

SYLLABUS FOR THE POST OF LECTURER (TECHNICAL)



Subject: TEXTILE TECHNOLOGY

1. TEXTILE FIBRE:

Classification of textile fibres; Essential requirements of fibre forming polymers; Gross and fine structures of natural fibres like cotton, wool, silk; Introduction to bast fibres; Properties and uses of natural and man-made fibres including carbon, aramid and ultra-high molecular weight polyethylene fibres; Physical and chemical methods of fibre and blend identification and blend analysis.

Molecular architecture, amorphous and crystalline phases, glass transition, plasticization, crystallization, melting, factors affecting T_g and T_m ; Polymerization of nylon-6, nylon-66, poly(ethylene terephthalate), polyacrylonitrile and polypropylene; Melt spinning processes for PET, polyamide and polypropylene; Preparation of spinning dope; Principles of wet spinning, dry spinning, dry-jet-wet spinning and gel spinning; Spinning of acrylic, viscose and other regenerated cellulosic fibres such as polynosic and lyocell; Post spinning operations such as drawing, heat setting, tow-to top conversion; Spin finish composition and applications; Different texturing methods.

Methods of investigating fibre structure such as density, x-ray diffraction, birefringence, optical and electron microscopy such as SEM and TEM, I.R. spectroscopy, thermal methods such as DSC, DMA, TMA and TGA; Structure and morphology of man-made fibres; Mechanical properties of fibres; Moisture sorption of fibres; Fibre structure-property correlation.

2. YARN MANUFACTURE

Principles of ginning; Principles of opening, cleaning and blending; Working principles of modern blow room machines; Fundamentals of carding; Conventional vs. modern carding machine; Card setting; Card clothing; Periodic mass variation in card sliver; Card auto leveller; Principles of roller drawing; Roller arrangements in drafting systems; Periodic mass variation in drawn sliver; Draw frame auto leveller; Principles of cotton combing; Combing cycle and mechanisms; Recent developments in combing machine; Principles of drafting, twisting, and bobbin building in roving formation; Modern developments in roving machine; Principles of drafting, twisting and cop building in ring spinning; Causes of end breakages; Modern developments in ring spinning machine; Working principles of ring doubler and two-for-one twister; Relationship between single yarn twist and folded yarn twist; Principles of compact, rotor, air-jet, air-vortex, friction, core, wrap and twist-less spinning processes.

3. FABRIC MANUFACTURE

Primary and secondary motions of loom; Shedding motion; Positive and negative shedding mechanisms; Type of sheds; Tappet, dobby and jacquard shedding; Weft insertion; Mechanics of weft insertion with shuttle; Shuttle picking and checking; Beat-up; Kinematics of sley; Loom timing diagram; Cam designing; Effect of sley setting and cam profile on fabric formation; Take-up and Letoff motions; Warp and weft stop motions; Warp protection; Weft replenishment; Principles of weft insertion systems of shuttle-less weaving machines such as projectile, rapier, water-jet and air-jet; Principles of functioning of multiphase and circular looms; Types of selvages.



Basic woven fabric constructions and their derivatives; Crepe, cord, terry, gauze, leno and double cloth constructions; Drawing and lifting plans.

Fundamentals of weft knitting; Classification of weft knitting technologies; Weft knitted constructions such as plain, rib, interlock and purl; Different knit stitches such as loop, tuck and float. Principle of warp knitting; Classification of warp knitting technologies; Swinging and shogging motion of guide bar; Basic warp knit construction such as pillar, tricot, atlas, inlay and nets

4. TESTING

Sampling techniques for fibres, yarns and fabrics; Sample size and sampling errors. Moisture in textiles; Fibre length, fineness, crimp, maturity and trash content; Tensile testing of fibres; High volume fibre testing. Linear density of sliver, roving and yarn; Twist and hairiness of yarn; Tensile testing of yarns; Evenness testing; Fault measurement and analysis of yarns.

Fabric thickness, compressibility, stiffness, shear, drape, crease recovery, tear strength, bursting strength, pilling and abrasion resistance; Tensile testing of fabrics; Objective evaluation of low stress mechanical characteristics; Air permeability; Wetting and wicking; Water-vapour transmission through fabrics; Thermal resistance of fabrics.
Dye fastness on fabrics.

5. TEXTILE WET PROCESSING

Preparatory process for wet processing.

Classification of Dyes and their application on cellulosic, protein and manmade fibres/yarn/fabric.

Different methods and styles of printing. Application of common finishes on textiles.