Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Thermal Engg.	Turbo Machines	MET 518	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
II	3	3-0-0	3 **Hours**

Unit – I

Introduction: Types of Turbo machines; Applications of turbo machines; Performance characteristics; Methods of analysis dimensional analysis; Dimensions and dimensional homogeneity; Buckingham Pi theorem; Other non-dimensional parameters for turbo machines; Similarity laws energy transfer in turbo machines: Review on fluid mechanics related to turbo machinery; Energy in flowing fluids; Euler equations; Equations for axial flow machines; Equations for mixed and radial flow machines; Degree of reaction. **(08 hours)**

Unit - II

Centrifugal Pumps: Basic construction and classification; Basic working principles; Performance characteristics; Cavitation; Performance modifications; Preliminary design procedure; Pump performance tests axial flow pumps and fans: Introduction; flow over isolated airfoils; Axial flow cascade; Preliminary design procedure; Propellers. **(07 hours)**

Unit – III

Centrifugal Fans Blowers and Compressors: Classification performance parameters and characteristics; Change of performance; Polytropic efficiency; Preliminary design of centrifugal compressors. **(07 hours)**

Unit – IV

Axial Flow Compressors: Introduction; Basic theory; Peliminary design of compressor stage; Determination of stage efficiency; Axial flow compressor performance; Surge and stall in compressor and the remedies. **(08 hours)**

Unit –V

Gas Turbines: Introduction; Thermodynamics of axial flow turbine; Degree of reaction; Preliminary design procedure for turbine stage; Determination of turbine stage efficiency; Axial flow turbine performance; compressor; Turbine matching; Radial inflow gas turbine; Thermodynamic processes in radial inflow gas turbine.

(08 hours)

Unit – VI

Wind Turbines: Introduction to wind power; Actuator theory; Types of wind turbines; Wind turbines characteristics and preliminary design analysis; Variable speed performance of wind turbines; Wind turbine applications. **(07 Hours)**

Recommended Books:

1. Fundamentals of Turbo Machinery; W. W. Peng; 1st Edition; John Wiley & Sons; 2008.
2. Principles of Turbo Machinery; D. G. Shepherd; 1st Edition; The Macmillan Company; 1956.
3. Gas Turbine Theory; Henry Cohen; G. F. C. Rogers; H. I. H. Saravanamuttoo; 2nd Edition; Pearson; 2001.
4. Mechanics and Thermodynamics of Propulsion; P. Hill and C. Peterson; 2nd Edition; Prentice Hall; 2009.
5. Fluid Mechanics; Thermodynamics of Turbo Machinery; S. L. Dixon; 4th Edition; Elsevier; 1998.
6. Gas Turbines; V. Ganesan; 2nd Edition; Tata McGraw Hil; 2006.