AUTOMOBILE ENGINEERING

CourseCode		Year		Semester	
Course Category	Minor in AE	Branch	ME	Course Type	Theory
Credits	4	L – T – P	3 – 1 – 0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	Skill	BTL	Units
CO1	Understand basic components of an Automobile.	Understand	L2	1,2,3,4,5
CO2	Analyse the working of various systems of engines.	Analyze	L3	1,2
CO3	Analyse the working of various automobile systems.	Analyze	L3	3,4,5
CO4	Analyse various alternative energy resources, emissions standards and application of plastic in automobiles.	Analyze	L3	5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1									1	3	1
CO2	3	1	1									1	3	1
CO3	3	1	1									1	3	1
CO4	3	1	1				2					1	3	1

Syllabus

UNIT	Contents	Mapped COs
I	**INTRODUCTION** Components of four-wheeler automobile – chassis and body – power unit –power transmission – rear wheel drive, front wheel drive, 4-wheel drive. Types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation –engine service, reboring, decarburization, Nitriding of crank shaft. **INTRODUCTION TO NHV:** Definition of Noise, Vibrations & Harshness in reference to Vehicular application.	CO1, CO2
II	**FUEL SYSTEM** S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pump – filters–carburetor – types – air filters – petrol injection. C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps. **COOLING SYSTEM:** Cooling Requirements, Air Cooling, Liquid Cooling, Thermosyphon, Forced Circulation System, evaporating cooling and pressure sealed cooling – antifreeze solutions. **IGNITION SYSTEM:** Ignition System-, battery, magneto, Electronic	CO1, CO2

	ignition	
III	**TRANSMISSION SYSTEM:** Clutches: Principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel. Gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box, 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.	**CO1, CO3**
IV	**STEERING SYSTEM:** Steering geometry – camber, castor, king pin rake, combined angle toe-in, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages. **BRAKING SYSTEM:** Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder, tandem master cylinder, Requirement of brake fluid, Pneumatic and vacuum brakes.	**CO1, CO3**
V	**ELECTRICAL SYSTEM:** Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc. **EMISSION FROM AUTOMOBILES:** Pollution standards National and international – Pollution Control– Techniques – Multipoint fuel injection for SI Engines. Common rail diesel injection. Energy alternatives – Solar, Photo-voltaic, hydrogen, Biomass, alcohols, LPG,CNG, liquid Fuels and gaseous fuels, electrical-their merits and demerits. **KEY AUTOMOTIVE PLASTICS APPLICATIONS:** Safety and Energy Management, Interiors and Occupant Safety. Glazing, Plastic-Metal Hybrid Structures, Headlamps, Body Panels, Under-the-Hood Components.	**CO1, CO3, CO4**

Learning Resources
Text books
1.Automotive Mechanics-Vol.1 & Vol.2, by Kirpal sing, Standard Publishers, New Delhi, 2008. 2.Automobile Engineering, (3rd edition), by William crouse, TMH Distributors, New Delhi. 3.Plastics Application Technology for Safe and Lightweight Automobiles,Sudhakar R Marur, SAE International (30 October 2013), USA
Reference books
1.Automobile Engineering Theory and Servicing, by James D. Halderman and Chase D. Mitchell, Pearson education inc, 2001. 2.Automobile Engineering, by Newton's steeds & Garrett Automotive Mechanics Heitner, Butterworth International, London.
E- Resources & other digital material
1.https://nptel.ac.in/courses/107/106/107106088/