

Program : <b>Diploma in Automobile Engineering</b>	
Course Code : <b>2051</b>	Course Title: <b>Basic Automobile Engineering</b>
Semester : <b>2</b>	Credits: <b>3</b>
Course Category: <b>Engineering Science</b>	
Periods per week: <b>3 (L:3, T:0, P:0)</b>	Periods per semester: <b>45</b>

### Course Objectives:

- To know the history and classification of automobiles,
- To understand various Vehicle Chassis Terminology,
- To appreciate the working and construction of different engines/ components,
- To classify different classes of vehicles based on usage, axle weight, power plant type.

### Course Prerequisites:

Topic	Course code	Course Name	Semester
Knowledge of basic science		Applied Physics I	1

### Course Outcomes:

On completion of the course, the student will be able to:

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive Level
CO1	Summarize different classification of vehicles and terminology of Chassis specification depending upon severity of operation.	10	Understanding
CO2	Make use of Petrol and Diesel Engines.	11	Applying
CO3	Illustrate the working and constructional details of various engine components.	11	Understanding
CO4	Outline the constructional details of camshaft, valves and valve operating mechanism	11	Understanding
	Series Test	2	

**CO - PO Mapping:**

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	2						
CO3	2						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

**Course Outline:**

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	<b>Summarize different classification of vehicles and terminology of Chassis specification depending upon severity of operation</b>		
M1.01	Explain the History of Automobile Vehicles in India and Abroad	3	Understanding
M1.02	Outline the various classifications of Vehicles	2	Understanding
M1.03	Outline different Vehicle layouts	3	Understanding
M1.04	Explain various terminology of vehicle specification	2	Understanding
<b>Contents:</b>			
<b>History And Classification</b>			
Automobile Vehicles - Definition - History and development in Abroad and in India before & after independence Different Indian and foreign Automobile manufacturing concerns of two-wheeler, three-wheeler, LMV and HTV - their products and plants location. Classification of Automobile, Major systems of an Automobile - their functions, Chassis - definition, chassis layout of two, three & four-wheeler with major components - their functions, engine mounts - need - types, definition of: wheel base - wheel track - overall length - front overhung - rear overhung height of CG point - ground clearance - gross weight and kerb weight.			
CO2	<b>Make use of Petrol and Diesel engines</b>		
M2.01	Understand the working principle of petrol & diesel engine	3	Understanding
M2.02	Distinguish between petrol and diesel engine	2	Understanding
M2.03	Identify various engine components	2	Applying

M2.04	Compare Two stroke and Four Stroke Engines	2	Understanding
M2.04	Identify the applications of Two stroke and Four Stroke Engines.	2	Applying
	Series Test-I	1	
<p><b>Contents:</b></p> <p><b>Engine Terminology</b></p> <p>Heat engines - Definition - types - comparison of IC and EC engines, engine terminology- bore - stroke - TDC - BDC - clearance volume - swept volume - total volume - compression ratio - mean effective pressure - indicated power - brake power - friction power - engine speed engine torque, classification of IC engines with respect to different parameters, Two stroke &amp; four stroke SI engines - construction - working, Two stroke &amp; Four stroke CI engines - construction - working, comparison of SI and CI engines - comparison of Two stroke and Four stroke engines.</p>			
<b>CO3</b>	<b>Illustrate the working and constructional details of various engine components</b>		
M3.01	Outline the different materials used for engine Construction	3	Understanding
M3.02	Outline the various Engine components	3	Understanding
M3.03	Summarize the Constructional details of single and multi-cylinder Engines	5	Understanding
<p><b>Contents:</b></p> <p><b>Engine Construction Details - I</b></p> <p>Cylinder block for single and multi - cylinder Engines - Their types - Constructional details - materials used, Cylinder head - constructional details materials used, crank case, oil pan, cylinder liners - types - construction - merits and demerits, Gasket - purpose - types, Piston - functions - requirements - constructional details - materials used, piston clearance - importance , Expansion control methods in pistons - heat dam - slots - bimetal - cam ground - taper piston - offset piston - special alloy, Piston rings - functions - types - constructional details - materials, Piston pin - construction - materials, Connecting rod and crank shaft - functions - types - construction - materials, Different methods of connecting piston with connecting rod - Explain each method.</p>			
<b>CO4</b>	<b>Outline the constructional details of camshaft, valves and valve operating mechanism</b>		
M4.01	Explain the firing orders of various multi-cylinder Engines	3	Understanding
M4.02	Illustrate the constructional details of Crank shaft and Cam shaft	4	Understanding
M4.03	Explain different valve arrangements and actuating mechanisms	4	Understanding
	Series Test-II	1	

**Contents:****Engine Construction Details - II**

Meaning and need of firing order, firing order of three, four- and six-cylinder engines- functions, construction and materials for flywheel- need, types and constructional details of vibration damper functions, construction and materials for cam shaft, different types of camshaft drives. Construction and materials for poppet valve, valve seat and valve guide- overhead valve operating mechanism, Camshafts of SOHC, DOHC types, Meaning and importance of valve clearance.

**Text /Reference:**

<b>T/R</b>	<b>BookTitle/Author</b>
T1	Kirpal Singh S - Automobile Engg., Vol. II - Standard Publications
R1	R.B. Guptha - Automobile Engg. - Satya Prakasan
R2	K.M.Guptha - Automobile Engg., Vol. I& II - Umesh Publications
R3	Anil Chikara - Automobile Engg., Vol. I -Satya Prakasan
R4	William.H.Crouse Automotive mechanics - McGraw - Hill Publications
R5	K.K.Ramalingam - Automobile Engg., Theory and Practice - Scitech Publications
R6	Dr.N.K. Giri - Automobile Technology - Khanna publishers
R7	Mathur and Sharma - I.C. Engines - Dhanpat rai publications

**Online Resources:**

<b>Sl.No</b>	<b>Website Link</b>
1	<a href="https://www.history.com/topics/inventions/automobiles">https://www.history.com/topics/inventions/automobiles</a>
2	<a href="https://www.explainthatstuff.com/historyofcars.html">https://www.explainthatstuff.com/historyofcars.html</a>
3	<a href="https://www.titlemax.com/articles/a-timeline-of-car-history/">https://www.titlemax.com/articles/a-timeline-of-car-history/</a>
4	<a href="https://cars.lovetoknow.com/History_of_the_Automobile_Industry">https://cars.lovetoknow.com/History_of_the_Automobile_Industry</a>