



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code:3172613

Semester – VII

Subject Name: Rubber Cable Technology

Type of course: Professional Elective Course- IV

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Introduction: Insulator, semiconductor and conductor, classification wire and cables, cable characteristics.	05
2	General properties of cable insulating materials: Electrical: Volume and surface resistivity, break down voltage, dielectric Constant, dielectric loss etc. Thermal: Heat resistance, permissible temperature, effect of overloading on the life of an electrical appliances and thermal conductivity, Chemical: Solubility, chemical resistance, weather ability, Mechanical and physical: Mechanical strength, porosity, density, brittleness, mouldability	06
3	Constructional Elements of Polymer-Insulated Cables: Conductor material, Metallic Conductors, Polymeric Materials for Cable Insulation, Protective Sheaths like CM, CSM, HDPE, LDPE, PVC, NBR, PTFE, EPDM, EVA, EMA, XLPE, Polyamide, Polyurethane, Armor, Electrical Screening, Metallic Screening, fillers other Chemicals etc..	08
4	Designation of Cables & Cable Design: Voltage Designation, Additional Symbols for Cables, Voltage grade, Current- Carrying Capacity and Selection of Conductor Cross-Sectional Area, Electrical Stress and Insulation Thickness, Dielectric Properties, Compound Design etc.	06
5	Special-Purpose Elastomeric Cables: Fire Survival (FS) Cables: Silicone Rubber Insulated FS Cables, Mica/ Glass and EPR Insulated FS Cables. Radiation- Resistant Cables.	06
6	Cable Manufacturing: Introduction, Conductor manufacturing, Wire drawing process, Constructional Features of a Drawing Ring, Lubricating Oil, Selection of Wire Dimension, Annealing, Extruded Cable	08



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	manufacturing, compounding, Curing, Cooling.	
7	Testing of Cable: Tensile, Elongation, Ageing Test, Hot Set Test Solvent Extraction, Insulation Resistance Test, AC Voltage Test, Partial Discharge Test, Bending Test, Heating Cycle Test, Voltage Test for 4 h, Other test .	06

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	10	15	15	10	10

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:-

- Power Cable Technology Sushil Kumar GanguliVivekKohli
- WIRE TECHNOLOGY PROCESS ENGINEERING AND METALLURGY ROGER N. WRIGHT
- Electrical Power Cable Engineering edited by William A. Thue
- Polymers for wire and cables- changes within an industry, by Keith Cousins, SmithersRapra Publishing, (2000)
- The History of Electric wire and Cables, by R. M. Black, (1983)

Course Outcome:

After learning this course students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Classify the wire and cables	10
CO-2	Distinguish the different properties of Insulating materials	15
CO-3	Identify the different raw materials & Polymers used in manufacturing of cables and wire	15
CO-4	Study, understand and generate the sequence of manufacturing operation to produce the end product.	15
CO-5	Solve the problems related to compounding & end product	15



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List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Major Equipments:

Mixing Mill, CalendarMachine, Vulcaniser, Semi Hydraulic Press, Extruder, different molds and Dies etc.

List of Open Source Software/learning website:

- <https://eprcable.ims.uconn.edu/>
- <https://lappindia.lappgroup.com/products/silicone-rubber-cable.html>
- <https://www.maillefer.net/en/application/rubber-cable-production/>