

DISCIPLINE SPECIFIC CORE COURSE – 18

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 (if any)
		Lecture	Tutorial	Practical/ Practice		
RUBBER TECHNOLOGY	4	2	0	2	Class 12th with Physics, Chemistry, Mathematics	-

Learning objectives

- To learn about the concept of vulcanization and properties of rubbers

Learning outcomes

After studying this paper, students will be able to

- Apply the knowledge of preparation of rubbers and fibres
- Learn the knowledge of different types curing techniques

SYLLABUS OF DSC-18

THEORY COMPONENT-

UNIT 1:

(4 Lectures)

RUBBERS: INTRODUCTION

Properties of rubber: Structure, glass transition temperature, mechanical properties (tensile, % elongation, compression set, fatigue resistance, resilience, hysteresis, hardness etc.)

UNIT 2: (10 Lectures)

PREPARATION, PROPERTIES AND APPLICATIONS

Natural rubber and synthetic rubbers (styrene-butadiene rubber, polybutadiene rubber, ethylene propylene diene rubber, butyl rubber, nitrile rubber, neoprene, silicone rubber, fluorocarbon rubber)

Thermoplastic elastomers: Structure, properties, preparation, types and applications

UNIT 3: (6 Lectures)

MIXING OF RUBBERS

Need for compounding - Rubber mixing mechanism -mixing machinery- two roll mill- internal mixer-machine design -mixing in internal mixers & two roll mill, continuous mixers - mixing cycles and procedures, operating variables and mix quality

UNIT 4: (6 Lectures)

VULCANIZATION OF RUBBER

Theory and mechanism of sulphur and non-sulphur vulcanization (with and without accelerators), rheocurve of compounded rubber, pre and post vulcanization processes, properties of vulcanized rubber

UNIT 5: (4 Lectures)

VULCANISATION TECHNIQUES

Importance of vulcanization - vulcanization processes - batch processes - Continuous vulcanization – machinery & process - Reaction injection moulding of PU; silicone injection moulding.

PRACTICAL COMPONENT (60 Lectures)

- To determine tensile strength, modulus, elongation at break of Rubber sheet.
- To determine tear strength, abrasion resistance, heat build-up, resilience, hardness, flex resistance for rubber compounds.
- To determine curing time and physical properties of rubber compounds.

- To determine mooney viscosity of rubber using Mooney viscometer.

ESSENTIAL/RECOMMENDED READINGS

- Martin J.M., Smith W.K., (2007) Handbook of Rubber Technology, CBS Publisher.
- Mark J. E., Erman B., Eirich F.R., (2005) The Science and Technology of Rubber, Elsevier Academic Press.
- Blow S., (2000), HandBook of Rubber Technology, Hanser Gardner.

SUGGESTIVE READINGS

- Morton W.E., Hearle J.W.S., (2008) Physical Properties of Fibres, Woodhead Publishing.
- Blow.C.M. andHepburn.C. Rubber Technology and manufacture, Butterworths, 1982.
- Evans.C.W., Practical Rubber Compounding and processing, Applied Science Publishers, London, 1981.

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