5037 - POWER PLANT ENGINEERING ✓

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	2	5	25	25	3 Hrs.	100	25 oral	175

Pre-requisite	Source
4037	MEC

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	25	50	175

RATIONALE: - More and more industries set up own active power plant in order to be self sufficient as far as their power requirement is concerned. Depending upon the type of industry, the generating plants are set up. Similarly more and more power plants are set up to meet the ever-growing power requirement in the industry. A technician in a industry will be associated to with the operation and maintenance of such power plants and this subject aim in providing them the insight into all the aspect of various types of power plants that are being set up.

COURSE CONTENT	Hrs	Mks
1. RESOURCES DEVELOPMENT OF POWER IN INDIA Introduction, Hydel power development, Thermal power development, Nuclear power development, Present power development, Future planning in India.	2	
2. FLUCTUATING LOADS ON POWER PLANTS 1 Introduction, 2 Load curves, 3 Terms and factors, Connected load, Maximum demand, 3 Demand factor, Average load, Peak load, Load factor, Diversity, Plant use factor, 2.3.9 Plant capacity factor. 4 Effect of variable load on power plant design and operation. 5 Selection of the number and size of units.	4	10
3. HYDROELECTRIC POWER PLANTS 1 Introduction, 2 Site selection for hydroelectric power plant 3 Classification of hydroelectric power plant; 4 General arrangement of storage type.Hydro-electric project and its operation. 5 Advantages of hydro-electric power plants.	4	10
4. INTERNAL COMBUSTION ENGINE POWER PLANT Introduction, Field of use, Components of IC engine power plant, Air intake system, Exhaust gas system, Fuel system, Engine cooling system, Lube-oil system, Engine starting systems, Electrical systems, Layout of medium capacity diesel power plant	4	10
5. GAS TURBINE POWER PLANT Introduction, Constant pressure combustion cycle, The simple gas turbine plant, Classification and comparison of different types of gas turbine power plant, Thermal refinement of simple open cycle constant pressure gas turbine power plant.	3	8
6. THE STEAM POWER PLANT Introduction, General layout of modern coal based steam power plant, Working of steam power plant, Site selection for thermal power plant, Different types of fuels uses for steam generations, Coal handling, Coal preparation and required equipments, Pulverised coal handling system, Unit system, Bin system, Coal burning methods, Brief introduction to different stokers, Pulverised fuel burners, Cyclone burners	10	20
7. THE FEED WATER LOOP Functions of the feed water loop, Water contamination –its effects, Water tests and analysis, De concentration or blow downs, General layout of water treatment plant, Water treatment methods, Ion exchange process, Demineralisation process, De-	6	10

aeration process, Water pumps (no constructional details), Reciprocating pumps, Turbine pumps, Centrifugal pumps, Feed water regulation		
8. THE GAS LOOP Function of the gas loop, Oil and gas supply systems, Flue gas cleaning, Mechanical dust collectors, Electrostatic precipitates, General layout of ash handling plant, Draft, Natural, Mechanical, Power requirement for draft fans, Fan drives and controls,	5	10
9. COOLING TOWERS Necessity of cooling condenser water, Condenser water cooling system, Mechanism of cooling, Cooling towers, Natural draft cooling tower (hyperbolic cooling tower), Mechanical draft cooling tower, Water distribution system used in cooling tower, Prevention of carryover losses and fog formation from cooling tower.	4	10
10. NUCLEAR POWER PLANTS Principal of release of energy by nuclear reaction, Nuclear fuels used in the reactors, General components of nuclear reactors, Different types of reactors, Pressurised water reactor, Boiling water reactors, Breeder reactors, General layout of nuclear power plant, Radiation hazard, Radio active waste disposal.	6	12
Total	48	100

TERM-WORK: - The term work shall consists of the following:-

1. Study of layout of hydro- electric plants
2. Study of general layout of modern thermal power plant
3. Study of coal and ash handling process
4. Study of cooling towers
5. Performance of experimental cooling tower
6. Study of general layout of diesel engine plant
7. Study of nuclear reactors
8. Study of layout of nuclear power plant.

REFERENCE BOOKS:-

1. Power Plant Engineering By F. T. Morse
2. A course in Power Plant Engineering. By S. Dmkundwar & S. C. Arora, Dhantpat Rai & Sons