DISCIPLINE SPECIFIC ELECTIVE (DSE-16)

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		
Wire and Cable Technology	**4**	**2**	**0**	**2**	**12Th with PCM/PCB**	**---**

COURSE OBJECTIVES:

The Learning Objectives of this course are as follows:

1. To familiarize with the selection criteria of materials for cable
2. To acquire knowledge of insulation thermal and mechanical properties of cable materials

LEARNING OUTCOMES

The Learning Outcomes of this course are as follows:

After studying this paper, students will be able to

1. Understand the basic concepts materials used in cable industries
2. Develop the understanding of the properties and applications of cable materials.

SYLLABUS OF DSE 16

THEORY: (30 Hours)

UNIT 1: INTRODUCTION (5 Hours)

Introduction to Insulator, semiconductor and conductor, classification wire and cables (eg. Electric, telecommunication etc.), cable characteristics.

UNIT 2: PROPERTIES OF CABLE INSULATING MATERIALS (10 Hours)

i) Electrical: Volume and surface resistivity, break down voltage, dielectric constant, dielectric loss etc.

ii) Thermal: Heat resistance, permissible temperature, effect of overloading on the life of electrical appliances and thermal conductivity

iii) Chemical: Solubility, chemical resistance, weatherability

iv) Mechanical and physical: Mechanical strength, porosity, density, brittleness, mouldability.

v) Factors affecting the electrical, thermal, chemical and mechanical properties of cable insulating materials. Selection of cable insulating materials

UNIT 3: POLYMERS FOR CABLE (10 Hours)

Polymers for cable insulation and sheathing (eg. CM, CSM, HDPE, LDPE, PVC, NBR, PTFE, EPDM, EVA, EMA etc.)

UNIT 4: MANUFACTURING OF CABLE (5 Hours)

Basic techniques, Extrussion, wire extrusion, Multy wire extrusion.

PRACTICALS: (60 Hours)

- Analysis of the thermal stability of cable material.
- Determination of the volume and surface resistivity of cable material.
- Chemical identification of the cable insulating materials
- Determination of fire resistance and smoke density of cable insulating materials.
- Evaluate weatherability of cable materials.
- Determination of mechanical strength (tensile, compressive, elongation, low temperature flexibility (to check ASTM) and hardness), and density of cable materials.
- Manufacturing of wire and cables.
- Determination of limiting oxygen index (LOI) of wire and cable materials.
- Determination of K-value of PVC.
- Industrial visitof cable industries for exposure to instruments and working.

ESSENTIAL/RECOMMENDED READINGS

1. Cousins K., (2000) Polymers for wire and cables- changes within an industry, SmithersRapra Publishing.
2. Black R.M., (1983) The History of Electric wire and Cables, Peter Peregrinus Ltd.

ADDITIONAL RESOURCES:

1. Martin J.M., Smith W.K., (2007) Handbook of Rubber Technology, CBS Publishers.
2. Ganguli, S. K., & Kohli, V. (2016). Power cable technology. CRC Press.

ASSESSMENT METHODS:

All the examiniations and assement methods shall be in the line with the University of Delhi gidelinceissused from time to time

KEYWORDS:

Mechanical strength, thermal insulation, weatherability, Polyvinyl chloride