b>M Mc Donald</b>
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<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<b>Automation of manufacturing process :</b> <ul style="list-style-type: none"> <li>Automation, Evolution of automation, goal of automation, application of automation, hard automation &amp; soft automation.</li> </ul>
<b>II</b>	<b>Numerical control:</b> <ul style="list-style-type: none"> <li>Introduction to N.C. Machine tools, N.C. Production systems, Machine control units. Tooling for N.C. machines, N.C. part programming.</li> </ul>
<b>III</b>	<b>Fundamental of CNC machines:</b> <ul style="list-style-type: none"> <li>CNC technology, function of CNC control in machine tools, classification of CNC system, contouring system, interpolators, open &amp; closed loop in CNC system, CNC controllers, direct numerical control(DNC system)</li> </ul>
<b>IV</b>	<b>Constructional feature of CNC machines:</b> <ul style="list-style-type: none"> <li>Design consideration of CNC machines for improving machining accuracy, structural member, slide ways, slide linear bearing, ball screw, spindle drives feed drives, work &amp; tool holding devices, automatic tool changer, tooling for CNC machines</li> </ul>
<b>V</b>	<b>Unconventional machining processes:</b> <ul style="list-style-type: none"> <li>ECM, EDM, AJM, USM, EBM, Nano Fabrication, Micro Machine.</li> </ul>
<b>Books &amp; Author's</b>	<b>PRODUCTION TECHNOLOGY NEWER MACHINING METHOD</b>  <b>R. K. JAIN S. S. SHAN</b>

**7TE7A SPINNING PRACTICAL – V****hrs/week-4****Max marks-100**

Spinning practical Familiarity with established processing parameters for production and carded combed, blended, folder and fancy yarns. Case studies pertaining to waste to waste analysis, estimation of the total productivity, actual efficiency levels and causes of loss of efficiency in different spinning preparatory departments, Viz. Blow-room, card, comber, draw-frame and simplex. Study of blow-room and card performance. Nep count in card web. Checking of comber waste. Assessment and control variability before yarn formation. Practice in handling and setting of the various spinning preparatory machines. Workload and measurement in spinning preparatory, Oiling and maintenance schedules. Idea of time and motion study.

Passage of material, speeds settings of two-for-one Twister machine. Study different types of Bearings.

**7TE8A WEAVING PRACTICAL – V****hrs/week-4****Max marks-100**

Study of constructional details of Air-Jet, and projectile weaving machines Study of constructional details of knitting machines.. Practice in weaving and knitting and checking the quality of fancy fabric and method of rectifying the defect.

**7TE11A PRACTICAL TRAINING& INDUSTRIAL VISIT****hrs/week-2****Max marks-100**

Each student, individual or in association with some other students at the end of the Third B.TECH. course will observe and collect the general and technical information pertaining to machinery, raw materials used, yarns and fabrics produced by the textile mills, in which he/she/they are undertaking 4 weeks' practical training with the approval of the Principal, M.L.V.T.E.C. Each student will have to submit a written/typed report duly approved and signed by the guide to the Head of the department.

**7TE12A PROJECT - I****hrs/week-2****Max marks-50**

Each Student individually, or in association with some other students will carry out mini project of an experimental and/ or theoretical nature in one of the main branches **Textile Engineering** and present him finding is a systematic in the report form duly approved and signed by his supervisors/Guide (to be nominated by the Head of the Departments/Institutions). Each candidate would submit 3 typed copies of mini project report to the head of the department/institution at least 15 days before the commencement of first semester examination after viva-voce examinations. The original report and a carbon copy will be retained by the concerned department/institution and the supervisor respectively.

**7TEDC DISCIPLINE AND EXTRA CURRICULAR ACTIVITY****Max marks-50**

# EIGHTH SEMESTER

## B. TECH. (Textile Engineering)

**SPINNING TECHNOLOGY**

[[8TE1A]

[Common with 8TT1]

<b>Class B. TECH. ((Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
I	<ul style="list-style-type: none"> <li>Measurement of performance of blow room: opening efficiency, cleaning efficiency, lap regularity and waste percentage</li> </ul>
II	<ul style="list-style-type: none"> <li>Assessment of performance of card</li> <li>Study of hooks formation, their control, removal and effect of yarn quality</li> </ul>
III	<ul style="list-style-type: none"> <li>Improvement in technology of carding for increased production and improved quality of sliver, high speed carding: designs of carding machines for improved performances</li> </ul>
IV	<ul style="list-style-type: none"> <li>Recent developments in drawing, lap preparation, combing processes, speed frames</li> <li>Types and basic principal of autolevellers</li> </ul>
V	<ul style="list-style-type: none"> <li>Irregularities of drafted material: random, quasi-periodic and periodic irregularities of addition of irregularities, effect of doubling on irregularity</li> <li>Causes of irregularity: influence of raw material, process and machine variables on irregularity</li> </ul>
<b>Books &amp; Author's</b>	<p><b>Manual of Cotton Spinning Vol IV</b> <b>Process Control in Spinning</b> <b>GAR Foster</b> <b>AR Garde &amp;</b> <b>TGA Subramanian</b></p> <p><b>Principles of Textile Testing</b> <b>Maintenance Management in Spinning</b> <b>JE Booth</b> <b>Textile Research Journal</b> <b>TV Ratnam et al</b></p> <p><b>Indian Textile Journal</b> <b>Textile Industries</b> <b>Indian Journal of Fibre &amp; Textile Research</b> <b>Joint Technological Conferences</b></p>

**MILL ORGANIZATION, COSTING AND ECONOMIC**

**[ 8TE2A]**

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>	
<b>I</b>	<ul style="list-style-type: none"> <li>• General cost concepts</li> <li>• Classification of cost, cost elements, methods and techniques of costing. Direct / indirect, Fixed / Variable, Total cost. Inventory costing</li> <li>• System of costing: Job, order, batch, process, unit and operating cost</li> </ul>	
<b>II</b>	<ul style="list-style-type: none"> <li>• Costing in Textile Industry: Cost structure, cost of raw material / labour / utilities</li> <li>• Cost control – standard costs, Variance analysis, determination of cost per kg of yarn, per meter of fabric, yarn realization, value loss, measures of cost reduction, selling price decision for yarn/fabric</li> <li>• Concepts of depreciation</li> </ul>	
<b>III</b>	<ul style="list-style-type: none"> <li>• Labour allocation in different departments of a textile mill</li> <li>• Work-load standards for card tenters, speed frames and ring tenters, doffers, winders, weavers, in terms of tripartite agreements and Labour Laws</li> </ul>	
<b>IV</b>	<ul style="list-style-type: none"> <li>• Economics of large package spinning and optimum package size.</li> <li>• Economics of Open-end Spun, Air-jet spun and Friction spun yarns.</li> </ul>	
<b>V</b>	<ul style="list-style-type: none"> <li>• Economics of super-speed automatic warp and weft winding machines.</li> <li>• Economics of various labour saving mechanisms mounted on automatic looms like 'box loader' and 'unfil' systems.</li> <li>• Economics of shuttle-less weaving machine like Projectile, air-jet, water-jet, circular weaving machine</li> </ul>	
<b>Books &amp; Author's</b>	<b>Textile Mill Management</b> <b>Process control in spinning</b> <b>Process control in Weaving</b>	<b>Dr. V.D. Dudeja</b> <b>ATIRA</b> <b>ATIRA</b>

**ENGINEERING OF TEXTILE STRUCTURES-II****[8TE3A]****[Common with 8TC3, 8TT3]**

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<ul style="list-style-type: none"> <li>• Elements of fabric geometry</li> <li>• Cloth setting theories</li> <li>• Fabric cover and fractional cover</li> <li>• Crimp balance equation</li> <li>• Fabric cover and fabric weight relationship</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>• Peirce's concept of fabric geometry</li> <li>• Flexible and elastic threads model</li> <li>• Graphical solutions</li> <li>• Latest modifications</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>• Translation of fiber and yarn properties into fabric properties, viz. tensile, tearing, abrasion, bending, shearing</li> <li>• Creasing &amp; shearing</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li>• Introduction about FAST and KAWABATA Instrument</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>• Design of textile structures for certain functional end uses</li> </ul>
<b>Books &amp; Author's</b>	<b>Structure of fibres, yarns and fabrics</b> <b>Hearle, Backer and Grosberg</b> <b>Textile properties</b> <b>Kaswell</b> <b>Journal of Textile Institute</b> <b>Textile Research Journal</b>



## Electives

### TECHNICAL TEXTILES

[8TE4.1A]

[Common with 8TC4.1, 8TT4.1]

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

Units	Contents of the Subject
I	<p><b>Introduction</b> Definition ,Textile materials in technical applications</p> <p><b>Fibers</b> Natural and man-made fibers suitable for technical application and their relevant properties</p> <p><b>Geotextile</b> Types of geotextiles, Properties of Geotextile Materials , Fibers used for geotextile applications, Properties of material used in Geotextiles , Function of Geotextiles [Mechanical , Reinforcement , Hydraulic functions], Geotextiles Typical applications of geotextiles.</p>
II	<p><b>Medical textiles</b> Fibers in various medical applications, Classification of medical Textiles ,Textile materials used for medical applications such as absorbency, sterilization, grafts, wound care, Cardiovascular application, Sutures.</p>
III	<p><b>Filtrations</b> Principles of wet and dry filtrations , Characteristic properties of fibres and fabrics in selective example of filtration.Vessels affecting performance of filter fabric .</p>
IV	<p><b>Protective Clothing</b> Thermal protection Ballistic protection Protection against micro organisms, chemicals and pesticides Protection from electromagnetic radiation and static hazards</p>
V	<p><b>Ropes and Cordages</b> Fibers for rope construction, application, oriented structure and production of ropes, cordages and twins .Behavior and important characteristics of ropes and cordages.</p> <p><b>Automotive Textiles</b> Fibers used for automotive applications – upholstery, carpeting, pre-formed parts, type, safety devices, filters and engine compartment items .Brief description for the manufacture and application of these devices or parts</p>
Books & Author's	<p><b>Textile Industries</b> <b>Textile Industry, “ Technical Conference On Textile Industry : Atlanta, 19778</b> <b>India’s Textile Industry</b> <b>World Textiles: Investment Innovation, Invention – Annual World Conference on World Textiles and Investment Innovation Invention”</b> <b>Textile Journals, Magazines and Topical Reports</b></p> <p><b>Murphy WS</b> <b>IEEE Publication</b></p> <p><b>Srinivasan, Kastury</b> <b>The Textile Institute, Manchester</b></p>

**COMPUTER ADDED DESIGN & MANUFACTURING****[8TE4.2A]**

<b>Class B. TECH. (Textile Engineering)</b>	<b>Evaluation</b>
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Internal (20) & End-term (80)]

<b>Units</b>	<b>Contents of the Subject</b>
<b>I</b>	<b>The design process Morphology of design:</b> <ul style="list-style-type: none"> <li>Product cycle - Sequential and concurrent engineering - Role of computers - Computer Aided Engineering - Computer Aided</li> </ul>
<b>II</b>	<b>Design:</b> <ul style="list-style-type: none"> <li>Design for Manufacturability – Computer Aided Manufacturing - Benefits of CAD.</li> </ul> <b>Creation of Graphic Primitives –</b> <ul style="list-style-type: none"> <li>Graphical input techniques - Display transformation in 2-D and 3-D - Viewing</li> </ul>
<b>III</b>	<b>Management System:</b> <ul style="list-style-type: none"> <li>Hierarchical data structure. Network data structure - Relational data structure. Data Current trends in Manufacturing Engineering</li> </ul> <b>Group Technology –</b> <ul style="list-style-type: none"> <li>Design for Manufacturing and Assembly - Process Planning Techniques - Total approach to product development - Concurrent Engineering – Rapid prototyping - Introduction to CAD / CAM software packages</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li><b>Introduction to production planning and control:</b></li> <li>Shop Floor Control Systems - Just in time approach, Emerging Challenges in CAD / CAM, Product Data Management, Product Modeling, Assembly and Tolerance Modeling</li> </ul>
<b>V</b>	<b>Flexible Manufacturing System:</b> <ul style="list-style-type: none"> <li>Introduction to FMS. Sequencing &amp; scheduling in FMS. Group technology. Production flow analysis.</li> </ul>
<b>Books &amp; Author's</b>	<b>COMPUTER ADDED DESIGN &amp; MANUFACTURING</b>  <b>S. VISHAL, P. RADHAKRISHAN, S. SUBRAMANYAN, V, RAJU, VIKRAM SHARMA</b>

## PRACTICALS

### 8TE5A SPINNING PRACTICAL - VI

hrs/week-4

Max marks-100

Collection and interpretation of data for process control and comparing the same with established norms. Waste analysis in ring and rotor spinning Locating and improving machines with substandard performance. Case studies pertaining to estimation of the total productivity, actual efficiency level, causes of looss of efficiency in ring, rotor and air-jet spinning. Study of the defects at various stages of spinning. Assessing process capability for count controls.

Calculations pertaining to comprasion of productive, average count etc. Practice in motion study, time study and work-load measurement in ring and rotor spinning departments, Oiling and maintenance schedules, Spare parts consumption and idea of the life of the various parts.

Practice in handling and setting of the ring and rotor spinning. Assessment and control of variability in ring, rotor and air-jet yarns.

Case studies pertaining to yarn costing. Conditions under which a worker is chargesheeted and suspended, To adequaint with labour laws.

Passage of material, speeds, settings, maintenace, schedule of open end, air0jet ad Dref machines study different types of beets

### 8TE6A WEAVING PRACTICAL VI

hrs/week-4

Max marks-100

Case Studies pertaining to winding warping, sizing, drawing-in and looming for the estimation of production, efficiency and cause of loose in efficiency, excessive wastes, warp and weft breakages. Familiarity with the temperature and humidity in different department and methods of controlling the same. Oiling and maintenance schedules. Spare parts consumption and controlling the same. Oiling and maintenance schedules. Spare parts consumption and idea of the life of various spare parts. Work load assignments in different department. Familiarity with established processing parameters for weaving and knitting and fancy fabrics. Stoppage and Snap studies

### 8TE7A COMPUTER AIDED TEXTILE DESIGNING LAB

hrs/week2

Max marks-50

Practice on dobby & jacquard based weaving designs software's Preparation of draft, designs and peg plans for various types of designs. Practice on printing software, colour separation, screen preparation. Use of scanners.

### 8TE9A PROJECT - II

hrs/week-2

Max marks-200

Each Student individually, or in association with some other students will carry out project of an experimental and/ or theoretical nature in one of the main branches **Textile Engineering** and present him finding is a systematic in the report form duty approved and signed by his supervisors/Guide(to be nominated by the Head of the Departments/Instituttions).Each candidates would submit 3 typed copies of the project report to the head of the depatment/institution atleast 15 days before the commencement of eighth semester examination after viva-voce examinations. The original report and a phoyo copy will be retained by the concerned department/institution and the supervisor respectively.

### 8TE10A SEMINAR

hrs/week-2

Max marks-100

Each student will have to deliver a talk on the topic in the weekly period allotted to this subject, either pertaining to his project work or any topic assigned by Head of the Department.The performance of the speaker would be judged in the class by a board of examiners

### 8TEDC Discipline and extra Curricular activity

Max marks-50