

<b>B. E. MECHANICAL ENGINEERING</b> <b>Choice Based Credit System (CBCS) and Outcome Based Education (OBE)</b> Semester VIII    Open Elective B			
<b>AUTOMOTIVE ENGINEERING</b>			
Course Code	<b>18ME752</b>	CIE Marks	40
Teaching Hours /Week (L:T:P)	3:0:0	SEE Marks	60
Credits	03	Exam Hours	03
<b>Course Learning Objectives:</b> <ul style="list-style-type: none"> <li>To know layout and arrangement of principal parts of an automobile.</li> <li>To understand the working of transmission and brake systems.</li> <li>To comprehend operation and working of steering and suspension systems.</li> <li>To know the Injection system and its advancements.</li> <li>To know the automobile emissions and its effects on environment.</li> </ul>			
<b>Module-1</b>			
<b>ENGINE COMPONENTS AND IT'S PRINCIPLE PARTS:</b> Spark Ignition (SI) & Compression Ignition (CI) engines, cylinder – arrangements and their relatives merits, Liners, Piston, connecting rod, crankshaft, valves, valve actuating mechanisms, valve and port timing diagrams, Types of combustion chambers for S.I.Engine and C.I.Engines, methods of a Swirl generation, engine positioning. Concept of HCCI engines, Hybrid engines, Twin spark engine, Electric car. <b>COOLING AND LUBRICATION:</b> Cooling requirements, Types of cooling- Thermo siphon system, Forced circulation water cooling system, Water pump, Radiator, Significance of lubrication, Splash and Forced feed system.			
<b>Module-2</b>			
<b>TRANSMISSION SYSTEMS:</b> Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints. Differential and rear axle, Hotchkiss Drive and Torque Tube Drive. <b>BRAKES:</b> Types of brakes, mechanical compressed air, vacuum and hydraulic braking systems, construction and working of master and wheel cylinder, brake shoe arrangements, Disk brakes, drum brakes, Antilock – Braking systems, purpose and operation of antilock-braking system, ABS Hydraulic Unit, Rear-wheel antilock, & Numerical.			
<b>Module-3</b>			
<b>STEERING AND SUSPENSION SYSTEMS:</b> Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Suspension, Torsion bar suspension systems, leaf spring, coil spring, independent suspension for front wheel and rear wheel, Air suspension system. <b>IGNITION SYSTEM:</b> Battery Ignition system, Magneto Ignition system, electronic Ignition system.			
<b>Module-4</b>			
<b>SUPERCHARGERS AND TURBOCHARGERS:</b> Naturally aspirated engines, Forced Induction, Types of superchargers, Turbocharger construction and operation, Intercooler, Turbocharger lag. <b>FUELS, FUEL SUPPLY SYSTEMS FOR SI AND CI ENGINES:</b> Conventional fuels, Alternative fuels, Normal and Abnormal combustion, Cetane and Octane numbers, Fuel mixture requirements for SI engines, Types of carburetors, C.D.& C.C. carburetors, Multi point and Single point fuel injection systems, fuel transfer pumps, Fuel filters, fuel injection pumps and injectors. Electronic Injection system, Common Rail Direct Injection System.			
<b>Module-5</b>			

**AUTOMOTIVE EMISSION CONTROL SYSTEMS:** Different air pollutants, formation of photochemical smog and causes. Automotive emission controls, Controlling crankcase emissions, Controlling evaporative emissions, Cleaning the exhaust gas, Controlling the air-fuel mixture, Controlling the combustion process, Exhaust gas recirculation, Treating the exhaust gas, Air-injection system, Air-aspirator system, Catalytic converter.

**EMISSION STANDARDS:** Euro I, II, III and IV norms, Bharat Stage II, III, IV norms. Motor Vehicle Act.

**Course Outcomes:** At the end of the course, the student will be able to:

- Identify the different parts of an automobile and it's working.
  - Understand the working of transmission and braking systems.
  - Understand the working of steering and suspension systems and their applications.
  - Selection and applications of various types of fuels and injection systems.
- Analyse the cause of automobile emissions, its effects on environment and methods to reduce the emissions.

**Question paper pattern:**

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Sl No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
<b>Textbook/s</b>				
1	Automobile engineering Vol I and II	Kirpal Singh	Standard Publishers	12 <sup>th</sup> Edition 2011
2	Automotive Mechanics	S. Srinivasan	Tata McGraw Hill	2003 2 <sup>nd</sup> Edition
<b>Reference Books</b>				
1	Automotive Mechanics	William H Crouse & Donald L Anglin	Tata McGraw Hill Publishing Company	10 <sup>th</sup> Edition 2007
2	Automotive Mechanics: Principles and Practices,	Joseph Heitner	D Van Nostrand Company, Inc	
3	Automobile Engineering	R. B. Gupta	Satya Prakashan	4 <sup>th</sup> edition 1984.
4	Fundamentals of Automobile Engineering	K.K.Ramalingam	Scitech Publications (India) Pvt. Ltd	