

Programme Name	Master of Textiles (Technical Textiles)	Semester	I
Course objective	To provide comprehensive knowledge about polymers and fibers for engineering applications.		
Course Title	Polymers and Fibers for Engineering Applications: (Open Elective)		
Course Outcomes	After completing this course, students will be able to: 1. Describe the basic concept of polymer and its products. 2. Explain the major fibres, plastics and rubbers used for engineering applications. 3. Outline the methods for the production of fibres, rubbers and plastics. 4. Discuss the various testing and evaluation methods for fibres and polymers. 5. Demonstrate the various applications of fibres and polymers		
Prerequisite	Knowledge about the various textile materials and its forms etc.		

Course Content:

Module 1	Introduction to polymers and textile fibres: Definition and classification. Molecular size and interaction, Molecular orientation and crystallinity in fibres, Polymers as fibres, plastics and rubbers. Properties and Structure of fibres, plastics and rubbers. Melting and Glass Transition Temperatures of Polymers. Fibre forming processes. Importance of polymer in the field of Medical, Military, Agriculture, Composites, etc.
Module 2	Manufacturing techniques overview: Spinning of Manmade fibres via melt spinning and solution spinning. Manufacturing of plastics by injection molding and other techniques. Rubber processing via calendering.
Module 3	Fibre properties and applications: Natural fibres like Cotton, Wool, Jute, etc. Regenerated fibres like Viscose. Man-made fibres like PET, PP, PA, PAN, Glass, Carbon, etc.
Module 4	Elastomer polymers, properties and applications: Natural rubber, Styrene–Butadiene Rubber, Nitrile Rubber, Ethylene–Propylene–Elastomer, Butyl Rubber, Thermoplastic Elastomers, Polybutadiene (Butadiene Rubber), etc..
Module 5	Testing of fibres, plastics and rubbers: Identification of material, Tensile testing, Impact testing, Flexural testing, water absorption, Flame resistance, etc.

Recommended Reading:

1. Industrial Polymers, Specialty Polymers, and Their Applications, Manas Chanda, Salil K. Roy, CRC press 2009.
2. Manufactured Fibre Technology, V.B. Gupta and V.K. Kothari, Springer Science + Business Media, 2003.
3. Plastics End Use Applications, Donald V. Rosato, springer, 2011.
4. High-performance Fibres, Edited by J W S Hearle, 2001, WPI.