Chhattisgarh Institute of Technology, Jashpur

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LESSON PLAN SESSION - 2025-2026
SUBJECT: POWER PLANT ENGINEERING SEMESTER: 6th
BRANCH: - MECHANICAL ENGINEERING

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	REMARK
Unit 01: Steam Power Plant.	**1.1 Power plant** : General layout of modern thermal power plant, Site selection, Presents status of power generation in India, Elements of power plant, function of each element, steam condition and dryness fraction.	02	
	1.2 Rankine cycle: Representation on PV, TS,HS plane, efficiency of Rankine cycle, Revision &improvement of thermal efficiency of Rankine cycle by lowering exhaust pressure, increasing boiler pressure and superheating Of steam. Numerical problems.	02	
	1.3 Reheat cycle representation on T-S and H-S Planes, flow diagram And advantages.	02	
	1.4 Simple regenerating cycle Flow diagram, representation on T-S**,** H-S plants, bleeding and feed power heating and pumping, advantages of Regenerative cycle.	01	
	1.5 Power station- Types of power station such as central power station, industrial power station, captive power station, advantages, and Classification of power station on the basis of prime-movers.	01	
Unit 02: Elements of power Plant.	**2.1** Steam Generators: Classification according to working pressure. **(a)**Low pressure boilers- Cochran, Lancashire and locomotive boilers **(b)**High pressure boilers -Velox, Benson, La-mont, Leoffler, supercritical boilers.	02	
	2.2(a) Boiler mountings- Safety valves, water level indicator, pressure gauge, blow off cock. **(b)** Accessories – super heater, economizer, pre heater and draft equipment. Superheat control methods, Pulverized fuel and necessity, storing systems etc.	03	
	2.3 Steam Prime mover Steam nozzle-types, Velocity of steam at outlet, Weight of discharge, Area of cross section at throat and outlet, Critical pressure ratio, Nozzle efficiency, Concept of prime mover, Steam turbine – working principle, method of compounding and governing, losses in steam turbines.	03	

	2.4 Condensing Unit - Functions of Steam condenser its type's jet and surface, Limitations and advantages of steam condenser, Elements of Condensing unit, cooling towers.	01	
Unit 03: Gas & Diesel Power Plants	**3.1Gas Turbine Power Plants-** Brayton cycle, classification of Brayton Or Joule Cycle, Open and Close cycle, representation of cycle on P.V. and T.S. diagram.	03	
	3.2 Thermal efficiency in terms of terminal temperature and pressure, effect of pressure ratio on thermal efficiency, Advantages and disadvantages of open and close cycle gas turbines, Important components of gas turbine power plant	02	
	3.3 Methods of improving thermal efficiency, Essential auxiliaries and controls of a gas turbine power plants, Fuels for gas turbines.	01	
	3.4 Diesel Engine Power Plants-Diesel power plant layout, Functions & components. Diesel power plant systems such as – Cooling and lubrication system, fuel injection system, solid injection system -Common rail system, individual pump system, distribution system, data recording.	02	
Unit 04: Nuclear Power Station	**4.1** Fission and Fusion. Chain reactions, fission materials, types of reactors, gas cooled, boiling Water liquid, metal cooled and fast reactor.	02	
	4.2 Arrangements of various elements in a nuclear power station, steam cycles and boilers coolant heat exchangers, Reactor control, Reactor shielding and safety methods.	02	
	4.3 Setting of Nuclear plants: Site evaluation Stages, Site Rejection Criteria, Earthquake, Geological criteria, Meteorological considerations, Flooding, Tsunami, Shoreline erosion, chemical explosion, Radiological impact study, Radioactivity pathways to Humans, environmental Impact study.	02	
	4.4 Hazards in nuclear power station – units of radiations, safe and dangerous dozes of radiations, safety precautions in nuclear power station, and Nuclear Power plants in India.	02	
Unit 05: Hydro Electric Power Plants	**5.1** Catchments area, Water Storage, element of hydroelectric power stations.	02	
	5.2 Characteristics of hydraulic turbines, Comparison of the factors governing the cost of hydro, steam and diesel power stations.	02	
	5.3 Selection of prime mover, speed and pressure regulation, methods of governing, starting and stopping of water turbines, operation of hydro turbines. Maintenance of hydropower plants	02	

Unit 06: Steam Power station Control and Economics	**6.1** Effect of load variation on shaft speed, steam admission, valve Opening, steam flow rate, steam pressure and combustion control system.	02	
	Power plant economics **6.2** Necessity of controlling factors in load variation, Control system (area system, centralized control system) Basic elements of control system, controls and instruments located in modern control station.	01	
	6.3 Concept of occurrence of fluctuating loads, Load curve and its significance, Connected load, maximum demand, demand factor, average load, load factor, diversity factor, plant capacity factor, plant use factor, effect of variable load and remedies.	02	
	Total Class Required	43	

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