

Subject Code: 01ME0801
Subject Name: Steam and Gas Turbine
B.Tech. IV Year – (Sem-8) Mechanical Engineering
Type of course: Program Core

Prerequisite: Engineering Thermodynamics, Fluid Mechanics, Heat Transfer

Rationale: The course is prepared to provide the detail knowledge of construction and working of steam turbine, gas turbine, nozzles etc.

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Evaluation Scheme					Total Marks
Theory	Tutorial	Practical		Theory Marks			Practical Marks		
				ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

COURSE OUTCOME

Students will be able to

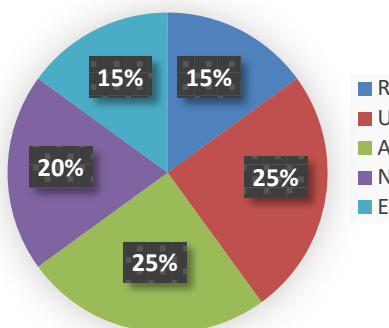
1. Analyze thermodynamic cycles of steam power plant and understand construction, working and significance of its various components
2. Analyze thermodynamic cycles of gas turbine power plant and jet propulsion systems

Sr no	Contents	Total hours	Weightage
1	Steam Nozzles – Definitions and applications, classification of nozzles, steady flow energy equation in nozzles, velocity of steam, mass of discharge through nozzle, critical pressure ratio and condition for maximum discharge, physical explanation of critical pressure ratio, nozzle efficiency	8	20
2	Steam Turbine: Principle of operation of steam turbine, classification of steam turbines, velocity diagram and work done, parson's reaction turbine, difference between impulse and reaction turbine, simple impulse turbine, compounding of impulse turbine, pressure compounded impulse turbine, velocity compound impulse turbine, pressure-velocity compounded impulse turbine, impulse reaction turbine, combination turbines, governing of steam turbine,	14	33

	Methods of attachment of blades to turbine rotor, Losses in steam turbine. Reheating, regenerative and intercooling in steam turbine, stage efficiency of impulse turbines, state point locus of an impulse turbine, state point locus for multistage steam turbine, reheat factor		
3	Gas Turbine -Types and application, air standard brayton cycle, actual brayton cycle, optimum pressure ratio for maximum cycle thermal efficiency, work ratio, cycle air rate, effect of operating variables on the thermal efficiency and work ratio, and air rate, simple open cycle turbine with regeneration, reheating and Intercooling, closed cycle gas turbine, fuel for gas turbine. Combined steam and gas turbine plant, requirements of combustion chamber, classification of combustion chambers.	14	33
4	Jet Propulsion: Fundamental of propulsion technology, classification of jet propulsion engines, turbojet Engine, thrustpower, propulsive and thermal efficiency, Turbo propulsion, Ramjet and Pulsejet engines	6	14

Distribution of Theory Marks

Remembrance	Understanding	Application	Analyze	Evaluate
15	25	25	20	15



Reference Books

1. Steam & gas turbine and Power Plant Engineering, R. Yadav, Central Publishing House, Allahabad.
2. Gas Turbines, V. Ganeshan, McGraw Hill Education
3. Power Plant Engineering, P.K. Nag, McGraw-Hill Education
4. Power Plant Engineering, R. K. Hegde, Pearson India Education
5. Thermal Engineering, R.K. Rajput, Laxmi Publication
6. Steam Turbine Theory and Practice, William J. Kearton, CBS Publication

List of Open Source Software/learning website

1. <http://nptel.ac.in/courses/112104117/18>
2. <http://nptel.ac.in/courses/112104117/4>
3. <http://nptel.ac.in/courses/112104117/17>