I Year I Semester	**L**	**P**	**C**
Code: 17PE233	**4**	**0**	**3**

ELECTRICAL DISTRIBUTION SYSTEMS
(Common to PE, P&ID, PE&ED, PE&D, PE&S, EM&D, PE&PS)

(Elective-III)

Prerequisites: Knowledge on basics of distribution systems, Compensation in electrical distribution systems, Circuit Analysis, concept of load modeling.

Course Educational Objectives:

1. To learn the importance of economic distribution of electrical energy.
2. To analyze the distribution networks for V-drops, PLosscalculations and reactive power.
3. To understand the co-ordination of protection devices.
4. To impart knowledge of capacitive compensation/voltage control.
5. To understand the principles of voltage control.

UNIT -1: (Residential, Commercial, Agricultural and Industrial) and their characteristics.

UNIT -2: Distribution Feeders and Substations: Design consideration of Distribution feeders: Radial and loop types of primary feeders, voltage levels, feeder-loading. Design practice of the secondary distribution system. Location of Substations: Rating of a Distribution Substation, service area with 'n' primary feeders. Benefits derived through optimal location of substations
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UNIT -3: System analysis: Voltage drop and power loss calculations: Derivation for volt-drop and power loss in lines, manual methods of solution for radial networks, three-phase balanced primary lines, non-three-phase primary lines.

UNIT -4: Protective devices and coordination: Objectives of distribution system protection, types of common faults and procedure for fault calculation. Protective Devices: Principle of operation of fuses, circuit reclosers, line sectionalizer and circuit breakers. Coordination of protective devices: General coordination procedure.

UNIT -5: Capacitive compensation for power factor control: Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and switched) powerfactor correction, capacitor location. Economic justification. Procedure to determine the bestcapacitor location. Voltage control: Equipment for voltage control, effect of series capacitors,effect of AVB/AVR, line drop compensation.

Course Outcomes:

After completion of this course the students will be able to:

- Analyze a distribution system.
- Design equipment for compensation of losses in the distribution system.
- Design protective systems and co-ordinate the devices.
- Understand of capacitive compensation.
- Understand of voltage control.

Reference Books:

1. “Electric Power Distribution System Engineering “byTuranGonen, Mc.Graw-Hill Book Company, 1986.
2. Electric Power Distribution-by A.S.Pabla, Tata McGraw-Hill Publishing Company, 4th edition, 1997.
3. Electrical Distribution V.Kamaraju-McGraw Hill
4. Handbook of Electrical Power Distribution – Gorti Ramamurthy-Universities press