Course Type	Course Code	Name of Course	L	T	P	Credit
ESO	MME 201	IC ENGINES	3	0	0	9

Course Objective

The course is designed to provide the detailed understanding of internal combustion engine mainly based on its performance and emission parameters. The course will give a conceptual knowledge on constructional and application of Internal Combustion Engines. The course will also give an insight into basics of operation of different Internal Combustion Engines.

Learning Outcomes

Upon successful completion of this course, students will:

- Do in-depth cycle analysis for different types of engines.
- Analyze fuel supply systems, ignition and governing systems of IC Engines.
- Understand combustion process of SI and CI Engines.
- Measure operating characteristics of IC Engines.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction:** Internal and external combustion engines; classification and nomenclature of I.C. engines, thermodynamic analysis and comparison of Otto, diesel and dual combustion cycles, actual engine cycles and their analysis, engine performance parameters.	8	Understanding of basic of I.C engines.
2	**Fuels:** Conventional fuels for S.I. and C.I. engines, fuel properties and their influence of engine performance; octane and cetane rating of fuels, alternative fuels.	6	Knowledge about fuels required for C.I and S.I engine.
3	**Carburetion and fuel Injection:** Mixture requirements for various operating conditions in S.I. Engines; elementary carburetor, drawbacks of carburetor, compensating devices, petrol injection systems; single-point and multi-point fuel inject systems; types of diesel inject systems, injection pump and injectors, fuel filters.	6	Contouring requirements for various operating conditions in S.I engine and knowledge of Carburetion and fuel Injection
4	**Combustion in I.C. Engines:** Stages of combustion in S.I. Engines; factors influencing the ignition lag and flame speed; detonation and its effects on engines performance; influence of engine variables on detonation; pre-ignition; Stages of combustion in C.I. Engines; delay period; variables affecting delay period; knock in C.I. engines.	6	An in-depth knowledge of Combustion in I.C. Engines
5	**Engine Testing and Performance:** Measurement of various engine performance parameters; fuel and air consumption, brake power, indicated power and friction power, indicator diagram, dynamometer, heat lost to coolant and exhaust gases; performance curves.	8	Knowledge on engine performance parameters of C.I and S.I engine.
6	**Engine lubrication, cooling and emission:** Engine lubrication system, engine cooling system, pollutants from SI and CI Engines; influence of operating parameter on emission; methods of emission control. **Supercharging:** Objectives of supercharging, its advantages, limitations and application, performance of superchargers, supercharging of SI and CI Engines, turbo-charged diesel engine, construction, operation and maintenance of its subsystems, trouble shooting of the engine.	8	Knowledge on pollutant formation, control and in-depth knowledge of supercharging.

Text Books

1. The Internal Combustion Engines: C.F. Taylor & E.S. Taylor, Int. Textbook Co.
2. Internal Combustion Engine Fundamentals: J.B. Heywood, McGrawhill Book Co.

Reference Books

1. Internal Combustion Engines –V. Ganesan, Pub.-Tata McGraw-Hill.
2. A Course in Internal Combustion Engines - M.L. Mathur& R.P. Sharma, DhanpatRai.
3. A Text Book of Internal Combustion Engines: R K. Rajput, Laxmi Publ.
4. A Course in Internal Combustion Engines: Damkundwar by DhanpathRai& Sons