Gautam Buddha University; Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Thermal Engg.	Advanced IC Engines and Gas Turbines	MET 601	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
III	3	3-0-0	3 Hours

Unit - I

Introduction of Internal Combustion Engine: Thermodynamic cycles of IC engine process; Fuel air cycles; Modified fuel air cycle; Use of combustion process charts. **(06 Hours)**

UNIT - II

Combustion in SI and CI Engines: Air-fuel ratio requirement of SI and CI; Carburetion; Stages of combustion-normal and abnormal combustion in SI engines; Factors affecting knock; Combustion chambers; Stages of combustion; Knock in CI engine; Factors affecting knock; Direct and indirect injection systems. **(08 Hours)**

Unit – III

Engine Exhaust Emission Control: Formation of NO_X; HC/CO mechanism; Smoke and particulate emissions; Green house effect; Methods of controlling emissions; Three way catalytic converter and particulate Trap; Emission (HC; CO; NO and NO_X) measuring equipments; Smoke and particulate measurement. **(07 Hours)**

Unit - IV

Alternate Fuels: Introduction of alternate fuel; Alcohols; Vegetable oils and bio-diesel; Bio-gas; Natural gas; Liquefied petroleum gas; Properties; Suitability; Engine modifications. **(08 Hours)**

Unit - V

Recent Trends: Homogeneous charge compression ignition engine; Lean burn engine; Stratified charge engine; Electronic engine management; Common rail direct injection diesel engine; Gasoline direct injection engine. **(08 Hours)**

Unit - VI

Gas Turbines: Open and closed cycle; Basic requirement of working media; Reheat cycle; Regeneration; Intercooled cycle with regeneration and reheat; Introduction to jet propulsion cycle and their analysis. **(08 Hours)**

Recommended Books:

1. Fundamentals of I.C. Engines; H. B. Heywood; Tata McGraw Hill; 1st Edition; 1988.
2. Internal Combustion Engines; V. Ganesan; Tata McGraw Hill; 3rd Edition; 2007.
3. Elements of gas Turbine Technology; J. D. Mattingly; Tata McGraw Hill; 2nd Edition; 2005.
4. Gas turbine Theory; Cohen; Rogers & Saravanamutto; Pearson education; 5th Edition; 2001.
5. Fundamentals of Internal Combustion Engines; H. N. Gupta; Prentice Hall of India; 1st Edition; 2006.