

TEXTILE TECHNOLOGY

Fibre Science and Technology : Cotton varieties and their properties; silk – pre and post cocoon operations; varieties of silk and their properties; varieties of wool and their properties; properties of other natural fibres.

Production and properties of viscose rayon and other regenerated fibres.

Requirements of fibre forming polymers; structural principles of polymeric fibres; fluid flow during spinning; technology of melt, wet, dry, dry jet wet, liquid crystal and gel spinning of polymeric fibres.

Production, properties and applications of PET polyester, nylon 6, nylon 66, polyacrylonitrile and polypropylene.

Spin finishes; drawing; heat setting; crimping and texturisation; tow to top converters and tow to staple converters.

Structural investigation of fibres; study of moisture absorption, tensile behaviour, torsional rigidity and flexural rigidity, and optical, frictional, electrical and thermal properties of fibres.

Yarn Engineering: Yarn numbering systems- direct, indirect and conversions.

Description and working of short staple spinning machinery - blow-room machinery, card, comber preparatory machines, comber, draw-frame, speed-frame, ring-frame; calculation of process parameters and process efficiencies; production calculations.

Methods of mixing and blending; two-folding of yarns; two for one twist principle; man-made fibre processing.

Principle and details of yarn formation in condensed yarn spinning, rotor spinning, friction spinning, air-jet spinning and other new spinning systems; structure of yarns produced from different spinning systems. Control of waste, productivity and quality.

Fabric Engineering : Fundamental concepts in winding, modern automatic winders; yarn clearing; winding synthetic and blended yarns and sewing threads; weft winding; Creels used in warping machines; beam and sectional warping machines; Sizing materials and recipes: size preparation and application; control systems used in sizing machine; sizing filament yarns; combined dyeing and sizing; energy conservation in sizing; process control in weaving preparation; preparation of warp beam for weaving.

Yarns quality requirements and preparations for high speed weaving machines.

Principles and limitations of various shedding, picking mechanisms; power required for picking; timing different mechanisms; automation and modern developments in weaving machine; cloth formation; loom accessories; process control in weaving.

Cloth geometry; cover factor; concepts in fundamental and advanced woven fabric designs.

Quality and preparation of yarn required for knitting; basic weft knitted structures and their production; needle control in weft knitting machines; factors affecting the formation of loop; effect of loop length and shape on fabric properties; process control in knitting; warp knitting fundamentals.

Web forming techniques for dry method of web preparation; production of bonded fabrics by mechanical, chemical and thermal methods; productions of spun bonded and melt blown fabrics; end uses of bonded fabrics.

Chemical Processing : Chemical structure and chemical properties of natural and man-made fibres; singeing; desizing; scouring; bio preparatory operations; Mercerization; bleaching; heat setting; processing machines.

Adsorption isotherms; dye-fibre interaction; properties and application of direct, azoic, vat, sulphur, reactive, acid, mordant, metal-complex, disperse and basic dyes; dyeing of blends; garment dyeing; assessment of colour fastness.

Fundamentals of colour measurement; whiteness and yellowness indices; colour matching; spectrophotometers.

Methods and styles of printing; printing machines; printing paste; printing with direct, reactive, acid and disperse dyes and pigments.

Calendering; crease proofing; anti-shrinking; softening; felting and non-felting of wool; bio-polishing; assessment of finishes; assessment of eco-friendliness of textiles; finishing of knits; garment washing.

Quality Evaluation: Textile quality parameters; online and off line testing methods.

Measurement of length and length uniformity, fineness, strength, maturity, trash content, moisture content of fibres using conventional and modern testing methods; advanced fibre information systems, high volume testing; measurement of lap, sliver and roving irregularity.

Assessment of count, twist, hairiness, strength and extension, evenness, imperfection, friction, crimp rigidity, work of rupture, fatigue, abrasion resistance of yarn; classification of yarn faults.

Determination of fabric construction parameters; assessment of tensile, bursting and tear strengths, low-stress mechanical properties, permeability, insulation properties, durability, comfort and handle properties of fabrics; grading of fabrics based on defects. Sampling; statistical significance tests; control charts.

