

PAPER – I TEXTILE TECHNOLOGY (DEGREE STANDARD)

CODE NO: 306

Unit - I: Fibre Identification and Blend analysis

- i) Textile fibre Classification.
- ii) Fine, gross structure and properties of fibres
- iii) Microscopic, physical and chemical test methods for fibre identification; blend analysis
- iv) Morphology characterization – Density, XRD, Electron microscopy v) Thermal characterization methods - DSC, DMA / TMA, TGA

Unit - II: Physical Properties of Fibres

- i) Mechanical – Tensile, Elastic recovery, Time Effect, Bending, Twisting & Compression
- ii) Optical - Absorption and dichroism, Reflection and lustre.
- iii) Electrical and Thermal Properties - Dielectric property, Static Electricity, Structural changes in fibres on thermal treatment

Unit - III: Synthetic Fibre Spinning and Post Spinning Operations

- i) Requirements of fibre forming polymers
- ii) Spinning of Polymers - Melt Spinning, Wet spinning, Dry spinning
- iii) Post Spinning Operations – Drawing, Crimping, Heat setting, Tow-to-top conversion, Texturing methods

Unit - IV: Spinning:

- i) Principles of opening, cleaning and mixing/blending of fibrous materials ii) Draft and Drafting, Irregularity introduced by drafting
- iii) Roller arrangements in drafting systems;
- iv) Combing cycle, combing efficiency, lap preparation;
- v) Mechanism of roving bobbin building, roving twist;
- vi) Ring Cop formation, forces acting on yarn and traveller;
- vii) Single and folded yarn twist, production of core spun / compact spun yarn.
- viii) Alternate Spinning systems - rotor spinning, air jet spinning, friction spinning.
- ix) Principles of long staple spinning – Jute, Wool

Unit - V: Weaving:

- i) Warp winding - random and precision winding, winding parameters ii) Yarn clearers and Tensioners; yarn splicing**
- iii) Types of warping - beam and sectional warping, pirn winding process;
- iv) Sizing Techniques, sizing of spun and filament yarns
- v) Primary, Secondary and Tertiary motions of loom, Loom timings. vi) Tappet, Dobby and Jacquard shedding;
- vii) Principles of Shuttleless Weft insertion systems.
- viii) Principles of Circular and Multiphase weaving
- ix) Basic woven fabric constructions and its derivatives

Unit - VI: Testing & Quality Control:

- i) Sample selection techniques using statistics.
- ii) Measurement of fibre length, strength, fineness, maturity iii) HVI and AFIS techniques
- iv) Determination of yarn count, twist and hairiness v) Tensile testing of fibres, yarns and fabrics
- vi) Evenness testing of slivers, rovings and yarns
- vii) fabric properties - air permeability, drape, crease recovery, tear / bursting strength & abrasion.

- viii) Objective Evaluation of fabric hand - FAST and KESF
- ix) Statistical analysis of experimental results – Mean, SD, CV%

Unit - VII: Chemical Processing:

- i) Preparatory processes for natural fibres, synthetics and common blends ii) Dyeing of fibres using various dye classes.
- iii) Batch-wise and continuous dyeing techniques
- iv) Styles of printing. Printing thickeners and auxiliaries. v) Printing of cotton with reactive dyes.
- vi) Printing of polyester with disperse dyes.
- vii) Mechanical and chemical finishing of cotton

Unit - VIII: Knitting & Garments:

- i) Knitting - Yarn quality requirements, principles of weft and warp knitting ii) Basic weft and warp knitted structures and its properties
- iii) Garments - Pattern making, Spreading, Cutting, Marker efficiency iv) Stitches and Seams
- v) Types of Sewing machine vi) Sewing thread attributes
- vii) Inspection and Merchandising

Unit - IX: Nonwovens & Technical Textiles:

- i) Nonwovens - Web formation
- ii) Bonding methods – mechanical, thermal and chemical. iii) Finishing and Application of nonwovens
- iv) Technical Textiles - Property requirements
- v) Industrial Textiles - Belts, Ropes, Tyre-cords, Coated abrasives vi) Automotive Textiles - Filter fabrics, Airbags, Carpets
- vii) Geotextiles – Applications in civil engineering
- viii) Agriculture Textiles – Crop covers, bird nets, soil mats and sacks ix) Packaging Textiles – Food packing and bags.

Unit - X: Textile Management & Environment Conservation:

- i) Industrial Engineering – Work study, method study, ii) Costing – Elements, Balance sheet, P & L Account
- iii) Tools – TQM, 5S, Kaizen, MIS. iv) Marketing Management
- v) Industrial relations and Labour laws
- vi) Energy conservation in textile production process, vii) Characteristics of Effluent
- viii) Effluent treatment.