

Course Name : Electrical Engineering Group
Course Code : EE/EP
Semester : Third
Subject Title : Electrical Power Generation
Subject Code : 9033

Teaching and Examination Scheme:

Teaching Scheme			Exam Scheme & Maximum Marks						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	00	00	03	80	20	--	--	--	100

Rationale:

This is a core technology subject. Electrical diploma pass outs should know the principle of generation of electricity, methods of generation of electricity & recent trends in generation of electricity.

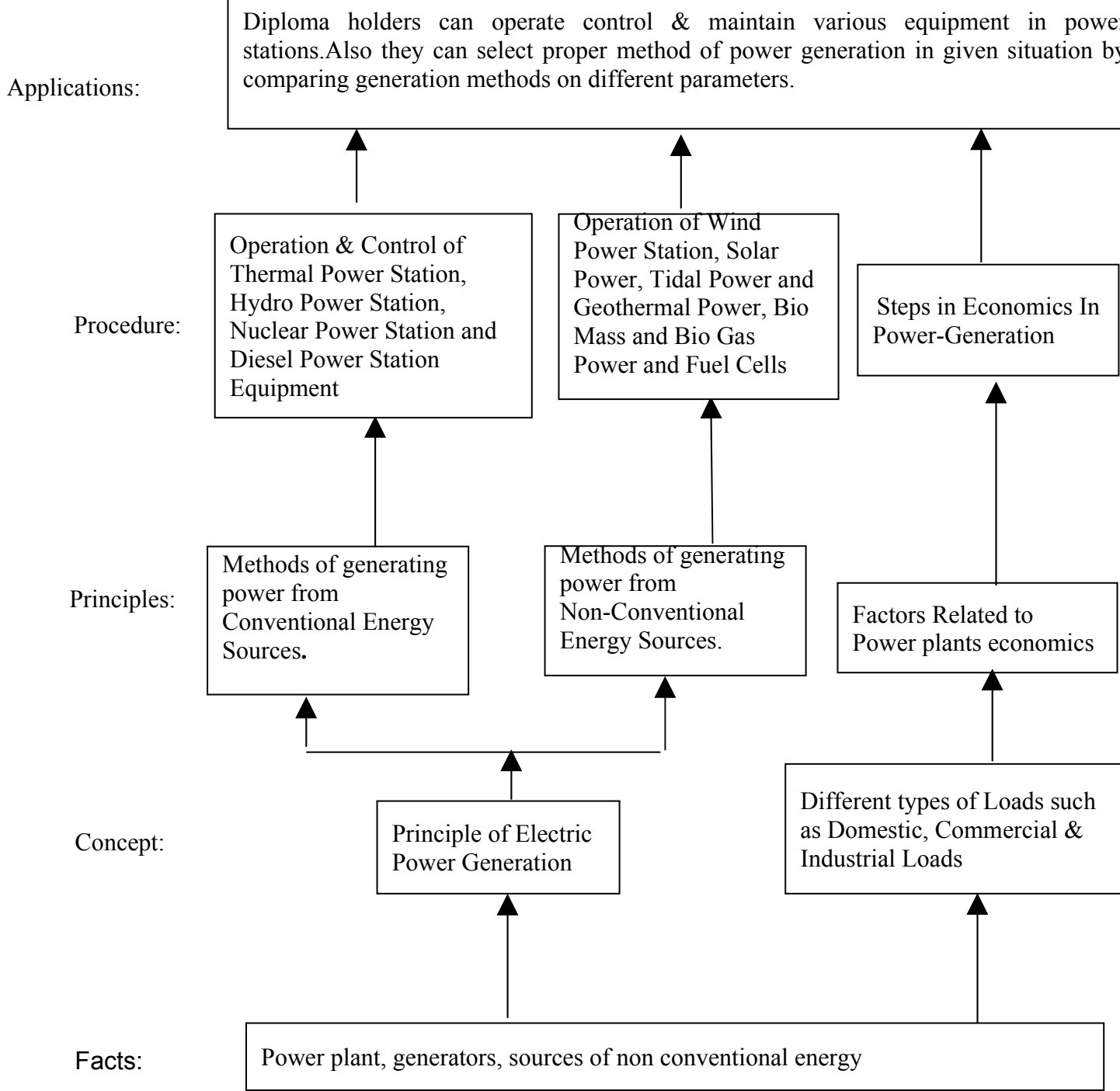
This subject will provide the basis for further studies in transmission, distribution and power system operation. Also the subject will provide the knowledge about the recent trends in non-conventional energy sources & their working principles.

Objectives:

The student will be able to:

- 1) Explain the working of different power plants
- 2) Identify different components of various systems in generating stations
- 3) Select suitable sites for different power stations
- 4) Define the terms used in economics of power generation and explain their relation
- 5) Select alternative energy sources for given conditions
- 6) Explain the working of wind mills and solar systems
- 7) Explain working of domestic & commercial D. G. Set

Learning Structure:



Contents: Theory

Chapter	Name of the topic	Hours	Marks
01	Basics Of Power Generation Importance of electrical power in day today life 1.1 Various sources of energy 1.2 Overview of method of electrical power generation 1.4 Comparison of Sources of power.	02	06
02	Thermal Power Stations 2.1 List of thermal power stations in the state with their capacities 2.2 Selection of site for thermal power stations. 2.3 Main parts , block diagram of thermal power stations. 2.4 Quality of fuel and its effect on quality of power generation 2.5 Operation of following components: 2.5.1 Boiler 2.5.2 Economizer. 2.5.3 Air pre heater 2.5.4 Super-heaters & re-heaters. 2.5.5 Steam prime movers. 2.5.6 Condensers. 2.5.7 Spray ponds & cooling towers. (Block diagrams & description in brief)	07	10
03	Nuclear Power Stations 3.1 Block diagram and working of Nuclear Power Station 3.2 Construction and working of Nuclear Reactor 3.3 Fuels used in Nuclear Power Station 3.4 Economics of Nuclear Power Station 3.5 List of Nuclear power stations in state & county with their capacities.	05	08
04	Hydro Power Stations 4.1 List of Hydro Power stations with their capacities & number of units in the state. 4.2 Selection of site and Classification 4.3 Layout of hydro Power stations 4.4 Types of Turbines & generators used 4.5 Selection of turbine and alternator according to water head and capacity	05	10
05	Diesel Power Stations 5.1 Applications of diesel power stations 5.2 Diesel electric plant- Main components (Block Diagram) 5.3 Different types of engines & their working. Operation, maintenance & trouble shooting chart of diesel plant.	05	08

<p style="text-align: center;">06</p>	<p>Non-Conventional Energy Sources</p> <p>6.1 Types of non-conventional energy sources.</p> <p>6.2 Solar Energy</p> <p style="padding-left: 20px;">6.2.1 Potential of solar energy.</p> <p style="padding-left: 20px;">6.2.2 Photovoltaic effect – for solar energy.</p> <p style="padding-left: 20px;">6.2.3 Construction & materials used in solar photo-voltaic cells.</p> <p style="padding-left: 20px;">6.2.4 Working & applications of solar energy.</p> <p>6.3 Wind Energy.</p> <p style="padding-left: 20px;">6.3.1 Selection of site for wind mills</p> <p style="padding-left: 20px;">6.3.2 Principle of electricity generation with the help of wind energy</p> <p style="padding-left: 20px;">6.3.3 Block diagram and working of Wind energy plant and its applications</p> <p style="padding-left: 20px;">6.3.4 List of major wind farms in the state with their approximate capacities</p> <p>6.4 Bio-mass & Bio-gas energy.</p> <p style="padding-left: 20px;">6.4.1 Composition of Bio-gas & its calorific value.</p> <p style="padding-left: 20px;">6.4.2 Traditional; non-traditional Biogas plants</p> <p style="padding-left: 20px;">6.4.3 Bio-mass based power generation plants & their capacities.</p> <p>6.5 Geo-thermal Energy and its Applications.</p> <p>6.6 Ocean energy.</p> <p style="padding-left: 20px;">6.6.1 Ocean thermal Electric conversion.</p> <p style="padding-left: 20px;">6.6.2 Energy from tides</p> <p style="padding-left: 20px;">6.6.3 Site requirements</p> <p style="padding-left: 20px;">6.6.4 Advantages and Limitations of Tidal power generation.</p> <p>6.7 Fuel Cells: Construction, working and applications</p>	<p style="text-align: center;">09</p>	<p style="text-align: center;">16</p>
<p style="text-align: center;">07</p>	<p>Economics Of Power Generation</p> <p>Terms commonly used in system operation: connected load, firm power, cold reserve, hot reserve, spinning reserve.</p> <p>Terms used in system operation such as Load-curve, load duration curve, integrated duration curve. (Simple numerical based on plotting above curves.)</p> <p>Factors affecting the cost of Generation: Average demand, Maximum demand, plant capacity factor& plant use factor, Diversity factor& load factor.</p> <p>(Simple numericals based on above)</p> <p>7.4 Choice of Size & number of Generator Units, difficulties involved in it.</p>	<p style="text-align: center;">09</p>	<p style="text-align: center;">12</p>
<p style="text-align: center;">08</p>	<p>Interconnected Power Systems</p> <p>8.1 Combined operation of power stations.</p> <p>8.2 Comparison of various types of power stations</p> <p>8.3 Advantages of Interconnection.</p> <p>8.4 Base load & peak loads, load allocation among various types</p>	<p style="text-align: center;">06</p>	<p style="text-align: center;">10</p>

	of power stations 8.5 Economic loading of interconnected stations. 8.6 Load sharing and transfer of load between power stations. 8.7 Inter connection of power stations at state and national level		
Total		48	80

Learning Resources:

1. Books:

Sr. No.	Author	Title	Publisher
1	Dr. S. L. Uppal	Electrical Power	Khanna Publishers.
2	Soni – Gupta - Bhatnagar	A course in Electrical Power	Dhanpatrai & Sons
3	Prof. G. D. Rai	Non conventional Energy sources	Khanna, New Delhi
4	Prof. Arrora and Dr. V. M. Domkundwar	A course in Power Plant Engineering	Dhanpatrai & Sons

2. Journals:

1. Electrical India - Journal for recent trends & development in Electrical Engineering