

**IV Year – I SEMESTER**

T	P	C
3+1*	0	3

**AUTOMOBILE ENGINEERING****Course Objectives:**

The course imparts the principles of automobile systems and provides the salient features of safety, emission and service of automobiles.

**UNIT – 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, decarbonisation, Nitriding of crank shaft.

**UNIT – II**

**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.

**UNIT – III**

**STEERING SYSTEM:** Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

**UNIT – IV**

**SUSPENSION SYSTEM:** Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

**BRAKING SYSTEM:** Mechanical brake system, hydraulic brake system, master cylinder, wheel cylinder tandem master cylinder requirement of brake fluid, pneumatic and vacuum brakes.

**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.

#### **UNIT – V**

**ENGINE SPECIFICATION AND SAFETY SYSTEMS:** Introduction-engine specifications with regard to power, speed, torque, no. of cylinders and arrangement, lubrication and cooling etc.

**Safety:** Introduction, safety systems - seat belt, air bags, bumper, anti lock brake system (ABS), wind shield, suspension sensors, traction control, mirrors, central locking and electric windows, speed control.

#### **UNIT – VI**

**ENGINE EMISSION CONTROL:** Introduction – types of pollutants, mechanism of formation, concentration measurement, methods of controlling-engine modification, exhaust gas treatment-thermal and catalytic converters-use of alternative fuels for emission control – National and International pollution standards

**ENGINE SERVICE:** Introduction, service details of engine cylinder head, valves and valve mechanism, piston-connecting rod assembly, cylinder block, crank shaft and main bearings, engine reassembly-precautions.

#### **TEXT BOOKS:**

1. Automotive Mechanics – Vol. 1 & Vol. 2 / Kripal Sing, standard publishers.
2. Automobile Engineering / William Crouse, TMH Distributors .
3. Automobile Engineering- P.S Gill, S.K. Kataria & Sons, New Delhi.

#### **REFERENCES:**

1. Automotive Engines Theory and Servicing, James D. Halderman and Chase D. Mitchell Jr., Pearson education inc.
2. Automotive Engineering / Newton Steeds & Garrett.
3. Automotive Mechanics / Heitner.

#### **Course Outcomes:**

The student after undergoing the course, shall visualize the layout of an automobile and its systems like transmission, steering, suspension, braking, safety etc and should know the vehicle troubleshooting.