

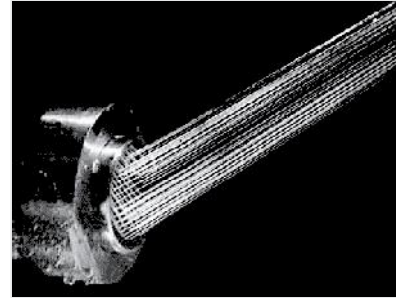
16TF201 TECHNOLOGY OF MANUFACTURED FIBRES

Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	-	-	20	20	-	-	-	-



Course Description and Objectives:

This course offers the knowledge of different principles of forming man made fibers. It also includes the concepts of micro fibers and texturing of man made fibers. Objective of this course is to enable the student to understand the concepts of manufacturing man made fibers, their properties and applications.

Course Outcomes:

The student will be able to:

- find the structure property relation of synthetic fibres.
- understand the importance of synthetic fibres in textile industry.
- know the various types of spinning principles.
- understand the texturing and its importance.
- describe about the various developments in man made fibers.

SKILLS:

- ✓ *Differentiate and identify various man made fibers.*
- ✓ *Analyze the structure of different fibers by using x-ray pattern.*
- ✓ *Analyze the texturisation of man made fibers.*

ACTIVITIES:

- *Collect different types of man made fibers.*
- *Find the different applications in which man made fibers are widely used.*
- *Analyze the fibers structure through SEM, optical microscope, FTIR.*
- *Selection of different routes for manufacturing of man made fibers.*

UNIT - 1**L-10**

INTRODUCTION TO FIBER STRUCTURE : Micellar theory, Continuous theory, Fringed micelles theory, Fringed fibrils theory, Modified fringed micellar theory; Important operations in the production of synthetic fibres, Principles of fibre forming polymers, Parameters influencing the quality; Degree of order, Degree of localization of order, Length/ width ratio of localized units, Degree of orientation, Degree of polymerization; Methods of investigating fibers - X-Ray diffraction, IR, NMR, Thermal Analysis, Optical microscopy, Electron microscopy, Scanning Electron microscopy.

UNIT - 2**L-8**

MELT SPINNING : Detailed note on elements of melt spin equipment, Polyester manufacture - Trans esterification, Polycondensation, Side reactions, Properties and Applications; Polyamides - Manufacture of Nylon 6, nylon 66, (manufacture monomers various routes for PET and nylon); Surface modification of polyester cause and effect, Recent developments in polyesters like CDP, EDP, CFDP, APP; Spin finishes - Ideal spin finish, Properties, Application and removal, Constitution of spin finish.

UNIT - 3**L-8**

SOLUTION SPINNING : Introduction, Process variables for solution spinning, Dry spinning, Wet spinning, Salient features of solution spinning, Rheology of Wet & Dry Spinning, Development of fiber structure and morphology during solution spinning, Comparison, Brief note on dry jet wet spinning; Manufacture of Rayons - Viscose, Acetate and Cuprammonium – Physical and chemical properties, A brief note on recent developments in viscose manufacturing (Lyocell fibre).

UNIT - 4**L-9**

MANUFACTURING : Properties and applications of Acrylics, Mode acrylics, PVA, Poly Vinyl Chloride and Polyvinyl alcohol, Polypropylene fibres; Drawing - Condition, Phenomena of necking, Drawing behavior of thermoplastic polymer, Influence of drawing on structure and property; Micro fibres - Detailed study of production, Properties and applications of micro fibres, Problems in processing of micro fibres in weaving.

UNIT - 5**L-10**

TEXTURISING : Draw backs of flat filament yarns, Definition and concept of texturising, Classification and characteristics of textured yarns, False Twist Texturising - Scientific principle in twist texturising, Methods of production of stretched(single heater) by conventional methods, Draw Texturising concept, Air Jet Texturising and its principle; Brief introduction about Other methods of texturising - BCF Processes and Yarns, Edge crimping, Stuffer box crimping, Knit-de-knit, Gear Crimping, Chemical Texturising.

TEXT BOOKS:

1. V. B. Gupta, "Technology of Manufactured Fibres", 3rd edition, Chapman and Hall, New York, 2004.
2. A. A. Vaidya, "Production of Synthetic Fibers", Prentice Hall of India, New Delhi, 2005.

REFERENCE BOOKS:

1. S. P. Mishra, "Fibre Science and Technology", New Age International Publishers, New Delhi, 2000.
2. H.V.Srinivasmurthy, "Textile Fibers", Textile Association of India Publication, 1988.