



SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with 'A' Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada Seetharamapuram, W.G.D.T., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT MECHANICAL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
20ME7E11	POWER PLANT ENGINEERING	VII	ME	05	2024-25	05-06-2024

COURSE OUTCOMES

1	Describe the layout of steam power plant and various handling equipment of coal, ash etc. [K2]
2	Describe the equipment used for combustion of coal and other supporting systems. [K2]
3	Discuss the working of diesel, gas turbine power plants and different hydro electric power plants. [K2]
4	Discuss the working principle and operation of Nuclear power plant and different types of reactors [K2]
5	Estimate various costs and load calculations involved in a power plant and identify environmental considerations. [K4]

UNIT	Outcomes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
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STEAM POWER PLANT

I	Describe the layout of steam power plant and various handling equipment of coal, ash etc. [K2]	1.1	STEAM POWER PLANT			Chalk & Talk, PPT, Videos and Active learning
		1.1.1	General layout of modern thermal power plant	T1	1	
		1.1.2	Site selection and different materials required for thermal power plants	T2	1	
		1.1.3	Classification of coal, coal storage,	T1	1	
		1.1.4	Outplant handling of coal, Inplant handling of coal	T2, T1	1	
		1.1.5	Pulverized fuel handling system, Ash handling systems	T1	1	
		1.2	BURNING OF COAL AND COMBUSTION NEEDS			
		1.2.1	Coal burning methods, overfeed and underfeed stokers chain grate	T1	1	
		1.2.2	Traveling grate, spreader stokers, single and multiretort stokers	T1	1	
		1.2.3	Pulverized fuel burning system and its components,	T1, T2	1	
		1.2.4	Draught system, dust collectors,	T1	1	
		1.2.5	Cooling towers and feed water treatment	T1	1	
Total					10	



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DIESEL ELECTRIC AND GAS TURBINE POWER PLANTS

II	Describe the equipment used for combustion of coal and other supporting systems.[K2]	2.1	DIESEL ELECTRIC POWER PLANT			Chalk & Talk, PPT, Videos and Active learning		
		2.1.1	Fields of use, general layout of diesel power plant,	T1, T2	1			
		2.1.2	Types of diesel engines used for diesel power plants	T1, T2	1			
		2.1.3	Different systems of diesel power plant – fuel supply system, air supply system, water cooling system, lubrication system, starting system	T1	1			
		2.1.4	Super charging of diesel engines	T1, T2	1			
		2.1.5	Advantages and disadvantages of diesel plants over thermal plants	T1, T2	1			
		2.2	GAS TURBINE PLANT					
		2.2.1	Introduction, classification	T1	1			
		2.2.2	Construction, layout with auxiliaries,	T1, T2	1			
		2.2.3	Principles of working of open cycle gas turbines	T1	1			
		2.2.4	Principles of working of closed cycle gas turbines	T1	1			
		2.2.5	Combined cycle power plants and comparison	T1, T2	1			
		TOTAL					10	
		HYDRO ELECTRIC POWER PLANT						
III	Discuss the working of diesel, gas turbine power plants and different hydro electric power plants.[K2]	3.1	Hydrology, hydrological cycle	T1	1	Chalk & Talk, PPT, Videos and Active learning		
		3.2	Rain fall and runoff its measurement	T1, R1	1			
		3.3	Hydrographs, flow duration curves, mass curve and storage	T1	1			
		3.4	Classification of dams and spill ways	T1, R1	1			
		3.5	Water hammer and surge tanks.	T1, R1	1			
		3.6	Classification of hydroelectric power plant	T1	1			
		3.7	Plant auxiliaries, plant operation	T2, R1	1			



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		3.8	Pumped storage plants.					
		3.9	Typical layouts of hydroelectric power plants	T1	1			
				Total	9			
NUCLEAR POWER STATION								
IV	Discuss the working principle and operation of Nuclear power plant and different types of reactors [K2]	4.1	Nuclear fuel, breeding and fertile materials	T1, T2	1	Chalk & Talk, PPT, Videos and Active learning		
		4.2	nuclear reactor, reactor operation	R1, T2	1			
		4.3	TYPES OF REACTORS: Pressurized Water Reactor (PWR),	T2, R1	1			
		4.4	Boiling Water Reactor (BWR),	T2, R1	1			
		4.5	Sodium Graphite Reactor (SGR),	T2, R1	1			
		4.6	Fast Breeder Reactor (FBR),	T1, R1	1			
		4.7	Homogeneous Reactor	T1, T2	1			
		4.8	Gas cooled Reactor	T1, T2	1			
		4.9	Radiation hazards and shielding radioactive waste disposal.	T1, T2, R1	1			
		4.10	Radioactive waste disposal.	T2, R1	1			
				Total	10			
POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS								
V	Estimate various costs and load calculations involved in a power plant and identify environmental considerations. [K4]	5.1 POWER PLANT ECONOMICS					Chalk & Talk, PPT, Videos and Active learning	
		5.1.1	Capital cost, investment of fixed charges, operating costs	T2, R4	1			
		5.1.2	General arrangement of power distribution	T2, R3	1			
		5.1.3	Load curves and load duration curve	T2, R1	1			
		5.1.4	Definitions of connected load, maximum demand	T2, R1	1			
		5.1.5	Demand factor, diversity factor – related exercises.	T2, R1	1			
		5.1.6	Average load, load factor	T2, R2	1			
		5.2	Impact on Environment					
		5.2.1	Introduction – Pollution from thermal power plants	T2, R2	1			
		5.2.2	removal of Sulphur dioxide and emission of NOx	T1, R1	1			
		5.2.3	Pollution from nuclear power plants and pollution from hydroelectric power plants.	T2, R2	1			
				Total	9			



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Course beyond the syllabus	Cooling Ponds, Piping System, Plant Instrumentation	3
CUMULATIVE PROPOSED PERIODS		51

Text Books:


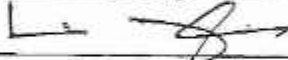
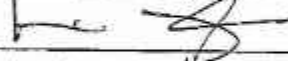

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
T1	Subhash C. Arora, S. Domkundwar, Power Plant Engineering, 8 th Edition, Dhanpat Rai, 2016
T2	P.K. Nag, Power Plant Engineering, 5 th Edition, Tata McGrawHill Education, 2021


Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
R1	R. K Rajput, Power Plant Engineering, 5 th Edition Laxmi Publications, , 2016
R2	P.C. Sharma, Power plant Engineering, 1 st Edition, S. K. Kataria & Sons, 2009

Web Details:

<https://archive.nptel.ac.in/courses/112/107/112107291/>

SNO	Details	Name	Signature
i.	Faculty	Dr. R. Lalitha Narayana	
ii.	Course Coordinator	Dr. R. Lalitha Narayana	
iii.	Module Coordinator	Dr. R. Lalitha Narayana	
iv.	Programme Coordinator	Dr. A Gopichand	


Principal