(4 Lect./Week)
(4 hrs. Lab/Week)
(1 Student's presentation /Week) **(Total Credits -7)**

Paper 502: Fiber Science and Rubber Technology

1. Introduction – classification and terminology of fibres, salient features of fibre forming polymers and their properties. Basic structure of a fibre. General properties of a fibre such as moisture absorption, tex, denier, tenacity, elongation at break and elastic recovery.
2. Naturally occurring fibres – Vegetable fibres, animal fibres, mineral fibres.
3. Man made and synthetic fibres –properties and uses of viscous rayon, cellulose acetate, nylon – 66, polyester, acrylic, carbon fibre and aramid fibres.
4. Physical properties of raw rubber and mastication.
5. Theories and phenomena of vulcanization, rheocurve of compounded rubber, mechanism of sulphur vulcanization with and without accelerators, theories of non sulphur vulcanization, properties of vulcanized rubber.
6. Natural rubber and synthetic rubber, styrene-butadiene rubber, polybutadiene rubber, ethylene propylene diene rubber, butyl rubber, nitrile rubber, neoprene, silicone rubber, fluorocarbon rubber.

Practical - Polymer VI: (Students to perform any six of the following)

1. Determination of tensile strength, modulus, elongation at break, tear strength, abrasion resistance, heat build-up resilience, hardness, flex resistance for rubber compounds.
2. Determination of curing time on physical properties of NR compound.
3. Effect of mastication on intrinsic viscosity.
4. Identification of fibres through solubility tests.
5. Identification of fibres by chemical methods
6. Analysis of reaction of fibres towards heat & flame.
7. Use of plastimeter, Mooney viscometer and Rheometer.
8. Qualitative analysis of Cellulose –Polyester blends.
9. Distinguish POY & FDY polyester filament yarn based on extensibility & shrinkage behavior.
10. Determination of Twist, elongation, TEX, Tenacity, Denier, and count of yarn, fibre & filament.

Suggested Readings:

1. Hand Book of Rubber Technology by Smith and Martin, CBS Publisher, (2007).
2. The Science and Technology of Rubber by J. E. Mark, B. Erman and F.R. Eirich, Elsevier Academic Press (2005).
3. Hand Book of Textile Fibers, by J. G. Cook, Woodhead Publishing Volume 1 (1984) and & Volume 2 (2009).
4. Hand Book of Rubber Technology by S. Blow, Hanser Gardner (2000).
5. Understanding Textiles by Collier and Tortora, Prentice Hall (2009).
6. Physical Properties of Fibers by Morton & Hearle, CRC Press (2008).