Subject: Steam and Gas Turbine (PE-5)								
Program: B. Tech. (Mechanical)				Subject Code: ME0724			Semester: VII	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE) Theory	Continuous Internal Evaluation (CIE) Practical	Total Marks
2	0	2	3	16/40	16/40	24/60	24/60	200

Course Objective

1. The course is designed to give fundamental knowledge of construction and working ofvarious types of turbines and their components
2. To create knowledge and understanding of steam turbine, gas turbine, nozzles etc.

Course Outcomes

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

COURSE CONTENT

UNIT-1 [08]

1 Steam Nozzles

Types of nozzles, velocity of steam, discharge through nozzle, critical pressure ratio and condition for maximum discharge, physical significance of critical pressure ratio, nozzle efficiency

UNIT-2 [10]

2 Steam Turbine

Principle of operation, types of steam turbines, compounding of steam turbines, impulse turbine velocity diagram, calculation of work, power and efficiency, condition for maximum efficiency, Reaction turbines –velocity diagram, degree of reaction, reheat factor, governing of steam turbine–throttle, nozzle and bypass governing, Methods of attachment of blades to turbine rotor, Labyrinth packing, Losses in steam turbine, Special types of steam turbine-back pressure, pass out and mixed pressure turbine

UNIT-3 **[10]**

3 Gas Turbine

Classification, open and closed cycle, gas turbine fuels, actual Brayton cycle, optimum pressure ratio for maximum thermal efficiency, work ratio, 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, Combined steam and gas turbine plant, requirements of combustion chamber,
types of combustion chambers .

UNIT-4 **[08]**

4 Gas Dynamics and Jet Propulsion

Fundamentals of gas dynamics, energy equation, stagnation properties, isentropic flow through nozzle and diffusers, Introduction to shock waves, introduction to jet propulsion, advantages and disadvantages of jet propulsion – turbojet engine with and without after burner, turboprop, ram jet, pulse jet, rocket engines – operation, solid and liquid propellants

Texts Books

1. Power Plant Engineering, P.K. Nag, McGraw-Hill Education
2. Steam & Gas turbines, R. Yadav, Central publishing House, Allahabad.

Reference Books

1. Power Plant Engineering, R. K. Hegde, Pearson India Education
2. Gas Turbines, V. Ganeshan, McGraw Hill Education
3. Thermal Engineering, R.K.Rajput, Laxmi Publication
4. Steam Turbine Theory and Practice, William J. Kearton, CBS Publication
5. Gas Turbines, Cohen & Rogers, Pearson Prentice Hall

Web Resources

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

List of Experiments

1. To study various types of steam nozzles
2. To study various types of steam turbine

3. To study various types of gas turbines
4. To study various types of vapour power cycles
5. To study various types of gas dynamics
6. To study about jet propulsion