

Internal Combustion Engines

S	Subject	Semester	Code	Credit Hours	Contact Hours
6.5	Internal Combustion Engines	6 th	MECH-421	3-0	48

Course Learning Outcome:

Upon successful completion of the course, student will be able to:

S #	CLO, Course Learning Outcome	Domain	Level	PLO
1.	Define the internal combustion engine, its types and its classification	Cognitive	C1	1
2.	Explain the basic knowledge, construction and working of various types of IC engines and its components.	Cognitive	C2	1
3.	Solve numerical problems related to the design and operation of IC engines.	Cognitive	C3	3
4.	Analyse the design and operation of various IC Engine systems including preparation of air/fuel mixture, combustion control and emission reduction.	Cognitive	C4	7
5.	Analyse the effect of engine operating parameters (air/fuel ratio, ignition timing, fuel properties etc.) on engine performance and emissions.	Cognitive	C4	4

Course Content:

1. Engine Classification
2. Working principles of SI & CI engines
3. Working Principles of Turbo-Engine its performance characteristics.
4. Testing and performance of characteristics of petrol engine under variable conditions of load and speed.
5. Testing and performance of characteristics of diesel engine under variable conditions of load and speed.
6. Knocking characteristics, Ignition advance & related, pressure crank angle diagram.
7. Combustion phases of SI and CI engines.
8. Engine emission and their control through in cylinder and out cylinder techniques.
9. Exhaust gas recirculation (EGR system).
10. Thermal reactor and course catalytic converters, EFI engines and advantages over conventional petrol engine.
11. Engine performance under part load conditions
12. Introduction to dual fuel engines, alternative fuels
13. Engine lubrication and lubricants.
14. Exhaust Flow
15. Fluid motion within Combustion chamber.
16. Heat transfer in Engines.

Quizzes	Assignments	Mid Term	Final Term
25%		25%	50%

Recommended Books:

1. Heywood, J.B. (), Internal Combustion Engine Fundamental, McGraw-Hill
2. Stone, R. & Macmillan, P. (), Introduction to I.C Engines
3. Taylor, C.F. (), Internal combustion Engines, MIT Press.
4. Pulkcrabek W.W. (2003), Engineering Fundamentals of the Internal Combustion Engine, University of Wisconsin-Platteville.

Assessment: