

COURSE TITLE : ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION.
COURSE CODE : 4034
COURSE CATEGORY : A
PERIODS/WEEK : 4
PERIODS/SEMESTER : 56
CREDITS : 4

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Electrical Power Generation	14
2	Economic Consideration of Electrical Power.	14
3	Electrical Power Transmission	14
4	Electrical Power Distribution	14
Total		56

Course Outcome:

Sl.	Sub	On completion of this course the student will be able:
1	1	To comprehend the various methods of power generation and its comparisons.
2	1	To comprehend the economic considerations in generation of electric power.
3	1	To understand the different systems of electric power transmission.
	2	To understand the effect of line parameters and other factors effecting the transmission of electric power.
4	1	To comprehend different types of power distribution system and its automation.
	2	To understand the use of underground cables and insulators in power distribution system.

Specific Outcome:

MODULE I Electrical Power Generation

- 1.1.1 To identify the different sources of power and their relative importance.
- 1.1.2 To differentiate conventional and non conventional methods of power generation.
- 1.1.3 To identify the factors governing location of various types of power station.
- 1.1.4 To draw schematic layout of;
 - i. Hydroelectric power stations.
 - ii. Steam power plants.
 - iii. Diesel power plants.
 - iv. Gas power plants.
 - v. Atomic power plants.
- 1.1.5 To select essential equipment in these power stations.
- 1.1.6 To determine the co-ordination of different power stations in the system.
- 1.1.7 To identify the equipment used in Power station.
- 1.1.8 To draw the layout of power station.
- 1.1.9 To differentiate various power stations.
- 1.1.10 To draw the layout of power station switch yard and to identify the equipment.
- 1.1.11 To solve simple problems regarding the quantity of electricity generated from the available quantity of water.
- 1.1.12 To solve simple problems regarding the quantity of electricity generated in a thermal power station.

MODULE II Economic Consideration of Electrical Power.

- 2.1.1 To compare capital and operational cost of various types of power stations
- 2.1.2 To state the terms- load estimate, demand factor, load factor, diversity factor, load curve.
- 2.1.3 To solve simple problems regarding the above factor.
- 2.1.4 To describe the Interconnection of power stations and combination.
- 2.1.5 To distinguish the base load and peak load.
- 2.1.6 To solve problems about operational schedule based on base load, peak load and other factors.
- 2.1.7 To compare various Tariff systems.
- 2.1.8 To determine the cost of energy based on Tariff.

MODULE III Electrical Power Transmission

- 3.1.1 To describe typical power supply transmission (both OH & UG based on voltage) schemes.
- 3.1.2 To illustrate systems of transmission based on voltage.
- 3.1.3 To identify the materials used as conductors and supporting structures.
- 3.1.4 To determine the sag in conductors due to supports (equal and unequal levels).

- 3.2.1 To state transmission line parameters, resistance, inductance and capacitance.
- 3.2.2 To find the resistance inductance and capacitance of two wire and three wire supply lines.
- 3.2.3 To explain why the transposition of line conductors is essential.
- 3.2.4 To illustrate the performance characteristics of short transmission lines.
- 3.2.5 To determine the line losses, efficiency and regulation of short lines and condition for maximum regulation.
- 3.2.6 To illustrate Ferranti effect, phenomenon of corona, skin effect, corona power loss.
- 3.2.7 To determine sending end voltage, current, power factor, regulation and efficiency of medium long lines.

MODULE IV Electrical Power Distribution

- 4.1.1 To discriminate feeders, distributors and service mains.
- 4.1.2 To describe different methods of distribution and their comparison.
- 4.1.3 To state voltage regulation.
- 4.1.4 To describe the different voltage regulating devices.
- 4.1.5 To describe the methods of power factor improvements in distribution system.

- 4.2.1 To identify different types of insulators used in distribution system.
- 4.2.2 To identify the different causes of failure of insulators.
- 4.2.3 To determine the string efficiency.
- 4.2.4 To describe methods of improving string efficiency.
- 4.2.5 To classify different types of underground cables.
- 4.2.6 To describe the construction of underground cables.
- 4.2.7 To state grading of cables, capacitance and inter sheath grading.
- 4.2.8 To describe methods of laying cables.
- 4.2.9 To illustrate EHV and HVDC.

CONTENTS

MODULE- I

Conventional and nonconventional energy sources – comparison - Generation of electrical energy - Selection of sight – hydroelectric – thermal and nuclear power plants - Detailed layout - explanation and comparison of hydro electric – thermal and nuclear power plants - calculation of total electrical energy generated in hydroelectric and thermal power stations - problems.

MODULE –II

Types of electrical loads - load on power station - load curve – terms – factors - connected load - Max. Demand – demand factor – load factor – diversity factor – capacity factor – plant use factor- problems - Base load - peak load – interconnected grid system- reason for interconnection- problems - Tariffs –

objectives of tariffs – types of tariffs - comparisons – simple tariff- flat rate tariff- block rate tariff- two part tariff- maximum demand tariff- power factor tariff - problems.

MODULE –III

Electric supply system – Single line diagram of a typical supply scheme – Components- comparisons - Various systems of power transmission-comparison - DC system – Single phase system – Two phase - Three phase - Over head line components - Conductor materials – Line

supports – Insulators – String efficiency- Sag (equal and unequal levels) – Transmission line parameters - Two wire and three wire – calculation – Resistance - Inductance – Capacitance - Transposition. Classification of over head transmission lines - Line losses - Voltage regulation - Transmission efficiency - Ferranti effect - Corona – Skin effect - Problems.

MODULE –IV

Distribution system - components – feeders- distributors – service mains- methods(connections scheme) of distribution – comparisons- OH and UG- requirements of distribution system- voltage regulation – voltage regulating devices- power factor improvements – different types of insulators- causes of failure of insulators- string efficiency- underground cables- construction – classification – grading- methods of cable laying- EHV and HVDC applications.

REFERENCES

1. VK Mehtha. Rohit Mehtha. Principles of Power System: S Chand & co.
2. J B Gupta. A course in Power Systems: S K Kataria &sons.