

- Gupta V.B., Kothari V.K., (1997) Manufactured Fibre Technology, 1<sup>st</sup> 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.

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### 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 <sup>th</sup> 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.

## **Learning outcomes**

The Learning Outcomes of this course are as follows:

After studying this paper, students will be able to

- Apply the knowledge of basic concept of manufacturing technology of tyre
- Demonstrate the designing and compounding of various tyre components.
- Evaluate performance and quality assessment of tyre.

## **SYLLABUS OF DSE-3**

### **THEORY COMPONENT-**

#### **UNIT 1 (8 Hours)**

##### **INTRODUCTION AND TYRE MANUFACTURING**

Classification: based on construction (pneumatic, radial, bias, cross ply, tube, tubeless, solid),

Types of tyre on their uses: Cycle tyre, Car tyre, Light truck tyre, truck tyre, aeroplane tyre, earthmoving machinery tyre, Animal drone vehicles tyre etc. Tyre Components: Tread, sidewall, Bede, Apex, Solder, Inner Liner etc. Mixing (Mixing instruments: two roll mill, kneader, internal mixers), processing (extrusion, calendaring, bead winding), building drum, curing (molding machines etc.)

#### **UNIT 2 (12 Hours)**

##### **TYRE DESIGN**

Compound design (selection of chemical ingredients); process design (process parameters correlating with properties); product design (constructions), latest advances in materials and technologies

#### **UNIT 3 (10 Hours)**

##### **TYRE TESTING**

Endurance, groove crack test, plunger test, traction: dry, wet and snow, air permeation, noise test, rolling resistance, drivability, road test, wet braking test, fuel economy test, tread to ply pull out, bead seating test

#### **PRACTICAL COMPONENT (60 Hours)**

- To identify the type of rubber by reverse engineering.
- To prepare fabric- rubber coated ply.

- To test mechanical and physical properties of vulcanized rubber.
- To perform air aging properties of rubber and rubber to fabric ply.
- To determine bonding strength of rubber to fabric.
- To calculate abrasion losses of tyre tread.
- To calculate rebound resilience of a rubber.
- Tyre indexing and cut section analysis.
- To evaluate the compression set of a rubber.
- To determine rolling resistance test.
- Industrial Visit of Tyre Industry/ R&D

### **ESSENTIAL/RECOMMENDED READINGS**

- Koutny F., Zling, (2007) Geometry and Mechanics of Pneumatic TIRE, CZE.
- French T., (1989) Tyre Technology, Adam Hilger, New York.
- Mark J.E., Erman B., Eirich F.R., (2005) The Science and Technology of Rubber, Elsevier.

### **SUGGESTIVE READINGS**

- Ford T.L., Charles F.S., (1988) Heavy Duty Truck TIRE Engineering SAE's 34<sup>th</sup> L. Ray Buckingdale Lecture, SP729.
- Clark S.K., (1971) Mechanics of Pneumatic Tires, National Bureau of Standards, Monograph, US Govt. printing office.
- Gent A.N., Walter J.D., (2006) The Pneumatic TIRE, U.S. Department of Transportation, National Highway Traffic Safety Administration.

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