

**TEXTILE FIBERS**

[3TC1]  
[Common with 3TT4, 3TE3]

Class B. TECH. (Textile Chemistry)	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>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, flax, ramie, 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>

**PRINCIPLES OF TEXTILE MANUFACTURING – I**

[3TC2]

Class B. TECH. (Textile Chemistry)	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>System of expressing yarn linear density.</li> <li>Introduction to Cotton, Woolen and Worsted systems of yarn production</li> </ul>
II	<ul style="list-style-type: none"> <li>Basic principle of opening, cleaning, Blow-room, Carding.</li> </ul>
III	<ul style="list-style-type: none"> <li>Combing, drawing and roving</li> <li>Ring spinning Doubling.</li> <li>Twist and twist multiplier</li> </ul>
IV	<ul style="list-style-type: none"> <li>Introduction to non-conventional spinning systems viz. air jet, open end, friction-spinning.</li> <li>Calculations pertaining to draft and production of the machines dealt with course</li> </ul>
V	<ul style="list-style-type: none"> <li>Properties and end uses of ring spun, rotor spun and air jet spun yarns</li> <li>Brief description of fancy yarns, ply cable yarn, core spun yarn</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Short Staple Spinning Part 1- W. Klien</li> <li>Spun Yarn Technology- R. Venkatsubramanyam</li> <li>Cotton Spinning- Traggart</li> <li>Elements of Raw Cotton and Blow Room-A. R. Khare</li> </ul>

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**PHYSICAL CHEMISTRY**

**[3TC3]**

<b>Class B. TECH. (Textile Chemistry)</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>• Classification, difference between colloidal solution, true solution and suspension. Preparation, properties and purification</li> <li>• Origin of charge, coagulation and protective action</li> <li>• Application of colloids</li> </ul>
II	<ul style="list-style-type: none"> <li>• Theoretical properties of colloidal systems interfacial phenomena particle kinematics, electrical properties, viscosity characteristics and studies</li> <li>• Lyophobic and Lyophilic solutions, gels and emulsions</li> <li>• Adsorption and absorption characteristics of adsorption</li> <li>• Types of adsorption, Langmuir adsorption, application of adsorption</li> </ul>
III	<ul style="list-style-type: none"> <li>• Thermo Chemistry: Heat of reaction at constant volume and pressure</li> <li>• Kirchoff's equation</li> <li>• Heat of combustion, Neutralization and formation</li> <li>• Laws of thermo-chemistry</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Electro-Chemistry: Phenomena of electrolysis</li> <li>• Faraday's Laws of electrolysis</li> <li>• Conductance of electrolytes</li> <li>• Effect of dilutions, pressure and temperature on conductance</li> <li>• Migration of ions, Transport number</li> <li>• Kohlrausch's law and its application</li> <li>• Electro chemical cells</li> </ul>
V	<ul style="list-style-type: none"> <li>• Kinetics of homogeneous reactions</li> <li>• First and second order reactions</li> <li>• Theory of catalysis</li> <li>• Acid -Base catalysis some industrial processes by different catalysts</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Physical Chemistry –Robert A. Alberty</li> <li>• Introduction to Physical Chemistry-S. Gladstone</li> <li>• Essential Of Physical Chemistry-B. S. Behl, G. D. Tuli</li> </ul>

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INTRODUCTION TO WET PROCESSING

[3TC4]

<b>Class B. TECH. (Textile Chemistry)</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>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>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Technology Of Dyeing-V. A. Shehnai, Vol. 6</li> <li>• Chemical Technology of Fibrous Materials- Sadov</li> <li>• Textile Processing and properties- Vigo</li> <li>• Dyeing and Chemical Technology of Fibres-E.R. Trotman</li> </ul>

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**ELECTIVES**  
**OBJECT ORIENTED PROGRAMMING**

[3TC5]  
[Common with 3TT5, 3TE5]

Class B. TECH. (Textile Chemistry)	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	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.
II	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.
III	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.
IV	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.
V	Multiple inheritance, virtual base classes, and class members, multiple class members. Templates, exception handling
Books & Author's	<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**

[3TC6]  
[Common with 3TT6, 3TE6]

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

Units	Contents of the Subject
I	•
II	•
III	•
IV	•
V	•
Books & Author's	•

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## PRACTICALS

### 3TC 7 Textile Fiber Identification & Analysis Practical :

**hrs/week - 4**

**Max marks-100**

Principle of microscopy, microscopic identification of fibers, preparation and mounting of specimen for longitudinal view.

Cross-section cutting –microtomy cork method, metal plate method, Hardy's microtome, mountants and reagents for fiber microscopy.

Standard scheme of analysis of homogeneous fiber and blends by physical and chemical methods.

Qualitative and quantitative determination of components.

### 3TC 8 PRINCIPLE OF TEXTILE MANUFACTURING PRACTICAL - I :

**Hrs/week – 4**

**Max marks - 100**

Demonstration and working principle of various spinning machines used for yarn manufacturing such as Blow room, Carding, Drawing, Lap former, Combing, Simplex, Ring spinning etc.

Introduction to open end spinning, air jet spinning, dref, friction spinning.

### 3TC 9 INTRODUCTION TO WET PROCESSING LAB

**Hrs/week – 4**

**Max marks - 100**

Desizing of cotton by rot steeping, acid and enzymatic method.

Scouring of cotton and estimation of weight loss in scouring.

Bleaching of cotton yarns and fabrics with Sodium hypochlorite, Hydrogen Peroxide, Optical bleaching

Mercerization of cotton yarns and fabrics.

Scouring of wool by Solvent and Emulsion method. Carbonization of wool, bleaching of wool etc.

Degumming of silk.

Bleaching of synthetic fibers with peroxide and sodium chlorite.

### 3TC 10 OBJECT ORIENTED PROGRAMMING LAB

**Hrs/week – 2**

**Max marks - 50**

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

### 3TCDC Discipline & Extra Curricular Activities

**Max marks-50**

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PRINCIPLES OF TEXTILE MANUFACTURING – II

[4TC1]

<b>Class B. TECH. (Textile Chemistry)</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>Weaving preparation:</b> <ul style="list-style-type: none"> <li>Object and basic principles of working of winding, warping, drawing-in and sizing machines</li> </ul>
II	<b>Weaving mechanism:</b> <ul style="list-style-type: none"> <li>Classification of weaving machines</li> <li>Basic mechanism of a plain loom and passage of warp through loom</li> <li>Plain tappet shedding motion, climax dobby</li> <li>Side lever under-pick motion, sley beat up motion</li> </ul>
III	<ul style="list-style-type: none"> <li>Cimmco semi positive let off motion</li> <li>Five wheel and seven wheel take up motion</li> <li>Introduction to non conventional looms e.g. Projectile, Rapier, Jet looms.</li> </ul>
IV	<b>Fabric Defects:</b> <ul style="list-style-type: none"> <li>Brief introduction of basic defects like starting mark, box mark, broken pick, slack and tight selvage, missing end (chira), reed marks, stains, temple mark.</li> <li>Brief introduction to set theory</li> <li>Specification for standard woven fabric</li> </ul> <b>Calculations:</b> <ul style="list-style-type: none"> <li>Weight of warp, weft and fabric</li> <li>Production of loom</li> </ul>
V	<b>Fabric Structure:</b> <ul style="list-style-type: none"> <li>Methods of fabric presentation weave repeat unit drafts and lifting plan constructions</li> <li>Construction of elementary weaves e.g. plain, twill, satin and sateen weaves</li> <li>Plain weave derivatives, weaves constructed on twill bases namely Herring bone waved and broken twills</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Color and Design- Watson Vol 1 and Vol 2</li> <li>Fabric Forming- Hasmukh rai</li> <li>Principles of weaving- Marks Robinson</li> <li>Weaving Calculation- Sen Gupta</li> </ul>

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## ANALYTICAL CHEMISTRY

[4TC2]

Class B. TECH. (Textile Chemistry)	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>Acid -Base Chemistry</b> <ul style="list-style-type: none"> <li>Preparation, properties and uses of buffer solutions</li> <li>Hydrogen ion concentration and its determination using: (1) Hydrogen-Electrode (2) Glass-Electrode (3) Quinhydrone- electrode</li> <li>Potentiometric titrations</li> </ul>
II	<b>Oxidation - Reduction:</b> <ul style="list-style-type: none"> <li>Oxidizing and reducing agents e.g., Peroxide, Chlorite, Hydro sulphite, Potassium permanganate, Potassium dichromate, etc.</li> </ul>
III	<b>Chromatography:</b> <ul style="list-style-type: none"> <li>Chromatographic methods of separation, adsorption, exchange and gas chromatography</li> <li>Solvent exchange</li> </ul>
IV	<b>Crystallography:</b> <ul style="list-style-type: none"> <li>Introduction, classification of crystals</li> <li>Crystal structure by X-ray diffraction, Bragg method</li> <li>Rotating crystal method and</li> <li>Powered method</li> </ul>
V	<b>Spectroscopy:</b> <ul style="list-style-type: none"> <li>Fundamental principles of spectroscopy,</li> <li>Instrumentation and brief out lines of UV, IR and NMR spectroscopy, their applications in textiles</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Principles of Physical Chemistry- Puri, Sharma</li> <li>Elements of Physical Chemistry-Atkins and de Paula</li> <li>Elementary Organic Spectroscopy- Y. R. Sharma</li> <li>Spectroscopy- Silver Stein</li> <li>Chemical Analysis-R. C. Jain, A. K. Srivastava</li> <li>Analytical Chemistry-GRJ D CHRISTIAN</li> <li>Organic Synthesis-Jagdamba Singh, L. D. S. Yadav</li> <li>Organic Chemistry- Morrison &amp; Boyd</li> </ul>

**THEORY OF DYEING**

**[4TC3]**

<b>Class B. TECH. (Textile Chemistry)</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>• Chemical bonds their role and involvement in dyeing of different textile materials</li> <li>• Role of chemical bonds in color fastness of dyes.</li> </ul>
II	<ul style="list-style-type: none"> <li>• Physical and Chemical principles involved in the application of Dyestuff e.g. Direct, Basic, Acid, Vat, Disperse, Azoic, Pigment dyes etc. to textile materials</li> </ul>
III	<ul style="list-style-type: none"> <li>• Various isotherms</li> <li>• Thermodynamics and Kinetics of Dyeing</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Theories of dyeing e.g. Absorption, Electrochemical, Colloidal and Solid solution, free volume, static pore theory etc</li> </ul>
V	<ul style="list-style-type: none"> <li>• Theories and concept of dyeing synthetic fibers viz. polyester, nylon, acrylic</li> <li>• Concept of solubility parameters,</li> <li>• Mechanism of carrier in pet dyeing,</li> <li>• Diffusion coefficient and its measurement</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Technology of Dyeing-V.A. Shehnaï Vol 6</li> <li>• Physical Chemistry of Dyeing-Vickerstaff</li> <li>• Cellulosic Dyeing-John Shore(SDC)</li> <li>• Textile Chemistry Vol 3- R. H. Peters</li> <li>• Theory of coloration of textiles-C. L. Bird</li> <li>• Dyeing and Chemical Technology of Textile Fibers- E. R. Trotman</li> </ul>

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**FABRIC PREPARATION**

[4TC4]

<b>Class B. TECH. (Textile Chemistry)</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>• Impurities in raw cotton and Grey cloth and chemical principle involved in their removal</li> <li>• Object of shearing, principles of working of shearing machines</li> <li>• Object of singeing, different types of singeing machines and their working</li> </ul>
II	<ul style="list-style-type: none"> <li>• Different methods of desizing.</li> <li>• Scouring of cotton in Kiers, J-boxes, continuous methods, solvent scouring etc, different types of washing machines.</li> </ul>
III	<ul style="list-style-type: none"> <li>• Mechanism of bleaching using various bleaching agents viz. bleaching powder, sodium hypo-chlorite, hydrogen peroxide.</li> <li>• Effect of pH in bleaching, semi continuous and continuous methods, faults and remedies.</li> <li>• Short sequences, combined preparatory processes, low temperature preparatory processes</li> <li>• Rapid bleaching, bleaching machines viz. kiers, J-boxes, bleaching cisterns,</li> <li>• Chlorine free bleaching</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Scouring and bleaching of jute, Linen, wool and silk</li> <li>• Optical brighteners</li> </ul>
V	<ul style="list-style-type: none"> <li>• Methods and equipments for yarn and fabric mercerization,</li> <li>• Factors affecting efficiency of mercerization,</li> <li>• Physical and chemical changes in cotton</li> <li>• Mercerization of cotton and PC blends,</li> <li>• Causticization.</li> <li>• Hot mercerization, Liquid ammonia treatment of cotton.</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Technology of Bleaching--V. A. Shehnai Vol</li> <li>• Textile Scouring and Bleaching-E. R. TRotman</li> <li>• Bleaching and Mercerizing- J.T. marsh</li> <li>• Bleaching and Mercerizing-BTRA</li> </ul>

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**POLYMERS AND EXTRUSION**

[4TC5]

[Common with 4TT5]

<b>Class B. TECH. (Textile Chemistry)</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>• Definition 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>	<ul style="list-style-type: none"> <li>• Manufactured Fiber Technology-V.B. Gupta and V.K. Kothari</li> <li>• Polyester Fiber- Herman Ludewig</li> <li>• Man Made Fibres- Moncrief</li> <li>• Handbook of Textile Fibers- J. Gordon Cook</li> <li>• Production of Synthetic Fibers- A. A. Vaidhya</li> </ul>

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

**[3TC6]**

**Common with [3TE6,3TT6]**

<b>Class B. TECH. (Textile Chemistry)</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>	<b>Semiconductor Diodes:</b> Introduction, characteristics and their applications <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>
<b>II</b>	<b>Field Effect Transistors:</b> <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> <b>Transistor Amplifiers:</b> <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>
<b>III</b>	<b>Operational Amplifiers (OpAmp):</b> <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> <b>Semiconductor Devices:</b> <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>
<b>IV</b>	<b>Cathode Ray Oscilloscope:</b> <ul style="list-style-type: none"> <li>• Introduction, Cathode ray tube – theory and construction</li> </ul> <b>Transducers:</b> <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> <b>Data Acquisition Systems:</b> <ul style="list-style-type: none"> <li>• Introduction, components and uses</li> </ul>
<b>V</b>	<b>Process control:</b> <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>	<ul style="list-style-type: none"> <li>• Industrial Electronics and Control –S. K. Bhattacharya</li> <li>• Modern Digital Electronics- R.P. Jain</li> <li>• Electronics Devices and Circuits-Milliman and Halkies</li> </ul>

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## B. PRACTICALS

### 4TC 7 PRINCIPLES OF TEXTILE MANUFACTURING PRACTICAL - II:

Hrs/week – 4

Max marks - 100

Winding, warping, sizing machines and drawing in. Passage of warp through plain power loom.  
Loom mechanism. Analysis of important particulars of fabrics made in plain, twill, satin/sateen weaves.

### 4 TC8 ANALYTICAL CHEMISTRY LAB :

Hrs/week – 4

Max marks - 100

Analysis of soap- Total fatty matter, alkalinity, free acids and unsaponifiable matter. Estimation of sodium bi-sulphite, sodium- sulphide and sodium hydro-sulphite. Determination of strength of hypochlorite and Hydrogen peroxide, estimation of strength of sodium hydroxide containing sodium carbonate volumetrically and by Tw meter.

Estimation of aluminum, iron, tin, chromium and copper.

Analysis of phenols and formaldehyde.

Saponification, Acid value and Iodine value of oils. Determination of flash point of oil.

Determination of viscosity of various substance used in textile manufacturing.

Chromatographic separation.

Effluent testing : Determination of some pollutant substances present in effluent from different industries i.e., carbonates , bi-carbonate, hydroxide, chlorine concentration, chemical oxygen demand etc by volumetric analysis.

Inorganic and organic preparations .

### 4 TC 9 EXPERIMENTAL PROCESS LAB: I

Hrs/week – 4

Max marks - 100

Dyeing of cotton and rayon with direct, sulphur, vat, reactive and azoic dyes etc.

Dyeing of wool and silk with acid, premetallised and chrome dyes.

After treatment to improve the fastness properties.

Dyeing of compound shades.

Application of natural colors on cotton, wool and silk.

Dyeing of vat, reactive and azoic by batch wise semi continues and continues methods.

### 4TC10 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.

### 4TCDC Discipline & Extra Curricular Activities

Max marks-50



FIFTH SEMESTER  
B. TECH. (Textile Chemistry)

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**TEXTILE CHEMICAL ANALYSIS****(5 TC 1)**

<b>Class B. TECH. (Textile Chemistry)</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>• Color fastness to light, washing, rubbing, sublimation, perspiration</li> <li>• Quantitative estimation of bleaching agents</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>• Evaluation of textile chemicals, auxiliary's viz. detergents, wetting agent, cross linking agents, softeners, stiffeners, silicone emulsions.</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>• Water quality for dyeing, effect of contaminants on textile wet processing, Water effluents testing.</li> <li>• Hardness, solid content dissolved and suspended, pH, Color, Chloride, fluoride, Chemical oxygen demand (COD), Bio- chemical oxygen demand (BOD), Oil and grease content</li> </ul>
<b>IV</b>	<ul style="list-style-type: none"> <li>• Analysis of damage to fibers by heat, light, oxidation and reduction.</li> <li>• Estimation of carbonyl and aldehyde groups in cellulose's, amino group in wool, silk and nylon</li> <li>• End group analysis of polyester and nylon</li> <li>• Fluidity measurement, copper number, estimation of degree of heat setting by Iodine absorption method, CDT and Shrinkage measurement</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>• Estimation of desizing efficiency by various methods</li> <li>• Test for estimating mercerization, Barium activity number, De-convolution count.</li> <li>• Chromatographic separation of dyes, Paper chromatography, thin layer chromatograph, Gas chromatography</li> <li>• Method of identification of dyes</li> <li>• Quantitative estimation of dyes</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Orientation Programme in Wet Processing-BTRA</li> <li>• Evaluation of Textile Chemicals Vol 8-V. A. Shehnai</li> <li>• ISI Handbook of Textile Testing</li> <li>• Textile Analysis –E.R. Trotman and S. R. Trotman</li> <li>• Technical Manual AATCC Vol 58</li> <li>• Analytical Methods for Textile Laboratory- AATCC Monographs</li> <li>• Polymer Characterization-J.R. White</li> </ul>

*Done*

**TECHNOLOGY OF DYEING**

(5TC 2)

<b>Class B. TECH. (Textile Chemistry)</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	Study of various methods of dyeing Various form of the dyes and their application.														
II	Principle and methods of dyeing natural and regenerated fibers with various classes of dyes e.g. Direct, Reactive, Vat, Sulphur, Basic, Acid and Azoic dyes. Application of Pigments														
III	Dyeing with natural dyes and mordants Dyeing of Denim fabrics														
IV	Dyeing of loose stocks and fibers Faults in dyeing and remedial measures														
V	Jigger, Winch, Soft flow machines, Padding Mangles Development in dyeing machines														
<b>Books &amp; Author's</b>	<table border="0"> <tr> <td><b>Technology of Dyeing</b></td> <td>V.A. Shehnai Vol 6</td> </tr> <tr> <td><b>Physical Chemistry of Dyeing</b></td> <td>Vickerstaff</td> </tr> <tr> <td><b>Cellulosic Dyeing</b></td> <td>John Shore(SDC)</td> </tr> <tr> <td><b>Textile Chemistry Vol 3</b></td> <td>R. H. Peters</td> </tr> <tr> <td><b>Theory of coloration of textiles</b></td> <td>C. L. Bird</td> </tr> <tr> <td><b>Dyeing and Chemical Technology of Textile Fibers</b></td> <td>E. R. Trotman</td> </tr> <tr> <td><b>Textile Processing and Properties</b></td> <td>Vigo</td> </tr> </table>	<b>Technology of Dyeing</b>	V.A. Shehnai Vol 6	<b>Physical Chemistry of Dyeing</b>	Vickerstaff	<b>Cellulosic Dyeing</b>	John Shore(SDC)	<b>Textile Chemistry Vol 3</b>	R. H. Peters	<b>Theory of coloration of textiles</b>	C. L. Bird	<b>Dyeing and Chemical Technology of Textile Fibers</b>	E. R. Trotman	<b>Textile Processing and Properties</b>	Vigo
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<b>Dyeing and Chemical Technology of Textile Fibers</b>	E. R. Trotman														
<b>Textile Processing and Properties</b>	Vigo														

## Textile Testing-I

[5TC3]

[Common with 5TE3, 5TT3]

Class B. TECH. (Textile Chemistry)	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	<p><b>Introduction to textile testing</b></p> <ul style="list-style-type: none"> <li>• Aim and scope</li> </ul> <p><b>Sampling techniques</b></p> <ul style="list-style-type: none"> <li>• General requirements, squaring, cut squaring and Zoning methods for sampling of raw material</li> <li>• Sampling techniques for yarn and fabrics for specific tests</li> <li>• Routine Sampling techniques used in the textile industry</li> </ul>
II	<p><b>Hygrometry and moisture relations of textiles</b></p> <ul style="list-style-type: none"> <li>• Terms and definitions</li> <li>• Relation between Relative Humidity and regain of textile materials</li> <li>• Equilibrium regain, hysteresis</li> <li>• Measurement of regain principle and operation of equipment</li> <li>• Official regain and concept of current invoice weight</li> </ul>
III	<p><b>Measurement of fiber physical characteristics</b></p> <ul style="list-style-type: none"> <li>• Fiber length, fineness, maturity and foreign matter of cotton and other fibers</li> <li>• Principle, construction, operation and calibration of equipment in common use for measurement of above properties</li> <li>• Grading of different cottons</li> <li>• Nep testing of cotton</li> </ul>
IV	<p><b>Fiber friction</b></p> <ul style="list-style-type: none"> <li>• Theories and measurement of friction of single and fiber assemblies during drafting</li> </ul> <p><b>Yarn numbering systems</b></p> <ul style="list-style-type: none"> <li>• Numbering systems</li> <li>• Conversion methods</li> <li>• Measurement of yarn number</li> </ul> <p><b>Measurement of yarn properties</b></p> <ul style="list-style-type: none"> <li>• Twist in spun, continuous filament and ply yarns</li> </ul> <p><b>Measurement of fabric properties</b></p> <ul style="list-style-type: none"> <li>• Serviceability, wear and abrasion</li> <li>• Definitions, methods for measuring abrasion resistance and evaluation of results Fabric creasing and crease recovery testing</li> </ul>
V	<p><b>Methods of test for fabric dimensions and other physical properties</b></p> <ul style="list-style-type: none"> <li>• Thickness</li> <li>• Weight</li> <li>• Crimp</li> <li>• Shrinkage</li> <li>• Air permeability</li> <li>• Wettability</li> <li>• Shower-proofness</li> <li>• Water-proofness</li> <li>• Flame-resistance</li> </ul>
Books & Author's	<p><b>Principles of Textile Testing</b> <b>Physical Properties of Textile Fibres</b> <b>Physical Testing of Textiles</b></p> <p>JE Booth WE Morton &amp; JWS Hearle B P Savelle</p>

*John*



**STRUCTURE AND PROPERTIES OF FIBER**

(5TC 4)  
[Common with 5TT4]

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

Units	Contents of the Subject
I	Structure of fibres: Morphology and order in fibre structure. Theories of fine structure of fibres. Methods of determination of molecular structures (crystallinity and orientation, crystal size), by X-ray methods, electron and optical microscopy.
II	Mechanical properties: Mechanism of deformation in fibres. Principles of elasticity and viscoelasticity. Phenomenological approach – stress-strain, creep and stress-relaxation behaviour of fibres. Simple spring and dashpot models simulating textile fibres.
III	Moisture properties: Absorption in fibres, hysteresis, quantitative analysis of moisture absorption, Pierce's theory, Swelling, heat of sorption.
IV	Thermal properties: Molecular motions and transition phenomenon. First order and second order transition phenomenon. Thermal expansion behaviour. Concept of heat setting and pleating. Specific heat of fibres – theoretical and actual.
V	Optical properties : Polarizability and refractive index. Birefringence and its measurement. Absorption and dichroism. Electrical properties: Di-electric properties and its measurement, effect of frequency and temperature of dielectric constant. Electrical resistance and its measurement. Static electricity and measurement of static charge in fibres. Frictional properties of fibers – nature and measurements.
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Physical properties of Textile Fibers-J.W. S. Hearle</li> </ul>

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## CHEMISTRY OF HIGH POLYMERS

[5TC5]

<b>Class B. TECH. (Textile Chemistry)</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>• Terms, definitions and scope of polymer chemistry, plastic, fibers and rubbers.</li> <li>• Chemistry and kinetics of chain polymerization.</li> </ul>
II	<ul style="list-style-type: none"> <li>• Kinetics of step polymerization, cationic polymerization, anionic polymerization.</li> <li>• Poly-condensation with special reference to polyester, polyamide, phenol formaldehyde, urea formaldehyde, epoxy resin.</li> </ul>
III	<ul style="list-style-type: none"> <li>• Types of molecular weights, Measurement of molecular weights and molecular weight dependent properties.</li> <li>• Poly-dispersity</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Chemical and geometrical structure of polymer molecule.</li> <li>• Transitions and its measurement.</li> <li>• Differential scanning calorimetry ( DSC ), Thermo-gravimetric analysis ( TGA ) .</li> </ul>
V	<ul style="list-style-type: none"> <li>• Polymer solutions</li> <li>• Thermodynamics of polymer dissolution</li> <li>• Florry and Huggins theory of polymer solutions.</li> <li>• Manufacturing process of polymers viz. Polyethylene, polystyrene, polyformaldehyde, polycarbonates, polyurethanes, polyethylene glycols, poly acrylic acid, poly propylene glucois, poly vinyl alcohol, silicone polymers.</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Polymer Science-Gowariker</li> <li>• Textbook of Polymer Science-Billmeyer</li> <li>• Principles of Polymer Chemistry-P.J. Flory</li> <li>• Introduction to Polymer Chemistry-R. B. Seymour</li> <li>• Organic Chemistry of Synthetic high Polymers-R. W. Lenz</li> </ul>

Tape

**ELECTIVES**

**Practical Application of Statistics**

[5TC6.1]

[Common with 5TE6.1, 5TT6.1]

<b>Class B. TECH. (Textile Chemistry)</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>	<ul style="list-style-type: none"> <li>Statistics for Engineers - William Mandenhall</li> <li>Statistics -N. L. Garg and S. G. Sharma</li> </ul>

**FINANCE, MATERIAL AND HUMAN RESOURCE MANAGEMENT****(5TC 6.2)****[Common with 5TE6.2,5TT6.2]**

<b>Class B. TECH. (Textile Chemistry)</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> <b>T. V. Rao</b>

## B. PRACTICALS

### 5TC7 TEXTILE CHEMICAL ANALYSIS LAB- I:

Hrs/week – 4

Max marks - 100

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Identification of dyes on the fibers. Dye purification. Nitrogen estimation, estimation of free and bound formaldehyde spectrophotometrically and iodometrically, Evaluation of wetting agents, leveling agents, silicon emulsion. Effluent water analysis-Estimation of COD, BOD, oil and grease, iron, sulphide, chloride content etc in effluent water

### 5TC8 EXPERIMENTAL PROCESS LAB -II

Hrs/week – 4

Max marks - 100

To study the effect of various dyeing parameters on dye ability viz. time, temp etc  
To study the effect of various chemicals and auxiliaries on dye ability viz. salt, leveling agents, dye fixing agents, carriers. To study the effect of various after treatments on direct, sulphur dyes .

### 5TC 9 TEXTILE TESTING PRACTICAL -I:

Hrs/week – 4

Max marks - 100

Measurement of fiber length and its distribution, fineness, maturity, moisture content and strength using conventional methods and instruments. Fiber 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.

### 6TC11 HUMANITIES AND PROFESSIONAL ETHICS:

Hrs/week – 2

Max marks - 50

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### 5TCDC Discipline & Extra Curricular Activities

Max marks-50

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SIXTH SEMESTER  
B. TECH. (Textile Chemistry)

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**TECHNOLOGY OF TEXTILE PRINTING**

**(6TC 1)**

<b>Class B. TECH. (Textile Chemistry)</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>	<ul style="list-style-type: none"> <li>• Principle of printing</li> <li>• Printing paste ingredients viz. various thickeners and other chemicals</li> <li>• Method of printing such as block, screen, roller printing</li> </ul>
<b>II</b>	<ul style="list-style-type: none"> <li>• Preparation of Screen for manual, flat bed and rotary screen printing machines</li> <li>• Engraving of design on roller</li> <li>• Styles of printing viz. Direct, Discharge, Resist etc. on natural fibers</li> </ul>
<b>III</b>	<ul style="list-style-type: none"> <li>• Styles of printing viz. Direct, Discharge, Resist etc. on synthetic and their blends</li> <li>• After treatment of printing material</li> <li>• Machines used for printing, dyeing, ageing, Steaming, Curing</li> </ul>
<b>IV</b>	<p><b>Novelty printing process</b></p> <ul style="list-style-type: none"> <li>• Transfer printing of synthetic and cotton</li> <li>• Flock printing</li> <li>• Garment printing</li> <li>• Pigment printing</li> <li>• Various type of pigments, binders, catalysts, emulsion thickening</li> <li>• Replacement of kerosene</li> <li>• Faults in printing and their prevention</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>• Ink jet printing</li> <li>• Application of printing CAD software, design preparation, colour reduction, colour separation, screen preparation..</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Technology of Printing- V.A. Shehnai</li> <li>• Textile Printing-Storey</li> <li>• Introduction to Textile Printing-W. Clarke</li> <li>• Textile Printing-Miles</li> <li>• Principles of Cotton Printing- D.G. Kale</li> <li>• Textile Printing-R.S. Prayag</li> <li>• Chemical Processing of Synthetic Fibers and blends-Datye and Vaidhya</li> </ul>

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**COMPUTER COLOUR MATCHING**

(6TC 2)

<b>Class B. TECH. (Textile Chemistry)</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>	<ul style="list-style-type: none"><li>• Theory and measurement of absorption spectrophotometer to qualitative and quantitative analysis of chemical substances in both transparent and opaque media in UV-VIS-NIR range</li><li>• Color science-perception of color, light sources, object, observer</li><li>• Color mixing laws-additive and subtractive mixing</li><li>• Eye and color vision</li></ul>
<b>II</b>	<ul style="list-style-type: none"><li>• Color order systems- Munsell, CIE system, color atlas</li><li>• CIE standard illuminants, observers, object, tristimulus values, chromaticity coordinates</li><li>• Dominant wavelength and purity</li></ul>
<b>III</b>	<ul style="list-style-type: none"><li>• Transformation of CIE system, equation index</li><li>• Whiteness and yellowness index</li><li>• Color difference measurement, various equations, tolerance limit</li><li>• Application in fastness testing</li><li>• Metamerism phenomenon and its application to textiles, indexes</li></ul>
<b>IV</b>	<ul style="list-style-type: none"><li>• Reflectance curves, Kubelka –Munk theory, Strength measurement</li><li>• Shade matching, data preparation, recipe prediction, correction, limitation and drawbacks of Computer Color Matching technique.</li></ul>
<b>V</b>	<ul style="list-style-type: none"><li>• Introduction to Chroma blend software</li><li>• Color measuring instruments</li><li>• Selection of instruments</li></ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"><li>• Instrumental Color Measurement –H.S Shah and R.S. Gandhi</li><li>• Fundamental to Computer Color Matching-N.S. Gangakhedkar</li><li>• Color Physics for Industry-R. Mc. Donald(SDC)</li><li>• Computer Color Analysis- A. D. Sule</li></ul>





**TEXTILE TESTING -II**

[6TC3]

[Common with 6TT3 & 6TE3]

<b>Class B. TECH. (Textile Chemistry)</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>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 ,Causes and their remedies</li> </ul>												
Books													
& Author's	<table border="0"> <tr> <td><b>Principles of Textile Testing</b></td> <td><b>JE Booth</b></td> </tr> <tr> <td><b>Handbook of Textile Testing &amp; Quality Control</b></td> <td><b>Elliot B Grover &amp; DS Hamby</b></td> </tr> <tr> <td><b>Physical Properties of Textile Fibres</b></td> <td><b>WE Morton &amp; JWS Hearle</b></td> </tr> <tr> <td><b>Textile Fibres, Yarns and Fabrics</b></td> <td><b>ER Kaswell</b></td> </tr> <tr> <td><b>Textile Testing</b></td> <td><b>JH Skinkle</b></td> </tr> <tr> <td><b>Physical Testing of Textiles</b></td> <td><b>B P Savelle</b></td> </tr> </table>	<b>Principles of Textile Testing</b>	<b>JE Booth</b>	<b>Handbook of Textile Testing &amp; Quality Control</b>	<b>Elliot B Grover &amp; DS Hamby</b>	<b>Physical Properties of Textile Fibres</b>	<b>WE Morton &amp; JWS Hearle</b>	<b>Textile Fibres, Yarns and Fabrics</b>	<b>ER Kaswell</b>	<b>Textile Testing</b>	<b>JH Skinkle</b>	<b>Physical Testing of Textiles</b>	<b>B P Savelle</b>
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<b>Textile Testing</b>	<b>JH Skinkle</b>												
<b>Physical Testing of Textiles</b>	<b>B P Savelle</b>												

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**MAN-MADE FIBRE PRODUCTION****[6TC4]****[Common with 6TE4,6TT4]**

<b>Class B. TECH. (Textile Chemistry)</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>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>												
<b>II</b>	<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>												
<b>III</b>	<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>												
<b>IV</b>	<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>												
<b>V</b>	<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>Acrylic Fibres</b>	<b>J.C.Masson</b>												

**CHEMISTRY OF INTERMEDIATES & DYES**

(6TC 5)

<b>Class B. TECH. (Textile Chemistry)</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>Isolation of products for manufacturing of dye intermediates</li> <li>Chemistry of benzene and naphthalene with their orientation rules</li> </ul> <b>Nitration</b> <ul style="list-style-type: none"> <li>General methods of nitration</li> <li>Nitration of toluene, phenol, aniline, naphthalene series</li> </ul> <b>Sulphonation</b> <ul style="list-style-type: none"> <li>General methods of sulphonation</li> <li>Dye sulphonation</li> </ul> Sulphonation of benzene, aniline, naphthalene series, naphthols sulphothols, sulphonic acids
II	<b>Amination</b> <ul style="list-style-type: none"> <li>General methods of amination</li> <li>Amination of nitro compounds</li> <li>Preparation of diazo salts</li> </ul> Amination of naphthalene series <b>Dye Intermediates</b> <ul style="list-style-type: none"> <li>Dye intermediates related to hydroxy</li> </ul> Halogen compounds and heterocyclic based compounds
III	<ul style="list-style-type: none"> <li>Historical development of natural and synthetic dyes</li> <li>Dyestuff industry in India</li> <li>Classification of dyes according to chemical constitution</li> <li>Methods of preparation of nitroso, nitro, azo dyes</li> <li>Methods of preparation of pyrazolone, acridine, xanthine, ketoamine, anthraquinones, azines, thiazines, oxazines, indigo, thio indigo, alizarine and various dyes. (Reaction Based)</li> </ul>
IV	<ul style="list-style-type: none"> <li>Chemistry of reactive, acid, basic, direct, sulphur, vat dyes, sulphurised vat colors, coupling of different naphthols</li> <li>Disperse dyes manufacture and purification</li> </ul>
V	<ul style="list-style-type: none"> <li>Relation between- color and chemical constitution, substantively and chemical constitution</li> <li>Chemistry of various types of pigments</li> <li>Photo physical processes (Phosphorescence and fluorescence) following light absorption</li> <li>Fluorescent brightening agents and miscellaneous dyes</li> <li>Toxicity of dyes and intermediates</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Organic Chemistry-IL Finar</li> <li>Synthetic Dyes- Chatwal</li> <li>Chemistry of Dyes and Intermediates-V A. Shehnaï Vol 2</li> <li>Chemistry of Synthetic Dyes-Venkatraman Vol 1-8</li> <li>Text Book of Dyes- M. G Arora</li> <li>Color Chemistry- R. L. M. Allen</li> </ul>

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**ELECTIVE**  
**Knitting Technology**

[6TC6.1]

Class B. TECH. (Textile Chemistry)	Evaluation
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>• Definition of Knitting , 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> <li>• Knit, Tuck and Float Stitches, their formation in machine and applications</li> </ul>
II	<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>
III	<ul style="list-style-type: none"> <li>• Circular machine used for plain knitted fabrics, Knitting geometry</li> <li>• Rib and Interlock double jersey</li> <li>• Purl knitting machine along with knitting cycle, design of cams</li> </ul>
IV	<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> <li>• Derivatives and ornamentation of weft knitted fabrics</li> </ul>
V	<ul style="list-style-type: none"> <li>• Nature and cause of irregularities</li> <li>• Derivatives and ornamentation of weft knitted fabrics</li> <li>• Knitted fabric faults, their causes and remedies.</li> <li>• Dry, Wet and Finished relaxed state of Knitted fabrics</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Knitting Technology-J.B. Spencer</li> <li>• Knitting Technology- Azgaokar</li> </ul>

*Table*

**UNIT OPERATIONS AND CHEMICAL ENGINEERING**

(6 TC 6.2)

<b>Class B.TECH. (Textile Chemistry)</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>• Definition and scope of chemical engineering</li> <li>• Unit operations of chemical engineering</li> <li>• Material balance and molecular units, mole fractions</li> <li>• Gas laws, simple calculations based on these laws</li> </ul>
II	<p><b>Mechanical separation</b></p> <ul style="list-style-type: none"> <li>• Introduction to screens and screen analysis, types of screening equipment</li> </ul> <p><b>Size reduction</b></p> <ul style="list-style-type: none"> <li>• Crushing and grinding machinery</li> <li>• Introduction to theory of size reduction</li> <li>• Power consumption</li> </ul>
III	<p><b>Drying</b></p> <ul style="list-style-type: none"> <li>• Classification of dryers</li> <li>• Special drying machinery used in textiles</li> <li>• Equilibrium moisture content, bound, unbound and free water</li> </ul> <p><b>Evaporation</b></p> <ul style="list-style-type: none"> <li>• Evaporator types and their description, accessories, capacity, heat and material balance, evaluation of boiling point</li> </ul>
IV	<p><b>Distillation</b></p> <ul style="list-style-type: none"> <li>• Terms and definitions, vapour-liquid equilibrium, boiling point diagrams</li> <li>• Equilibrium distillation, differential distillation and steam distillation</li> </ul>
V	<ul style="list-style-type: none"> <li>• Simple treatment of fluid flow</li> <li>• Heat transfer</li> <li>• Heat exchangers</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>• Unit Operations-Mecabe, Smith</li> </ul>

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## PRACTICALS

### 6 TC 7 TEXTILE PRINTING LAB I :

Hrs/week – 4

Max marks - 100

Printing of cotton with various methods viz. blocks, roller and screen by using various classes of dyes.  
Printing of cotton fabric with different styles e.g. Direct, Discharge, Resist style etc.  
Printing of woolen and silk fabrics.

### 6TC 8 COMPUTER COLOUR MATCHING LAB:

Hrs/week – 2

Max marks – 50

Experiments based on measuring optical density, transmittance etc.  
Study the reflectance curves of various colored samples, munsell color order system and hue, value, chroma, CIE illuminants, standard observers, tristimulus values, chromaticity coordinates, L a b values, K/S values, Strength measurement, whiteness and yellowness index, color difference, metamerism, staining and shade change.  
Preparation of primary datas for shade matching, shade correction

### 6TC 9 TEXTILE TESTING PRACTICAL- II :

Hrs/week – 4

Max marks - 100

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 fiber, 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.

### 6TC 10 COLOUR AND DESIGN PRACTICAL:

Hrs/week – 2

Max marks - 50

Colour, its nature and color perception in relation to the object, observer and light source.  
Dimensions and Attributes of color combination.  
Physical and Psychological aspects of color. Texture and its determinants.  
Application of computer aided design to textile Printing, Color separation, color reduction, marker preparation, Screen preparation  
Introduction to traditional Indian textiles and study of their Printing principles.

### 6TC 11 TEXTILE CHEMICAL ANALYSIS LAB- II

Hrs/week – 2

Max marks - 50

Fastness of dyes e.g. fastness to light, washing, rubbing, perspiration, sublimation International standards viz. AATCC, ASTM, BIS, ISO. Evaluation of extent of heat setting. Degree of mercerization, Barium activity number. Estimation of mechanical and chemical degradation of cotton, wool, silk, determination of copper number, cup ammonium fluidity, ethylene blue number, CDT, amino end groups in nylon.

### 6TCDC Discipline & Extra Curricular Activities

Max marks-50



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SEVENTH SEMESTER  
B. TECH. (Textile Chemistry)

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**DYEING OF SYNTHETICS AND BLENDS**

7TC 1)

<b>Class B. TECH. (Textile Chemistry)</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	<ul style="list-style-type: none"> <li>• Classification and developments in disperse dyes</li> <li>• Various auxiliaries used in pet dyeing</li> </ul>
II	<ul style="list-style-type: none"> <li>• Pretreatments and dyeing of polyester, pet/cellulose, pet/wool blends by batch, semicontinuous, and continuous dyeing methods</li> <li>• Recent developments in dyeing techniques, problem associated with dyeing of such materials, common faults and their remedies</li> </ul>
III	<ul style="list-style-type: none"> <li>• Dyeing of nylon with various classes of dyes, barre and its rectification, dyeing of nylon blends, leveling agents for nylon dyeing</li> <li>• Dyeing of acrylic fiber with new basic dyes, faults and remedy, retarders</li> <li>• Dyeing of micro fiber fabrics, textured yarn and fabrics</li> <li>• Dyeing of new fiber viz Lyocell, Lycra, Modal</li> </ul>
IV	<ul style="list-style-type: none"> <li>• Mass coloration of polyester, nylon, acrylics, polypropylene and viscose fibers</li> <li>• Thermosol method of dyeing</li> <li>• E-control dyeing, dyeing with super critical carbon dioxide</li> </ul>
V	<ul style="list-style-type: none"> <li>• Dyeing machines for synthetic fibers e.g. high temperature high pressure</li> <li>• Beam dyeing, jet dyeing, soft flow machines</li> <li>• Development in dyeing machines</li> <li>• Dyeing of loose fibers, yarns</li> </ul>
<b>Books &amp; Author's</b>	Dyeing of Polyester and its blends-Edited by M.L. Gulrajani Technology of Dyeing-V.A. Shehnaï Vol 6 Physical Chemistry of Dyeing-Vickerstaff Textile Chemistry Vol 3- R. H. Peters Theory of coloration of textiles-C. L. Bird Dyeing and Chemical Technology of Textile Fibers- E. R. Trotman Textile Processing and Properties- Vigo Chemical Processing of Synthetic Fibers and blends-Datye and Vaidhya Chemical Processing of Polyester and its Blends-R.M. Mittal & Trivedi



**TECHNOLOGY OF FINISHING****( 7TC 2)**

<b>Class B. TECH. (Textile Chemistry)</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>• Classification of various finishes</li><li>• Principle of finishing of cotton, wool, silk and linen textile materials.</li></ul>								
<b>II</b>	<ul style="list-style-type: none"><li>• Various semi permanent, permanent finishes e.g. starch finish, wash and wear, easy care finish, formaldehyde free finishes, anti shrink finish, water repellent finish, water proof finish, rot and mildew proof, soil release, fire retardant finishes for natural fibers</li></ul>								
<b>III</b>	<ul style="list-style-type: none"><li>• Organdie, Zero -Zero finish and softening of textile materials.</li><li>• Low liquor application techniques like foam finishing</li></ul>								
<b>IV</b>	<ul style="list-style-type: none"><li>• Weighting of silk, scroop finish on silk fabrics</li><li>• Finishing of woolen textile materials e.g. blankets, shawls, blazers</li><li>• Moth proofing of woolen materials</li></ul>								
<b>V</b>	<ul style="list-style-type: none"><li>• Finishing machinery's e.g. Stenter, Calendar, Sanforising, Decatising</li></ul>								
<b>Books &amp; Author's</b>	<table><tbody><tr><td><b>Introduction to Textile Finishing</b></td><td><b>J.T. Marsh</b></td></tr><tr><td><b>Chemical Processing of Synthetic Fibers and blends</b></td><td><b>Datye and Vaidhya</b></td></tr><tr><td><b>Textile Finishing</b></td><td><b>V.A. Shehnai</b></td></tr><tr><td><b>Chemical Finishing of Synthetic Fibres and Fabrics</b></td><td><b>Lewin &amp; Cello</b></td></tr></tbody></table>	<b>Introduction to Textile Finishing</b>	<b>J.T. Marsh</b>	<b>Chemical Processing of Synthetic Fibers and blends</b>	<b>Datye and Vaidhya</b>	<b>Textile Finishing</b>	<b>V.A. Shehnai</b>	<b>Chemical Finishing of Synthetic Fibres and Fabrics</b>	<b>Lewin &amp; Cello</b>
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<b>Chemical Finishing of Synthetic Fibres and Fabrics</b>	<b>Lewin &amp; Cello</b>								

Engineering of Textile Structure –I

[7TC3]

[Common with 7TT3, 7TE3]

<b>Class B. TECH. (Textile Chemistry)</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, 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 fiber yarns</b> <ul style="list-style-type: none"> <li>• The practical and experimental studies</li> <li>• Mechanics of staple fiber yarns</li> <li>• Hamburger model and later modifications</li> <li>• Spin ability of and torsional behavior of Fibers and yarns</li> </ul>	
<b>Books &amp; Author's</b>	<b>Structural Mechanics of Fibre, Yarn, Fabrics</b> <b>Structure of Yarn</b>	<b>JWS Hearle, P Grosberg &amp; S Backer</b> <b>Witold Zurek</b>

**Energy conservation in wet processing****(7 TC 4)**

<b>Class B. TECH. (Textile Chemistry)</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>• Different forms of energy use</li><li>• Efficiency of energy utilization and energy conservation</li><li>• Sources of energy including non-conventional sources</li></ul>
<b>II</b>	<ul style="list-style-type: none"><li>• Conservation of water and steam in chemical processing of textiles</li><li>• Electrical energy saving.</li></ul>
<b>III</b>	<ul style="list-style-type: none"><li>• Study of different wastages in chemical processing of textiles</li><li>• Energy audits</li></ul>
<b>IV</b>	<ul style="list-style-type: none"><li>• Process control in wet processing</li><li>• Study of boilers and improvement in efficiency</li></ul>
<b>V</b>	<ul style="list-style-type: none"><li>• RF driers</li><li>• Minimum application technique</li><li>• Foam finishing</li><li>• Vacuum system</li></ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"><li>• Energy Conservation in Textile wet Processing Sanjay Gupta and M. L. Gulrajani</li><li>• Chemical Processing of Synthetic Fibers and blends Datye and Vaidhya</li></ul>

**POLLUTION CONTROL AND PROCESS HOUSE MANAGEMENT:****(7TC 5)**

<b>Class B. TECH. (Textile Chemistry)</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>• Hazards in man made fiber production and wet processing</li><li>• Toxicity of dyes, intermediates, auxiliaries, finishing chemicals</li><li>• Textile effluent and their characterization, measurement of effluent strength, methods of treatment, disposal and recycling of effluents</li></ul>
<b>II</b>	<ul style="list-style-type: none"><li>• Management Information system (MIS)</li><li>• Handling of chemicals, processed goods, storing of goods for subsequent operations or for final product, Ventilation and lighting systems</li><li>• Causes of accidents in process houses, safety devices, methods for minimizing accidents</li></ul>
<b>III</b>	<ul style="list-style-type: none"><li>• Duties and responsibilities of process house staff</li><li>• Costing as an aid to management, elements of costing, control of materials, stores and labor cost</li><li>• Classification and distribution of overheads, depreciation and different system of providing depreciation</li></ul>
<b>IV</b>	<ul style="list-style-type: none"><li>• Determination of cost per meter of processed goods, Process control in process houses</li><li>• Objectives of material management</li><li>• Nature and scope of material management</li></ul>
<b>V</b>	<ul style="list-style-type: none"><li>• Inventory management and inventory control</li><li>• Store management and stock verification</li><li>• Human resource development system, concept and process of human resource planning</li></ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"><li>• Orientation Programme in Wet Processing-BTRA Publication</li><li>• Chemical Processing of Synthetic Fibers and blends-Datye and Vaidhya</li></ul>



**ELECTIVE**

**WET PROCESSING MACHINES**

(7TC6.1)

Class B. TECH. (Textile Chemistry)	Evaluation
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>Functional design of coloration machines – Fiber, lap, Tow and Yarn dyeing machines. Jigger, winches</li> </ul>
II	<ul style="list-style-type: none"> <li>Pressure beam, various types jet (fully flooded, partially flooded, TSF) dyeing machines</li> </ul>
III	<ul style="list-style-type: none"> <li>Mangles, open-width washers, hydro extractors, vacuum/steam impregnators, singeing machine, continuous bleachers and steamers, mercerize, solvent scouring machines</li> </ul>
IV	<ul style="list-style-type: none"> <li>Cylinder dryers, stenter, garment dyeing machines, rotary, flat-bed printing machines, calendars</li> </ul>
V	<ul style="list-style-type: none"> <li>Fabric transport devices, synchronization of machinery, Instrumentation and process control, boiler plant and electricity supply</li> </ul>
Books & Author's	<ul style="list-style-type: none"> <li>Chemical Processing of Synthetic Fibers and blends-Datye and Vaidhya</li> <li>Dyeing of Polyester and its blends-Edited by M.L. Gulrajani</li> <li>Introduction to Textile Finishing-J.T. Marsh</li> <li>Dyeing and Chemical Technology of Textile Fibers- E. R. Trotman</li> </ul>

**WET PROCESSING OF WOOL**

7TC6.2

Class B. TECH. (Textile Chemistry)	Evaluation
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>Different varieties and quality of wool fiber, impurities in wool.</li> <li>Scouring and bleaching of wool fibers, machines for wool scouring, bleaching.</li> </ul>										
II	<ul style="list-style-type: none"> <li>Processing of woolens and worsted.</li> <li>Milling, crabbing and super contraction.</li> <li>Dyeing of woolen materials in loose fiber form, tops, hanks and fabric.</li> </ul>										
III	<ul style="list-style-type: none"> <li>Dyeing with various classes of dyes viz. acid, metal complex, chrome dyes, reactive dyes, natural dyes.</li> </ul>										
IV	<ul style="list-style-type: none"> <li>Finishing of woolen materials, application of various finishes viz. blowing, KD, rotary press, paper press, London shrinkage.</li> <li>Shrink proofing of wool</li> </ul>										
V	<ul style="list-style-type: none"> <li>Processing of wool blends e.g. wool cotton, polyester wool</li> <li>Flame retardant finish on woolen materials.</li> </ul>										
Books & Author's	<table border="0"> <tr> <td>Dyeing and Chemical Technology of Textile Fibers</td> <td>E. R. Trotman</td> </tr> <tr> <td>Textile Processing and Properties</td> <td>Vigo</td> </tr> <tr> <td>Finishing of woolen material</td> <td>A. R. Brady</td> </tr> <tr> <td>Textile fibers and their uses</td> <td>K. P. Hess</td> </tr> <tr> <td>Chemical Processing of Polyester and its Blends-R.M.</td> <td>Mittal &amp; Trivedi</td> </tr> </table>	Dyeing and Chemical Technology of Textile Fibers	E. R. Trotman	Textile Processing and Properties	Vigo	Finishing of woolen material	A. R. Brady	Textile fibers and their uses	K. P. Hess	Chemical Processing of Polyester and its Blends-R.M.	Mittal & Trivedi
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## **B. PRACTICALS**

### **7TC 7 DYEING OF SYNTHETIC FIBRES LAB:**

**Hrs/week – 4**

**Max marks - 100**

Dyeing of various synthetic fibers e.g. polyester, nylon, acrylic blends with various classes of dyes.  
Shade matching on cellulose with vat, reactive and sulphur dyes.

### **7TC 8 TEXTILE FINISHING LAB:**

**Hrs/week – 4**

**Max marks - 100**

Finishing of cotton, wool, silk, synthetics and blended fabrics.  
Finishing of textiles to obtain different effect viz. crease resistance, water repellent, flame retardant, softening, stiffening, soil release, antistatic etc.  
Bio polishing of cotton fabrics, teflon finishes etc.  
Study of heat setting and evaluation.

### **7TC 9 PROJECT STAGE-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 Chemistry** 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.

### **7 TC 10 PRACTICAL TRAINING AND INDUSTRIAL VISIT :**

**Hrs/week – 4**

**Max marks - 100**

3 Detailed study of process sequences and machines involved in the concerning industry, problems occurring and preventive measures taken by the concerned industry.  
Inventory control and determination of cost involved in various processing steps.  
Utility management viz. water, electricity, power etc. of the concerned industry.  
Determination of workload distribution based on production.

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### **7TCDC Discipline & Extra Curricular Activities**

**Max marks-50**



EIGHTH SEMESTER  
B. TECH. (Textile Chemistry)

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**TEXTILE AUXILIARIES:****(8TC 1)**

<b>Class B. TECH. (Textile Chemistry)</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>Detailed classification of textile auxiliaries, various anionic, cationic and nonionic agents</li> </ul>
II	<ul style="list-style-type: none"> <li>General methods of preparation and specific uses in textile processing auxiliaries . scouring, bleaching, mercerizing, dyeing and printing auxiliaries</li> </ul>
III	<ul style="list-style-type: none"> <li>Physical principles involved in detergency and wetting, HLB numbers</li> <li>Principles of action of auxiliaries based on surface active agents</li> <li>Surface activity, wetting, dispersing, stripping agents and leveling agents</li> </ul>
IV	<ul style="list-style-type: none"> <li>Emulsification theory and emulsifying agents.</li> <li>Different softening agents and their application</li> <li>Optical brightening agents and their application.</li> </ul>
V	<ul style="list-style-type: none"> <li>Sequestering agents and their utility in processing</li> <li>Eco friendly auxiliaries</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Chemistry of Textile Auxiliaries- V.A. Shehnai</li> <li>Detergents-Daytner</li> <li>Scouring and Bleaching- E.R. Trotman</li> <li>Colorants and Auxiliaries by John Shore</li> </ul>

**ADVANCEMENT IN TEXTILE FINISHING****(8TC 2)**

<b>Class B. TECH. (Textile Chemistry)</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	<ul style="list-style-type: none"> <li>Developments in finishing machines</li> <li>Finishing of synthetics and union fabrics e.g. 100% polyester, nylons, acrylics and their blends with cotton, viscose, wool</li> <li>Heat setting of various synthetics and union fabrics</li> </ul>
II	<ul style="list-style-type: none"> <li>Weight reduction of polyester fabrics, silk like polyester</li> <li>Finishing of sarees, dress materials</li> <li>Poly di methyl siloxanes, reactive silicones, amono silicones and development in silicone compounds</li> </ul>
III	<ul style="list-style-type: none"> <li>Antistatic finishes, soil release finishes, water proofing and breathable fabrics</li> <li>Formaldehyde free finishes</li> <li>Durable press finish</li> </ul>
IV	<ul style="list-style-type: none"> <li>Flame retardant finishes for cotton, polyester, polyester-cotton blends, wool, nylon and FR fibers</li> </ul>
V	<ul style="list-style-type: none"> <li>Study of latest finishing chemicals and auxiliaries viz. eco friendly finishes</li> <li>Protective clothing, anti microbial finishes, ballistic protection ,nano- finishing chemicals, plasma treatments, microencapsulation</li> </ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"> <li>Introduction to Textile Finishing-J T. Marsh</li> <li>Chemical Processing of Synthetic Fibers and blends-Daty and Vaidhya</li> <li>Textile Finishing- V.A. Shehnai</li> <li>Chemical Finishing of Synthetic Fibres and Fabrics-Lewin &amp; Cello</li> </ul>



**ENGINEERING OF TEXTILE STRUCTURES- II**

**[8TC3]**

**[Common with 8TT3, 8TE3]**

<b>Class B. TECH. (Textile Chemistry)</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>• 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>								
II	<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>								
III	<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>								
IV	<ul style="list-style-type: none"> <li>• Introduction about FAST and KAWABATA Instrument</li> </ul>								
V	<ul style="list-style-type: none"> <li>• Design of textile structures for certain functional end uses</li> </ul>								
<b>Books &amp; Author's</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><b>Structure of fibres, yarns and fabrics</b></td> <td style="width: 50%; border: none;"><b>Hearle, Backer and Grosberg</b></td> </tr> <tr> <td style="border: none;"><b>Textile properties</b></td> <td style="border: none;"><b>Kaswell</b></td> </tr> <tr> <td style="border: none;"><b>Journal of Textile Institute</b></td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;"><b>Textile Research Journal</b></td> <td style="border: none;"></td> </tr> </table>	<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>	
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<b>Textile Research Journal</b>									

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**ELECTIVES**  
**TECHNICAL TEXTILES**

[8TC4.1]

[Common with 8TE4.1,8TT4.1]

<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)]

Units	Contents of the Subject																		
I	<b>Introduction</b> Definition , Textile materials in technical applications <b>Fibers</b> Natural and man-made fibers suitable for technical application and their relevant properties <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.																		
II	<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.																		
III	<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 .																		
IV	<b>Protective Clothing</b> Thermal protection Ballistic protection Protection against micro organisms, chemicals and pesticides Protection from electromagnetic radiation and static hazards																		
V	<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. <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																		
<b>Books &amp; Author 's</b>	<table border="0"> <tr> <td><b>Textile Industries</b></td> <td><b>Murphy WS</b></td> </tr> <tr> <td><b>Textile Industry, " Technical Conference</b></td> <td><b>IEEE Publication</b></td> </tr> <tr> <td><b>On Textile Industry : Atlanta, 19778</b></td> <td></td> </tr> <tr> <td><b>India's Textile Industry</b></td> <td><b>Srinivasan, Kastury</b></td> </tr> <tr> <td><b>World Textiles: Investment Innovation,</b></td> <td><b>The Textile Institute,</b></td> </tr> <tr> <td><b>Invention – Annual World Conference on</b></td> <td><b>Manchester</b></td> </tr> <tr> <td><b>World Textiles and Investment Innovation</b></td> <td></td> </tr> <tr> <td><b>Invention"</b></td> <td></td> </tr> <tr> <td><b>Textile Journals, Magazines and Topical Reports</b></td> <td></td> </tr> </table>	<b>Textile Industries</b>	<b>Murphy WS</b>	<b>Textile Industry, " Technical Conference</b>	<b>IEEE Publication</b>	<b>On Textile Industry : Atlanta, 19778</b>		<b>India's Textile Industry</b>	<b>Srinivasan, Kastury</b>	<b>World Textiles: Investment Innovation,</b>	<b>The Textile Institute,</b>	<b>Invention – Annual World Conference on</b>	<b>Manchester</b>	<b>World Textiles and Investment Innovation</b>		<b>Invention"</b>		<b>Textile Journals, Magazines and Topical Reports</b>	
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**APPAREL INDUSTRY AND GARMENT PROCESSING****(8TC 4.2 )**

<b>Class B. TECH. (Textile Chemistry)</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>• Introduction to apparel industry their requirement in Indian Context</li><li>• Knitwear and garment industry</li><li>• Factors involved in the study of clothing science</li></ul>
II	<ul style="list-style-type: none"><li>• Functional description of clothing</li><li>• Physical properties of clothing and clothing material in relation to the comfort, thermal transmission</li><li>• Role of environmental conditions in the protective performance of garments</li></ul>
III	<ul style="list-style-type: none"><li>• Processing of denim garments</li><li>• Bio polishing</li><li>• Stone washing</li></ul>
IV	<ul style="list-style-type: none"><li>• Processing of knitwear garments, dyeing, durable press finish, printing of garments</li><li>• Limitation of garment processing</li></ul>
V	<ul style="list-style-type: none"><li>• Garment dyeing machines viz. paddle dyeing, rotary drum and high temperature circulation liquor machines</li><li>• Quality requirements in fabrics for garments</li><li>• Quality control in garments</li></ul>
<b>Books &amp; Author's</b>	<ul style="list-style-type: none"><li>• Clothing, Comfort &amp; Function, Lyman Fourt &amp; Norman R. S Hollies, marcel Dekker Inc. New York. 1970</li><li>• Colourage, Nov. 1994</li></ul>



## PRACTICALS

### 8TC 5 DYEING OF SYNTETICS AND BLENDS PRACTICAL :

Hrs/week – 4

Max marks - 100

Shade matching of polyester and blended textiles.  
Dyeing on jigger, winch and jet dyeing machines.  
Preparation of fancy yarn, vigraux printing.

### 8TC 6 TEXTILE PRINTING LAB –II:

Hrs/week – 4

Max marks - 100

Printing of polyester and its blends by using different methods and styles of printing.  
Screen preparation for manual and rotary screen printing machines.  
Printing of polyester, cotton and its blends by using of Pigment colours.  
Evaluation of thicker.

### 8TC 7 ADVANCED EXPERIMENTS IN DYEING:

Hrs/week – 2

Max marks - 50

Determination of dyeing kinetics, diffusion coefficient, exhaustion percentage by optical density methods.  
Effect of system variable parameter on exhaustion percentage of dyes.  
Preparation of datas for ccm, shade matching and shade correction using ccm technique

### 8TC 8 PROJECT STAGE II:

Hrs/week – 4

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 Chemistry** 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 candidates would submit 3 typed copies of the project report to the head of the deparatment/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.

### 8TC 9 SEMINAR:

Hrs/week –nil

Max marks - 100

8TCDC Discipline & Extra Curricular Activities

Max marks-50

