## **LESSON PLAN**

## DEPARTMENT OF MECHANICAL ENGINEERING, ITT, CHOUDWAR

SUBJECT: POWER STATION ENGINEERING

Periods: 4 per week

NAME OF FACULTY: SRIKANTA KUMAR PANIGRAHI, LECTURER(MECH)

**SEMESTER:** 6<sup>th</sup> **No. of weeks:** 15

Week		Theory / Proctical Topics
	Class Day	Theory / Practical Topics INTRODUCTION:
1st	1	Describe sources of energy
	2 <sup>nd</sup>	Explain concept of Central and Captive power station
	$3^{\text{rd}}$	Classification power plants.
	4 <sup>th</sup>	
2 <sup>nd</sup>	1 <sup>st</sup>	Importance of electrical power in day today life.
	$2^{\text{nd}}$	Overview of method of electrical power generation.
	2	THERMAL POWER STATIONS: Layout of Modern steam power stations
	3 <sup>rd</sup>	Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram
	3	and determine thermal efficiency.
	4 <sup>th</sup>	Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal
		efficiency, Work done, work ratio, and specific steam Consumption.
3 <sup>rd</sup>	1 <sup>st</sup>	Solve Simple Problems.
	2 <sup>nd</sup>	List of thermal power stations in the state with their capacities.
	3 <sup>rd</sup>	Boiler Accessories: Operation of Air pre heater,
	4 <sup>th</sup>	Operation of Economiser, Operation Electrostatic precipitator
4 <sup>th</sup>	1 <sup>st</sup>	Operation of super heater.
	2 <sup>nd</sup>	Need of boiler mountings and operation of boiler
	3 <sup>rd</sup>	Draught systems-Natural draught
	4 <sup>th</sup>	Forced draught & balanced draught
5 <sup>th</sup>	1 <sup>st</sup>	Its advantages & disadvantages.
	2 <sup>nd</sup>	Steam prime movers: Advantages & disadvantages of steam turbine,
	3 <sup>rd</sup>	Elements of steam turbine, Governing of steam turbine.
	4 <sup>th</sup>	Compounding of steam turbine
6 <sup>th</sup>	1 <sup>st</sup>	Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and
	,	Gross efficiency.
	2 <sup>nd</sup>	Steam condenser: Function of condenser, Classification of condenser.
	3 <sup>rd</sup>	Function of condenser auxiliaries such as hot well, condenser extraction pump,
	. th	air extraction pump, and circulating pump.
_th	4 <sup>th</sup>	Cooling Tower: Function and types of cooling tower,
7 <sup>th</sup>	1 <sup>st</sup>	Spray ponds, Selection of site for thermal power stations.
	2 <sup>nd</sup>	NUCLEAR POWER STATIONS:
		Introduction, Compare the nuclear and thermal plants, its advantages &
	3 <sup>rd</sup>	disadvantages.
	4 <sup>th</sup>	Classify nuclear fuel (Fissile & fertile material)  Various terminology relating to Nuclear Power.
8 <sup>th</sup>	1 <sup>st</sup>	Explain fusion and fission chain reaction.
0	$2^{\text{nd}}$	Selection of site for nuclear power stations.
	$\frac{2}{3^{\text{rd}}}$	Explaining the various components of nuclear reactor
	4 <sup>th</sup>	Explaining the various components of nuclear reactor  Explaining PWR & BWR.
9 <sup>th</sup>	1 <sup>st</sup>	Selection of site for nuclear power stations.
	$2^{\text{nd}}$	List of nuclear power stations.
	$3^{\text{rd}}$	Explain the disposal of nuclear waste.
	4 <sup>th</sup>	DIESEL ELECTRIC POWER STATIONS:
	+	DIEGEL ELECTRIC I OWER STATIONS:

Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system			State the advantages and disadvantages of diesel electric power stations.
and fuel supply system  3rd Fuel injection system  4th Air supply system, Exhaust system  11th 1st Cooling system,  2nd Lubrication system  3rd Starting system, governing system  4th Selection of site for diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  HYDEL POWER STATIONS:  Introduction, State the advantages and disadvantages of hydroelectric power plant.  3rd Comparison with Thermal power plant  Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS  Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.	10 <sup>th</sup>	1 <sup>st</sup>	Comparison with Thermal power plant
3 <sup>rd</sup>   Fuel injection system   4 <sup>th</sup>   Air supply system, Exhaust system   11 <sup>th</sup>   1 <sup>st</sup>   Cooling system,   2 <sup>nd</sup>   Lubrication system   2 <sup>nd</sup>   Lubrication system   3 <sup>rd</sup>   Selection of site for diesel electric power stations   12 <sup>th</sup>   1 <sup>st</sup>   Performance and thermal efficiency of diesel electric power stations   12 <sup>th</sup>   1 <sup>st</sup>   Performance and thermal efficiency of diesel electric power stations   HYDEL POWER STATIONS:   Introduction, State the advantages and disadvantages of hydroelectric power plant.   Comparison with Thermal power plant   4 <sup>th</sup>   Classification and explaining the general arrangement of storage type hydroelectric project   2 <sup>nd</sup>   Selection of site of hydel power plant.   3 <sup>rd</sup>   Explaining the operations of other types of hydroelectric project   2 <sup>nd</sup>   Selection of site of hydel power plant.   3 <sup>rd</sup>   List of hydro power stations with their capacities and number of units in the state.   4 <sup>th</sup>   Brief idea about the types of turbines and generation used.   14 <sup>th</sup>   1 <sup>st</sup>   Micro, Mini & Small Hydro power projects   2 <sup>nd</sup>   Solving Simple nuclear problems.   3 <sup>rd</sup>   Solving Simple nuclear problems.   4 <sup>th</sup>   GAS TURBINE POWER STATIONS   Introduction   15 <sup>th</sup>   1 <sup>st</sup>   Selection of site for gas turbine stations, Fuels for gas turbine   2 <sup>nd</sup>   Elements of simple gas turbine power plants   3 <sup>rd</sup>   Operation of Gas Turbine Power Station   4 <sup>th</sup>   Merits, demerits and application of gas turbine power plants.		$2^{\text{nd}}$	Explain briefly different systems of diesel electric power stations: Fuel storage
4th Air supply system, Exhaust system  11th 1st Cooling system, 2nd Lubrication system  3rd Starting system, governing system  4th Selection of site for diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  12th HYDEL POWER STATIONS: Introduction, State the advantages and disadvantages of hydroelectric power plant.  3rd Comparison with Thermal power plant  4th Classification and explaining the general arrangement of storage type hydroelectric project  2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.			
11 <sup>th</sup>			Fuel injection system
2nd Lubrication system  3rd Starting system, governing system  4th Selection of site for diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  4th Pyper Power Stations:  Introduction, State the advantages and disadvantages of hydroelectric power plant.  3rd Comparison with Thermal power plant  4th Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.			Air supply system, Exhaust system
3rd Starting system, governing system  4th Selection of site for diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  4th POPER STATIONS: Introduction, State the advantages and disadvantages of hydroelectric power plant.  3rd Comparison with Thermal power plant  Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.	11 <sup>th</sup>		Cooling system,
4th Selection of site for diesel electric power stations  12th 1st Performance and thermal efficiency of diesel electric power stations  4th POEL POWER STATIONS: Introduction, State the advantages and disadvantages of hydroelectric power plant.  Comparison with Thermal power plant  4th Classification and explaining the general arrangement of storage type hydroelectric project  2th Explaining the operations of other types of hydroelectric project  2th Selection of site of hydel power plant.  List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2th Solving Simple nuclear problems.  3trd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2th Selection of Gas Turbine Power plants  3trd Operation of Gas Turbine Power plants  4th Merits, demerits and application of gas turbine power plants.			Lubrication system
12th 1st Performance and thermal efficiency of diesel electric power stations  2nd HYDEL POWER STATIONS: Introduction, State the advantages and disadvantages of hydroelectric power plant.  3rd Comparison with Thermal power plant  4th Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.			Starting system, governing system
Ath   Brief idea about the types of turbines and generation used.   14th   1st   Micro, Mini & Small Hydro power projects   2nd   Solving Simple nuclear problems.   3rd   Solving Simple nuclear problems.   4th   Gas Turbine Power Station   4th   3rd   Solving Simple gas turbine   2nd   3rd   3rd			Selection of site for diesel electric power stations
Introduction, State the advantages and disadvantages of hydroelectric power plant.  3rd Comparison with Thermal power plant  4th Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.	12 <sup>th</sup>		Performance and thermal efficiency of diesel electric power stations
plant.  3rd Comparison with Thermal power plant  4th Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.		$2^{\text{nd}}$	
3rd   Comparison with Thermal power plant			Introduction, State the advantages and disadvantages of hydroelectric power
4th Classification and explaining the general arrangement of storage type hydroelectric project  13th 1st Explaining the operations of other types of hydroelectric project  2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.		,	
hydroelectric project  13 <sup>th</sup> 1 <sup>st</sup> Explaining the operations of other types of hydroelectric project  2 <sup>nd</sup> Selection of site of hydel power plant.  3 <sup>rd</sup> List of hydro power stations with their capacities and number of units in the state.  4 <sup>th</sup> Brief idea about the types of turbines and generation used.  14 <sup>th</sup> 1 <sup>st</sup> Micro, Mini & Small Hydro power projects  2 <sup>nd</sup> Solving Simple nuclear problems.  3 <sup>rd</sup> Solving Simple nuclear problems.  4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.			
13 <sup>th</sup> 1st Explaining the operations of other types of hydroelectric project  2 <sup>nd</sup> Selection of site of hydel power plant.  3 <sup>rd</sup> List of hydro power stations with their capacities and number of units in the state.  4 <sup>th</sup> Brief idea about the types of turbines and generation used.  14 <sup>th</sup> 1st Micro, Mini & Small Hydro power projects  2 <sup>nd</sup> Solving Simple nuclear problems.  3 <sup>rd</sup> Solving Simple nuclear problems.  4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1st Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.		4 <sup>th</sup>	
2nd Selection of site of hydel power plant.  3rd List of hydro power stations with their capacities and number of units in the state.  4th Brief idea about the types of turbines and generation used.  14th 1st Micro, Mini & Small Hydro power projects  2nd Solving Simple nuclear problems.  3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.	41-		
List of hydro power stations with their capacities and number of units in the state.  4 <sup>th</sup> Brief idea about the types of turbines and generation used.  14 <sup>th</sup> 1 <sup>st</sup> Micro, Mini & Small Hydro power projects  2 <sup>nd</sup> Solving Simple nuclear problems.  3 <sup>rd</sup> Solving Simple nuclear problems.  4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.	13 <sup>th</sup>	_	
state.  4 <sup>th</sup> Brief idea about the types of turbines and generation used.  14 <sup>th</sup> 1 <sup>st</sup> Micro, Mini & Small Hydro power projects  2 <sup>nd</sup> Solving Simple nuclear problems.  3 <sup>rd</sup> Solving Simple nuclear problems.  4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.			• • •
14 <sup>th</sup> 1 <sup>st</sup> Micro, Mini & Small Hydro power projects  2 <sup>nd</sup> Solving Simple nuclear problems.  3 <sup>rd</sup> Solving Simple nuclear problems.  4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.		3 <sup>rd</sup>	
2 <sup>nd</sup> Solving Simple nuclear problems.  3 <sup>rd</sup> Solving Simple nuclear problems.  4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.		4 <sup>th</sup>	Brief idea about the types of turbines and generation used.
3rd Solving Simple nuclear problems.  4th GAS TURBINE POWER STATIONS Introduction  15th 1st Selection of site for gas turbine stations, Fuels for gas turbine  2nd Elements of simple gas turbine power plants  3rd Operation of Gas Turbine Power Station  4th Merits, demerits and application of gas turbine power plants.	14 <sup>th</sup>		Micro, Mini & Small Hydro power projects
4 <sup>th</sup> GAS TURBINE POWER STATIONS Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.		$2^{\text{nd}}$	Solving Simple nuclear problems.
Introduction  15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.		3 <sup>rd</sup>	Solving Simple nuclear problems.
15 <sup>th</sup> 1 <sup>st</sup> Selection of site for gas turbine stations, Fuels for gas turbine  2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.		4 <sup>th</sup>	GAS TURBINE POWER STATIONS
2 <sup>nd</sup> Elements of simple gas turbine power plants  3 <sup>rd</sup> Operation of Gas Turbine Power Station  4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.			Introduction
3 <sup>rd</sup> Operation of Gas Turbine Power Station 4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.	15 <sup>th</sup>	1 <sup>st</sup>	Selection of site for gas turbine stations, Fuels for gas turbine
4 <sup>th</sup> Merits, demerits and application of gas turbine power plants.			Elements of simple gas turbine power plants
			Operation of Gas Turbine Power Station
D 1:1.1		$4^{ ext{th}}$	Merits, demerits and application of gas turbine power plants.
Remedial class			Remedial class
Remedial class			Remedial class

Sign. of Faculty