

Course Code ESE-818	Credit Hours (Th-Pr) 3.0-0	Power Distribution Systems (Elective)	Contact Hrs/Week (Th-Pr) 3.0-0	Total Contact Hrs (Th-Pr) 45-0
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Course Outline:

Distribution System is an important portion of power systems due to its high investment and its direct effect on customer. This course is intended to give an overview of the characteristics of distribution systems, power quality requirements, and protection measures. The planning and design considerations are also covered.

Pre-requisites: B.E (Chemical, Mechanical, Electrical, Environmental and Materials)

Recommended Books:

S. No.	Title	Author(s)	Assigned Code	Remarks
1.	Power Distribution Engineering - Fundamentals and Applications	J. J. Burke	JB	Text
2.	Electric Power Distribution	A. S. Pabla	PS	Reference
3.	Power quality enhancement using custom power devices	A. Ghosh and G. Ledwich	LG	Reference

Course Objectives:

Power supply requirements, customer classification, over-current protection devices and its coordination, power quality requirements and its control, reliability of distribution systems, planning and design consideration of distribution system, grounding and safety of distribution systems

Learning outcome:

The students will be able to analyze and carry out preliminary design for an efficient power distribution system and load management. Small to medium grid connected distribution systems emanating from both conventional and renewable sources are included in the takeaway.

Topics Covered:

No.	Topics	Text Book	Contact Hours
1.	Introduction 1. Economic Growth and Electrification 2. The Importance of Distribution Systems 3. The Differences of Power Supply between Urban and Rural Area.	JB	6
2.	Load Characteristics and Consumer Classification 1. Load Survey 2. Load Fluctuation in Demand 3. Consumer Classification 4. Sensitive Load - Computer Loads	JB	6
3.	Distribution Systems and Its Features 1. Distribution Systems 2. Distribution Primary Feeders 3. Bus-bar Arrangement 4. Unit Substations	JB	4
4.	Power Quality Fundamentals 1. Definition of Power Quality 2. Harmonics, Voltage Sag, Interruption, Transients 3. Power Supply for Sensitive Loads	JB	6
5.	Voltage Drop and Line Losses 1. Voltage Drop Definition 2. Solution to Improve Voltage Drop 3. Line Losses Definition 4. Calculation of Line Losses 5. Function of Capacitors, Optimal Placement	JB	4
6.	Over-current Protection Devices and Its Coordination 1. Fault Classification 2. Characteristics of Over-current Protection Devices 3. Coordination of Protection Devices.	JB	6
7.	Reliability of Distribution System 1. Fundamentals	JB	5

	2. Factors Effecting on Reliability		
8	Custom Power Devices 1. Concept 2. Classification 3. DVR, DSTATCOM, UPQC 4. Application	JB	4
9	Distribution System Automation 1. Introduction 2. Objectives 3. Contents 4. Automation and Reliability	JB	4