AUTOMOBILE ENGINEERING

VIII Semester: ME

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AME020	ELECTIVE	3	-	-	3	30	70	100
Contact Classes:45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

COURSE OBJECTIVES:

The course should enable the students to:

I. The need and scope of automobile engineering in the field of automotive industry.
II. The basic concepts and working principles of various automobile systems.
III. The problems associated with the power transmission from engine to rear axles by using the concepts of kinematics of machines.
IV. The causes of automobile emissions and preventive measures according to the national and international standards.

COURSE OUTCOMES:

After successful completion of the course, Students will be able to:

CO 1 **Identify the basic components of automobile and working principles Of fuel injection systemsto meet the load demands.**
CO 2 **Compare the fuel supply system of petrol and diesel enginesto compute thermal efficiencies and limitations.**
CO 3 **Explain the working and operation process of various types of cooling systems used in automobile.**
CO 4 **Identify the various ignition systems and electrical circuits related to lighting horn.**
CO 5 **Analyze the power transmission through clutches, gears, propeller shafts, universal joints and differential gear boxesto achieve differential outputs.**
CO 6 **Demonstrate different suspension systems used in motor bikes, cars, trucksfor effective travel under several load conditions.**
CO 7 **Calculate the braking force in order to stop the vehicle safetyand choose respective braking system.**
CO 8 **Select the correct steering mechanismby comparing various steering mechanisms.**
CO 9 **Analyze the alternative energy sources, alternative fuels in orderto reduce the emissions coming from automobiles.**
CO 10 **Choose the suitable system and its technological developmentsfor environmental friendly automobiles in the real world applications.**

MODULE-I	INTRODUCTION	Classes: 09

Introduction to automobile engineering, chassis and body components, types of automobile engines, engine lubrication, engine servicing; Fuel system; spark ignition engine fuel supply systems, mechanical and electrical fuel pump, filters, carburetor types, air filters, petrol injection, multipoint fuel injection(MPFI) and gasoline direct injection systems; Compression ignition engines fuel supply systems, requirement of diesel injection systems, types of injection systems, direct injection systems, indirect injection (IDI) systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps, CRDI and turbocharged direct injection (TDI) systems.

MODULE-II	COOLING SYSTEM	Classes: 09

cooling requirements, air cooling, water cooling, thermo, water and forced circulation system, radiators types cooling fan, water pump, thermostat, pressure sealed cooling, antifreeze solutions, intelligent cooling; Ignition system**:** Function of an ignition system, battery ignition system constructional features of storage, battery, contact breaker points, condenser and spark plug, magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers, spark advance and retard mechanism; Electrical system**:** Charging circuit, generator, current-voltage regulator, starting system, bendix drive mechanism solenoid switch, lighting systems, automatic high beam control, horn, wiper, fuel gauge, oil pressure gauge, engine temperature indicator.

MODULE-III	TRANSMISSION AND SUSPENSIONS SYSTEMS	Classes: 09

Transmission system: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid flywheel, gear box, types, sliding mesh, constant mesh, synchro mesh gear boxes, epicyclic gear box, auto transmission, continuous variable transmission over drive, torque converter, propeller shaft, Hotch-Kiss drive, torque tube drive, universal joint, differential, rear axles, types, wheels and tyres.

Suspension system: Objects of suspension systems, rigid axle suspension system, torsion bar, shock absorber, independent suspension system, air suspension system, Daimler-benz vehicle suspension.

MODULE-IV	BRAKING AND STEERING SYSTEMS	Classes: 09

Braking system: Mechanical brake system, Hydraulic brakes system, Master cylinder, wheel cylinder tandem master cylinder; Requirement of brake fluid, Pneumatic and vacuum brake, anti-skidbraking (ABS), regenerative braking; Steering system: Steering geometry, camber, castor, king pin, rake, combined angle, toe-in, toe-out, center point steering, types of steering mechanism, power steering, Hydraulic, electronics, Ackerman steering mechanism, Davis steering mechanism, steering gears types, steering linkages, special steering colomuns.

MODULE-V	EMISSIONS FROM AUTOMOBILES	Classes: 09

Emissions from Automobiles, Pollution standards national and international, various pollution control techniques: Multipoint fuel injection for spark ignition engines, common rail diesel injection, variable valve timing, closed crank cake ventilation, pc valves, EGR value, catalytic converters, catalyst window, lambda probe, energy alternatives, solar, photo-voltaic, hydrogen, biomass, alcohols, LPG, CNG, liquid Fuels and gaseous fuels, hydrogen as a fuel for internal combustion engines, their merits and demerits, standard vehicle maintenance practice.

Text Books:

1. WillamH Crouse,DonaldL. Anglin,‐AutomobileEngineering‖,McGraw-Hill,10th Edition,2006.
2. Manzoor, NawazishMehdi, YosufAli, ‐A Text Book Automobile Engineering‖, Frontline Publications, 1st Edition,2008.
3. Dr.KirpalSingh,‐AutomobileEngineering‖,StandardPublishers‖,2nd Edition,2013.

Reference Books:

1.R.K. Rajput,‐ATextBookofAutomobileEngineering‖,LaxmiPublications,1stEdition,2010.
2. S. Srinivasan,‐AutomotiveEngines‖,McGraw-Hill,2nd Edition,2003.
3. Khalil U Siddiqui, ‐A Text Book of Automobile Engineering‖, New Age International, 1stEdition, 2009.

Web References:

1. http://nptel.kmeacollege.ac.in/syllabus/125106002/

E-Text Books:

1. http://www.engineeringstudymaterial.net/tag/automotive-engineering-books/
2. www.engineering108.com/.../Automobile_Engineering/Automobile-engineering-ebook