



**Semester – III**

**Subject Name: Automobile Engines**

**Subject Code: 09AE0301**

**Diploma branch in which subject is offered:-** Automobile Engineering

**Objective:**

The course is designed to provide the detailed understanding of Internal combustion engine mainly based on its performance and emission parameters.

**Credits Earned:** 4

**Course Outcomes:**

After learning the course the students should be able to:

- Identify different types of internal combustion engines, its components and their applications.
- List out various performance parameters of the engine and its signification with the economical and environmental issues.
- Select various methods of power enhancement such as supercharger and turbocharger
- Explain fuel supply systems and ignition system of IC Engines.
- Distinguish different lubricating system and cooling system used in IC Engines.

**Pre-requisite of course:** Elements of Mechanical Engineering

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
3	0	2	4	50	30	20	25	25	150

**Contents:**

Sr. No.	Topics	Teaching hrs.	Weightage
1	<b>Engine Principles and fundamentals</b> Introduction, Basic engine nomenclature, Classification of automobile engines, Application of engines, Four stroke SI and CI engine, Two stroke cycle engine, Comparison of two stroke and four stroke cycle engine	04	10



2	<b>Constructional features of automobile engine components.</b> Cylinder block, Cylinder liner, Types of liner, comparison of dry and wet liners, cylinder head, gaskets, type of gaskets, piston, piston ring pin etc., Piston, piston rings, Piston ring joints, piston pin., Crank shaft, camshaft, connecting rod, valve, valve cooling, valve mechanisms, valve timing, port-timing diagram, manifolds, silencers, flywheel etc.	04	10
3	<b>I.C. Engine Performance Parameters</b> Indicated power, brake power, friction power, Air-fuel ratio, Mechanical Efficiency, Thermal Efficiency, Indicated thermal efficiency, Brake thermal efficiency, Specific fuel consumption, Air standard efficiency, Volumetric efficiency, Relative efficiency, Octane Number , Cetane Number	04	10
4	<b>Fuel Systems</b> Fuel supply system in petrol engines, Mechanical fuel pump, electrical fuel pump, Principles of carburetion, Simple Carburetor, Starting, Idling & slow running, acceleration, Main metering system, choke system, Requirement of fuel injection system, Diesel Fuel injection system, Types of fuel injection pumps for single and multi-cylinder engines, Types of fuel injectors, Air fuel mixture ratio in a petrol and diesel engine and comparison	18	35
5	<b>Supercharger and Turbocharger</b> Purpose and objectives of Supercharging, Thermodynamic cycles of Supercharged engine, Types of Supercharger, different arrangement of Supercharger, Limitations of supercharging, Turbocharger and its types	04	10
6	<b>Lubrication systems</b> Need of Lubrication system, Types of Lubricants, properties of Lubricant, SAE ratings, Wet and Dry sump lubricating system	04	10
7	<b>Engine cooling system</b> Introduction – Purpose of cooling systems, Air cooling system, Water cooling systems, Comparison of air & water cooling systems, Parts of cooling system, Thermostat, Water expansion tank, Temperature Indicator Pressure cap, water pump, fan and fan belt, radiator, Cooling water additions	04	10

**References:**

1. Internal Combustion Engines by V. M. Domkundwar, Dhanpat Rai Publications (P) Ltd.



2. Internal Combustion Engine Fundamentals by John B. Heywood, McGraw Hill Education Pvt Ltd.
3. Internal Combustion Engine by V Ganeshan, McGraw Hill Education Pvt. Ltd.
4. Internal Combustion Engine by M.L.Mathur and R.P.Sharma, Dhanpat Rai Publications (P) Ltd.
5. Fundamentals of Internal Combustion engine by H.N.Gupta, PHI Learning.
6. Internal Combustion Engines by K. K. Ramalingam, Scitech Publications Pvt. Ltd.

**Suggested Theory distribution:**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
35%	40%	25%	0	0	0

**Suggested List of Experiments:**

1. Operate a cut section model to explain four stroke engine.
2. Study about supercharging and turbo charging of I C Engines.
3. Study of various lubricating and cooling system of IC Engines.
4. Study fuel supply system in SI and CI engine.
5. Study about various methods for measurements and testing of I C engines
6. Performance test on 4 Stroke Petrol Engine and determination of Indicated Power of Multi Cylinder Petrol Engine using Morse Test.
7. Performance test on 4 Stroke Diesel Engine
8. Assembly and disassembly of I C Engines

**Instructional Method:**

- a) Lectures cum Discussion using Chart (such as fuel injection system for Petrol & Diesel engine), Cut Section Model (such as 2 & 4 stroke S.I & C.I. engine, supercharger), Display board (such as cooling system, lubricating system).
- b) Visit of authorized workshop of two wheeler and four wheeler.
- c) Use of animation or video clips.