

## Textile Technology (TX)

### Engineering Mathematics

**Linear Algebra:** Matrices and Determinants , Systems of linear equations , Eigen values and Eigen vectors.

**Calculus :**Limit continuity and differentiability; Partial Derivatives; Maxima and Minima; Sequences and series ; Test for convergence ; Fourier series

Vector Calculus : Gradient ;Divergence and Curl ; Line a; Surface and volume integrals ; Stokes ,Gauss and Green's theorems

**Differential Equations :** Linear and non-linear first order ODE's; Higher order linear ODE's with constant coefficients ;Cauchy's and Euler's equations ; Laplace transforms; PDE's- Laplace ,heat and wave equations.

**Probability and Statistics :** Mean , median, mode and standard deviation ; Ransom variable; Poisson , normal and binomial distributions ; Correlation and regression analysis.

**Numerical Methods:** Solutions of linear and non-linear algebraic equations ;integration of trapezoidal and Simpson's rule ; single and multi-step methods for differential equations.

### General Textile Technology

**Textile Fibres:** Classification of textile fibres, fibre properties , New fibres ,Substrate & Geometry, Spinning of Man Made fibres and terms related , spinnerets, properties of cotton, wool, silk and bast fibres, comparison of natural and man-made fibres for production and properties , Spin finish, types of silk yarns, types of silk fabrics, Types of yarn (single, multi fold & Fancy) ,

**Silk Technology :** types of silks ,production of Silk from Mulberry , rearing , reeling , throwing process, elements of quality in Silk

**Yarn Count systems:** Yarn Numbering systems, differences , conversion from one system to other

**New and Unconventional Natural fibres :**Organic, Bt, PALF, Bamboo, Maize, applications

**Textile Testing:** objectives, number of sample and sample preparation methods ,Testing of fibres, yarns & fabrics for properties , interpretation of results using statistics, role of SHF, KESF, FAST, AFIS systems

### Yarn Manufacture :

**Blow Room :**Cotton selection , Mixing and Blending , selection of openers and cleaners , parameters controlling quality ,Modern developments in openers and Blow room

**Carding Drawing :** Objectives , elements , role played , setting , modern developments in Card and , drawframe, quality control aspects

**Comber and Simplex:** Preparatory process to combing, selection of machines , quality control at comber ; Simplex Objectives , elements , role played , setting , modern developments and quality control

**Ring Frame and Post spinning :** Objectives , elements , role played , setting , modern developments and quality control in Ring spinning; post spinning machines, selection.

**Spin Plan :** preparation of spin plan for cotton, blends and synthetics

**Advanced yarn Manufacture :** principles of open end spinning, selection criterion, elements and working of Rotor, DREF, and Airjet spinning

**Texturing :** principles and methods of texturing , application

**Fabric Manufacture :**

**Winding** :types of spinning packages , principles of winding , selection criterion , systems of yarn preparation, practical aspects, kinetics of winding , productivity of winding , quality control aspects and production planning

**Warping** : types of warping, selection criterion, practical aspects, practical aspects of sectional warping , productivity , quality control aspects and production planning.

**Sizing** : different methods of types of Sizing , elements of sizing machine , Size preparation and devices , Size ingredients and selection , calculation of concentration of size recipe, Quality control aspects , role of each zone, productivity of winding , quality control aspects and production planning

**Post sizing** : selection of heald, reed and drop wire, and their selection.

**Loom shed** : Weave preparatory plan, Introduction to Weaving, Loom specification and Loom(Shuttle)classification and elements and mechanisms, quality control and production aspects, Loom primary and secondary motions ,shedding devices and sheds, Automatic weaving , Dobby and Jacquard shedding , box motions , practical problems, Timing of looms , setting of looms for different types of fibres and sorts,

**Unconventional weaving** : principles , selection criterion, working elements of Gripper projectile, Rapier , Airjet and Waterjet weaving , multiphase weaving, triaxial weaving .

**Fabric structure , Knitting , Nonwovens and Textile wet Processing**

**Fabric structure** : elements of fabric structure , representation, primary , secondary and special weaves, compound structures and their features .

**Knitting** : Principles of loop formation in latch , beard and compound needle in weft knitting , machine arrangement for rib, purl and interlock, methods of representation of knit structure , geometry of knits, elements of warp knitting , machine aspects, loop formation in latch , beard and compound needle , type of warp knit structure , calculations in weft and warp knitting

**Nonwoven fabrics**: differences between woven, knitted and nonwoven , methods of nonwoven, selection, production of needle punched nonwoven , properties and applications

**Textile wet processing** : grey cloth inspection, method of water calculation , elements, process and parameters of singeing , desizing , scouring , bleaching , mercerizing and quality control aspects, dyeing and elements of dyeing , dyes and classification, dyeing methods , faults of dyeing, printing and its elements , methods of printing , print paste preparation and elements of print paste , role played by each element, printing machines , selection of printing methods; finishing elements and methods , types of finishes and machines used

**Apparel Technology**

**Sourcing** : Need, Scope, role played by Sourcing manager

**Markers & Marker Planning**: Need and scope of Markers, types, Marker making Methods (Manual and Automated), constraints on fabric width, checks and stripes, constraints on grain direction.

**Spreading** : Need, Objectives, requirements and methods of spreading, economic cut quantities, factors affecting economic cut quantities, computerized cut order planning

**Cutting**: Objectives, methods of cutting , Types of cutting machines and applications, study on computer controlled cutting machine, Role of CNC machines in cutting, Laser, water Jet and Plasma cutting. Sticking, Bundling, Dispatch

**Sewing technology:** Introduction to sewing machines, Types, Sewing Machine- components and functions of sewing machine. Embroidery machines – mechanism, stitch formation, Computer controlled embroidery sewing machine. Selection of Stitches & Stitching Mechanism: classification ,Comparison of stitches and Its usage.Seams: definition, types of seams, Seam Finishes

**Sewing threads:** types, selection of sewing threads, sewing problems. Sewing thread consumption , work aids, Care labelling

**Fusing technology:** Need, methods, requirement of fusing process, fusing machinery. quality control in fusing. Pressing of garment and equipment.

**Washing:** Types, principles of laundering, different methods of washing, characteristics of washing machine