PCTX4203 **Fibre Science and Technology – II**

Module-I **(10 hours)**

1. **Mechanical properties of Textile fibres** :Basic definition- true stress, specific stress, tenacity and breaking length, recapitulation of elastic and plastic deformation, Hook's law and Poisson's ratio; stress-strain curves; comparative stress-strain diagrams of different fibres.

2. **Elastic recovery, strain recovery, work recovery:** Shear, bending, torsion and compression;

3. **Other properties**
   a) Optical Properties, b) Thermal properties, c) Fibre friction and d) Dielectric properties.

Module-II **(10 hours)**

4.Structure of Fibres :

a. **Morphological structure** : Longitudinal and cros-sectional view of natural and man-made fibres.
b. **Chemical structure** :: chemical structure of synthetic fibres, chemical structure of natural fibres-vegetable or cellulosic, animal or polypeptide fibres, recapitulation of bonding in polymer fibres – primary bonding, secondary bonding, methods of investigating structure-idea of infrared spectroscopy, x-ray, microscopy, NMR etc;
c. **Microstructure and macrostructure of fibres:** Recapitulation of crystalline and non-crystalline materials –structure of crystals, polymer crystals, X-ray diffraction and crystallinity, thermal analysis of polymers by DTA, TGA and DSC.

Module-III **(10 hours)**

5. Texturing: Introduction, purpose, bulked and textured yarns, methods of texturing thermoplastic and non-thermoplastic yarns- basic principles, feed material characteristics-study of twist-set-detwist, false twist, edge crimp, stuffer box crimp; knit de-knit techniques of texturing and the techniques of modified stretch yarn;, properties and uses of textured.

6. High performance fibres.**:** Introduction to Polyurethene, Kevlar , Nomex, Glass fibre, Carbon fibre, PVA fibre, PVC fibre etc.

Text Books

1. Physical Properties of Textile Fibres by W.E. Morton and J.W.S. Hearle
2. Manmade Fibres - R.W. Moncrieff,
3. Textile Fibre, V.A. Shenai
4. Dyeing and chemical Technology of Textile Fibres " , Trotman, E.R.,Charles Griffin and Co Ltd., London. 1990.

Referene Books :

1. Fiber Science by Steven B. Warner,
2. Mechanical Properties of Solid Polymers by I. M. Ward,
3. Textile- Motivate Series by A. Wynne, Macmillan.
4 Textile Chemistry , American Elsevier Publishing Co. Inc., New York , 1986.
5.. Peters, R.H., " Textile Chemistry Vol.I, II and III ", Elsevier Publishing Co.Inc., New York, 1985.
6 . Menachem Lewin and Stephen B.Sello, " Handbook of fibre science and Technology; Vol.I, Fundamentals and preparation-Part A ", Marcel Dekker Inc., New York, 1983.