

POWER DISTRIBUTION AND UTILIZATION (THEORY)

EE-370

Pre-requisite: Circuit Analysis-II

Credit Hours 03

Contact Hours 48

RECOMMENDED BOOKS

A Text Book of Electrical Power by M. L. Anand

REFERENCE BOOKS

Electrical Power Distribution System by TuranGonen, Latest Edition

OBJECTIVE OF COURSE

The objective of this course is to familiarize with the principles of electrical power engineering and the way of their application to practice. This course is linked to the basics of power distribution systems and effective utilization of power in heating and illumination applications. Main focus in this course would be on topics: power factor, batteries and electrical processes, heating and welding.

S.NO	CLO/PLOs MAPPING	DOMAIN	PLO
01	Identify possible methods of power production, transport and consumption.	C1	01
02	Demonstrate knowledge related to the construction of synchronous generator and its operational conditions from the point of view of loading	C3	01
03	Analyze the connection of a synchronous generator to phases of the grid	C3	02
04	Categorize power consumption appliances and investigate various power factor improvement mechanisms	C4	04

COURSE CONTENTS

Introduction to distribution system

- Urban, suburban and rural distribution systems

- Primary, secondary and tertiary voltages
- Radial and ring main systems, application of distribution transformers
- Estimation of load
- Load characteristics
- Substation switch gears and bus bar arrangements
- Calculation of voltage drop and regulation in distribution feeders
- Grounding and earthing
- Distribution transformer neutral
- Earthing resistance
- Earthing practice in L.V. networks

Power Factor

- Disadvantages and causes of low power factor
- Methods for improvement
- Application of shunt capacitors in distribution network

Batteries & Electrochemical Processes

- Main types of batteries and their working
- Battery charging
- Electroplating
- Electrolysis and electro-metallurgical process
- Cathodic protection of poles
- Gas pipes, oil pipes and water structures

Heating and Welding

- Electric heating
- Resistance, induction and dielectric heating
- Electric furnaces
- Microwave heating
- Electric welding
- Resistance welding and its types
- Fundamentals of Illumination Engineering:
- Laws, units and terms used
- Requirements for good lighting
- Illumination schemes for various situations (street lighting, commercial/industrial lighting, stadium/flood/stage/spot lighting etc.)
- Types of lamps, their working and relative merit