19TT201 TECHNOLOGY OF MANUFACTURED FIBERS

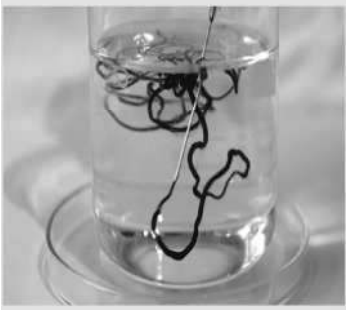
Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P
45	15	-

WA/RA	SSH/HSH	CS	SA	S	BS
10	45	-	-	-	-



SOURCE:
https:// en.wikipedia.org/ wiki/File: Rayon_ synthesis.webm

COURSE DESCRIPTION AND OBJECTIVES:

The main objective of this course is to impart the knowledge of different principles of forming manmade fibers. It also enables the students to know the different fibers structures and its effects on fiber properties. It also includes the concepts of micro fibers and texturizing of manmade fibers.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Interpret different manmade fibers based on their origin	1
2	Analyze the various principles of forming manmade fibers and its effect on properties of fibers	2
3	Compare the change in properties of filaments before and after applying spin finishes	4
4	Select the monomers and polymerization technique based on the final properties required	3

SKILLS:

- ✓ *Choose the fibers based on the end use application.*
- ✓ *Analyze the structure of different fibers.*
- ✓ *Identify the fibers by texture.*

UNIT - I **L-9**

INTRODUCTION TO MANMADE FIBERS : Distinction between natural and man made fibers for production, properties & end uses; Important operations in the production of synthetic fibres; Fibres varying substrate and geometry; Principles of fibre forming polymers, parameters influencing the quality, glass transition temperature.

INTRODUCTION TO SOLUTION SPINNING : Salient features of solution spinning; Principles of wet and dry spinning, rheology of wet & dry spinning, comparison, a brief note on dry jet wet spinning.

UNIT - II **L-9**

MELT SPINNING : Detailed note on elements on melt spin equipment, various zones in extruders, design of extruder, types of extruders, characteristic feature of extruder, types of spin pack assemblies, construction of spinnerets, spinneret cleaning methods, Rheology of melt spinning, variables of melt spinning, high speed spinning concept (integrated spin drop process, H4 S and FDY Process). Stretching and drawing; Drawing condition phenomena of necking, drawing behavior of thermoplastic polymer, influence of drawing on structure and property.

UNIT - III **L-10**

SPIN FINISHES : Objectives, types of spin finish, application methods, problems of application, Ideal spin finish, constitution of spin finish, problems in removal of spin finish; Manufacture of Rayons; viscose rayons, manufacturing process, physical and chemical properties. A brief note on recent developments in modal and Tencil fiber manufacturing (Lyocell fibre); Manufacture, properties and applications of acrylics, modacrylics, polypropylene fibers.

UNIT - IV **L-8**

MICRO FIBRES : Methods of production, bi-component technology, meltblown process, properties and applications of micro fibres, problems in processing of micro fibres in weaving.

NANO FIBER : Methods of production, properties, applications.
SPANDEX FIBER : Methods of production, properties, applications.

UNIT - V **L-9**

POLYESTER MANUFACTURE : Transesterification, polycondensation, technical details, chemical reactions, side reactions, properties and applications.

MANUFACTURE OF POLYAMIDE: Nylon; classification of polyamides, manufacture of nylon 6, nylon 66, (manufacture of monomers by various routes for PET and Nylon).

SURFACE MODIFICATION OF SYNTHETIC FIBRES: Need, polyester cause and effect, recent developments in polyesters like CDP, EDP, CFDP, APP etc.

TEXT BOOKS :

1. V. B. Gupta, “Technology of Manufactured Fibres”, 3rd edition, Chapmen and Hall, New York, 2004.
2. 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”,Woodhead Publishers , New Delhi, 2017.
3. E P G Gohl; L D vilensky, “Textile Science”, 2nd edition, Publisher-Melbourne: Longman Cheshire, 1983.