

DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE-2)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credit s	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lectu re	Tutoria l	Practical / Practice		
FIBRE MANUFACTURING TECHNOLOGY	4	2	0	2	Class 12th with Physics, Chemistry	---

Learning objectives

The Learning Objectives of this course are as follows:

- To learn about the basic concepts of spinning including melt and solution spinning.
- To understand various parameters affecting spinning, drawing and heat setting of fibre structure and properties

Learning outcomes

After studying this paper, students will be able to:

- Manufacture fibre with desired properties.
- Demonstrate the various spinning variables.

SYLLABUS OF DSE-2

THEORY COMPONENT-

UNIT 1 **(6 Hours)**

INTRODUCTION TO FIBRES

Manmade fibres: definition of man-made fibres, brief history of manmade fibres, relative merits and demerits of manmade and natural fibres

UNIT 2: **(12 Hours)**

MELT SPUN FIBRES

Melt spinning of PP, polyester and nylon-6 and nylon -66, Effect of parameters on structure development in nylon 6, PET, PP, post spinning operations (drawing, necking and heat setting), bulking/texturing

UNIT 3 (12 Hours)

SOLUTION SPUN FIBRES

Cellulose diacetate and triacetate fibres: Unit operations, dope preparation, dry-jet-wet-spinning

Acrylic fibres: Acrylonitrile polymerization (solution, emulsion and aqueous dispersion polymerization), Fibre manufacturing; polymer solubility and dope preparation, wet spinning (fibre extrusion and coagulation, structure of coagulated fibre, tow processing), dry-jet-wet-spinning

Rayon fibres: Viscose rayon process (chemistry and spinning), overview of alternatives to viscose process

Gel spinning of PE, PAN and PVA

PRACTICAL COMPONENT (60 Hours)

- To prepare polypropylene fibre by melt spinning.
- Study of preparation, melt spinning and properties of any one specialized melt spun fibre.
- Melt spinning and cold drawing of nylon 6 using laboratory spinning and drawing machines
- To prepare polyester fibre by melt spinning.
- Solution spinning of acrylic fibre.
- Dry-jet-wet spinning of PAN fibre.
- To characterize a woven fabric with respect to its dimensional properties: thread density, yarn number, yarn crimp, weave, cover factor, areal density, skewness, thickness
- To determine the crease recovery of fabric and observe the effect of loading time and recovery time on crease recovery.
- Drawing and heat setting of fibres.
- Chemical modification of fibres.
- Visit of Industry/R&D organization

ESSENTIAL/RECOMMENDED READINGS

- Gupta V.B., Kothari V.K., (1997) Manufactured Fibre Technology, 1st Ed Chapman and Hall.
- NPTEL course material on Manufactured fibre Technology.
- Macintyre J.E., (2005) Synthetic Fibres: Nylon, Polyester, Acrylic, Polyolefin, Elsevier Science.
- Vaidya A.A., (1988) Production of Synthetic Fibres, First Edition, Prentice Hall of India.

SUGGESTIVE READINGS

- Vaidya A.A., (1988) Production of Synthetic Fibres, First Edition, Prentice Hall of India.
- Kothari V.K., (2000), Textile Fibres: Developments and Innovations, IAFL Publications.
- Nakajima T., (2000) Advanced Fiber Spinning Technology, First Edition, Woodhead Publisher.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE-3)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/Practice		
TYRE TECHNOLOGY	4	2	0	2	Class 12 th with Physics, Chemistry	---

Learning objectives

The Learning Objectives of this course are as follows:

- Familiarizing various types of tyres and their components.
- Developing the knowledge of manufacturing techniques of various tyres.