

3. SYNTHETIC FIBER TECHNOLOGY

Module I (16 Hours)

Introduction to natural and synthetic fiber forming polymers: Essential characteristics and molecular architecture of fiber forming polymers

Concept of order in polymers: crystallinity, orientation, physical structure of natural and man-made fibers

Synthesis of synthetic fiber forming polymers: Nylons, polyester, Orlon, polyolefins, PVC and copolymer fibers, spandex, Teflon, carbon-fibers, aromatic polyesters and aromatic nylons, high performance fibers

Module II (10 Hours)

Spinning techniques: Melt spinning, dry and wet spinning of fibers

Post spinning operations: Fiber drawing, heat setting, texturing

Dyeing and finishing of man-made fibers: General principles of finishing and dyeing of fibers. Common types of finishes applied to textile fibers

Fiber drawing, heat setting, texturing, structural & mechanical properties and applications of fibers based on: viscose, cellulose acetate, polyamides, polyesters, acrylics, polypropylene, glass and carbon-fibres

Module III (10 Hours)

Identification, analysis and testing of synthetic fibers: Physical methods for investigating fiber structure. Optical properties of oriented polymers and fibres, refractive index and birefringence

Socio-economic aspects of synthetic fibers, advanced fiber technology, bi- and multi-component fibers, hollow fibers, hard elastic fibers, geotextile fibers, Fiber reinforced plastics (FRP)

Text and Reference Books:

1. Billmeyer Jr.; Fred W., Synthetic Polymers, Doubleday and Co. Inc., New York (1972).
2. Gupta, V.B., and Kothari, V.K., Manufactured Fibre Technology, Chapman & Hall, 1997.
3. Fourne, Franz, "Synthetic Fibres, Machines and Equipment, Manufacture, Properties", Hanser Publisher, 1999.
4. Corbman, Bernard P, "Textiles fibre to fabric", Sixth Edition, McGraw Hill, 1983