

Subject Code: 1ET4030605	Subject Title: POWER STATION ENGINEERING
Pre-Requisite	--

RATIONALE:

The consumption of electrical energy is universally accepted as a tool for measuring the living standard of the nation and its people. Therefore, the growth of power industries plays an important role in the economic development of the nation. The scientists of every nation are in search of new energy sources for power generation which are more advantageous than conventional energy sources and easily available. With these technological advances, nation needs skill based, trained technocrats in different areas like, system analysis, equipment installations, testing, commissioning, operation, safety, maintenance etc. The technocrats should also be aware in pollution control, chemical analysis of fuels and safety areas. Essential efforts are made in this course to ensure that students develop above skills and awareness of different areas to become successful technocrats.

COURSE OBJECTIVE:

The course content should be taught and implemented with an aim to develop different skills

1. Draw the layout of different power station.
2. List the specifications of PowerStation auxiliaries.
3. Understand the testing methods of control and power cables.
4. Understand the importance of interconnected system.
5. Solve the numerical problems on power plant economy.
6. List the methods of pollution control in power station.
7. Observe safety measures applied in power station.
8. Understand the importance of chemical analysis of fuels.
9. Understand the personal setup of modern power stations.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
4	-	2	5	60	40	20	30

DETAILS OF COURSE CONTENTS:

Sr No	Topics and Sub-topics	Total Hours	% Weightage
1	POWER STATION EQUIPMENT AND THEIR LAYOUT 1.1 Electrical and mechanical equipment and their auxiliaries of (i) Thermal (ii) Hydro and (iii) Nuclear Power Station (Specification, performance and applications) 1.2 Layout of above Power stations and control room. 1.3 Performance of alternator with infinite bus bar. 1.4 Performance and applications of synchronous motor. 1.5 Vector group of power transformer. 1.6 Unit transformer and station transformer.	16	30
2	POWER AND CONTROL CABLE 2.1 Ratings and Testing of power cable. 2.2 Advance methods of fault location. 2.3 Types of cable joints, connections and terminations. 2.4 Comparison of power and control cable.	04	05
3	INTERCONNECTED SYSTEMS 3.1 Inter connections of power stations. 3.2 Inter connections of substations. 3.3 Load sharing. 3.4 Power limit of inter connector. 3.5 Functions of load dispatch centre (LDC)	06	10
4	POWER PLANT OPERATION ECONOMY 4.1 Components for total cost of generation per unit. 4.2 Methods for depreciation calculation. 4.3 Interpretation of load curves. 4.4 Effect of load curves on cost per KWH.	08	15
5	POLLUTION AND ITS CONTROL IN POWER STATIONS 5.1 Types of pollution in different Power stations. 5.2 Control of pollution. 5.3 Effect of pollution on environment. 5.4 Standardization for environment protection. 5.5 Methods for reducing pollution.	06	10
6	SAFETY MEASURES IN MODERN POWER STATION 6.1 Possible hazards in power station 6.2 Indian Electricity (I.E) rules for general safety. 6.3 Preventive measures for safety.	06	15

	6.4 Safety devices applied to different equipment. 6.5 Safety tools and equipment used in power station		
7	CHEMICAL ANALYSIS OF FUELS AND WATER 7.1 Chemical analysis of coal and lignite (only data) 7.2 Chemical analysis of oil and gas(only data) 7.3 Chemical analysis of water(only data) 7.4 Merits and demerits of different fuels.	04	05
8	POWER STATION MANAGEMENT 8.1 Organization structure of modern power station 8.2 Responsibilities and duties of personal. 8.3 Delegation of power. 8.4 Record keeping in power station 8.5 GEC Code for materials	06	10

COURSE OUTCOME:

The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:

1. Understand the layout of different power station.
2. List the specifications of PowerStation auxiliaries.
3. Understand the testing methods of control and power cables.
4. Understand the importance of interconnected system.
5. Solve the numerical problems on power plant economy.
6. List the methods of pollution control in power station.
7. Observe safety measures applied in power station.
8. Understand the personal setup of modern power stations.

LIST OF PRACTICAL:

SR NO	PRACTICALS/EXPERIMENTS
1	Study of thermal power station equipments and its layout.
2	Study of Hydro power station equipments and its layout.
3	Study of Nuclear power station equipments and its layout.
4	Synchronize an alternator with infinite bus bar.
5	Role of load dispatch centre (LDC)
6	Study of different types of load curves.
7	Determination of depreciation cost in power station.

8	Effect of pollution and methods for reducing it.
9	Study of safety devices applied to equipment in TPS/NPS/HPS.
10	Organization structure of modern power station

LIST OF REFERENCES:

1. A course in Power Plant Engg. Arora S. Domkundwar Dhanpatrai & sons
2. A course in Electrical Power J. B. Gupta S. K. Kataria & sons
3. Power Plant Technology C. L. Wakil Mc. G.Hill
4. Plant Engineers Hand Book, Vol I & II Homy P. Seervai Multitech Publishing
5. Electrical Power Nagrath & Kothari Tata Mc. Hill