INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

AUTOMOBILE ENGINEERING								
VII Semester: ME								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AMEC44	**Elective**	3	-	-	3	30	70	100
Contact Classes:45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		
Prerequisite: Kinematics of Machinery								

I. COURSE OVERVIEW:

This is a first course in automobile engineering introducing the anatomy and the functioning of all major components of the modern automobile. With an introduction to the engine and its accessories, the course deals in detail with the description of automobile components like clutch, transmission, final drive, axles, wheels, suspension, steering, Cooling systems among others. Concepts of emissions from automobile are also included.

II. COURSE OBJECTIVES:

The students will try to learn:

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 theconcepts of kinematics of machines.
IV. The causes of automobile emissions and preventive measures according to the national andinternational standards.

III.COURSE SYLLABUS:

MODULE-I: INTRODUCTION (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) andgasoline 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 (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 SYSTEM (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 (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 (09)

Emissions from Automobiles, Pollution standards national and international, various pollution controltechniques: 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.

V. TEXT BOOKS:

1. Willam H Crouse, Donald L. Anglin, "Automobile Engineering", McGraw-Hill, 10th Edition,2006.
2. Manzoor, Nawazish Mehdi, YosufAli, "A Text Book Automobile Engineering", Frontline Publications, 1st Edition, 2008.
3. Dr.KirpalSingh,"Automobile Engineering", Standard Publishers, 2nd Edition, 2013.

VI. REFERENCE BOOKS:

1. R.K. Rajput,"A Text Book of Automobile Engineering", Laxmi Publications, 1st Edition, 2010.
2. S. Srinivasan, "Automotive Engines", McGraw-Hill, 2nd Edition, 2003.
3. Khalil U Siddiqui, "A Text Book of Automobile Engineering", New Age International, 1st Edition, 2009.

VII.WEB REFERENCES:

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

VIII. E-TEXT BOOKS:

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