COURSE TITLE : AUTOMOBILE ENGINEERING
COURSE CODE : 4027
COURSE CATEGORY : A
PERIODS/WEEK : 5
PERIODS/SEMESTER : 90
CREDITS : 4

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Power Systems Air pollution Noise and its effects	21
2	Transmission Systems Clutch, Gear, Propeller Shaft Differential	22
	TEST I	2
3	Suspension system Front axle, Rear axle Steering	22
4	Heels, Tyres, Brakes Modern Trends in Automobile Engineering	21
	TEST II	2
	TOTAL	**90**

OBJECTIVES

Upon completion of the study of this subject, the student will be able to:

MODULE I

1.1.0 Understand the working of different systems of I.C. Engines

1.1.1 Draw a neat layout of the fuel system of petrol engine
1.1.2 State the function of each component in the fuel system
1.1.3 Mention correct air fuel ratio for different engine speeds
1.1.4 Explain the working of A.C. Mechanical pump
1.1.5 Define carburetion
1.1.6 Functions of carburetor
1.1.7 Explain with simple sketches, the working of simple carburetor, Solex carburetor and SU carburetor
1.1.8 Draw a layout of the fuel system of a Diesel engine
1.1.9 Explain the construction and working of Bosch pump, Injector and injection nozzles
1.1.10 Explain with sketches the working of coil ignition and magneto ignition systems
1.1.11 Explain with sketch the working of electronic ignition system – transistorized ignition system
1.1.12 State the functions of cooling system
1.1.13 Classify the cooling system
1.1.14 Explain air cooling and different types of water cooling
1.1.15 Compare air cooling and water cooling systems

1.1.16.1 Explain different types of radiators
1.1.16.2 Explain different types of coolants
1.1.17 Explain the working of thermostat, temperature indicators and water pumps in cooling system
1.1.18 State the purpose of lubrication in I.C. Engines
1.1.19 Explain the different properties of lubricants-
1.1.20 Explain splash system, forced system and (mist)/petroil system
1.1.21 Explain quantity governing, quality governing, hit and miss governing and combination system
1.1.22 Understand the various emissions from automobile engines that hazardous to environment and its control mechanism.
1.1.23 Explain emissions from automobiles – nitrogen oxides – soot – carbon monoxide, hydrocarbons, aldehydes and other exhaust components
1.1.24 Explain pollution from SI engine & CI engines
1.1.25 Explain pollution control techniques
1.1.26 Understand noise, specification and its effect on human beings
1.1.27 Explain the source of noise – combustion – mechanical – intake and exhaust – transmit ion – brake noise – road noise – tyre noise – wind noise and body noise.
1.1.28 Explain noise reduction Techniques.

MODULE II

2.1.0 Understand the working of Transmission systems of Automobiles

2.1.1 Explain the working of the transmission system of Automobiles
2.1.2 State the functions and list the requirements of a good clutch
2.1.3 Explain with sketches the construction and working of a single plate and multiple clutches Diaphragm clutch ,automatic clutches , centrifugal clutch and fluid coupling.
2.1.4 List the functions of gear box
2.1.5 Explain with neat sketches the working of sliding mesh and constant mesh gear boxes Synchromesh gear box.
2.1.6 Explain the working principle of a Epicyclic gear box ,torque converter and overdrive.
2.1.7 Explain with sketches the function, construction and working of propeller shaft, universal joint, C V joint final drive and differential.

MODULE III

3.1.0 Understand the working of suspension system.

3.1.1 Explain stub axle and wheel mountings
3.1.2 Explain types of live rear axle
3.1.3 Explain semi plotting rear axle, three quarter plotting axle and full floating axle.
3.1.4 Explain independent suspension and advantages.
3.1.5 Explain rear suspension – Independent, leaf spring, spring shakle, and air suspension System.
3.1.6 Explain the steering components – steering wheel , column
3.1.7 Explain types of steering gears – worm and worm sector – rack and pinion
3.1.8 Understand re-circulating ball steering gear
3.1.9 Explain power steering and centre point steering.
3.1.10 Explain steering geometry – camber, caster, king pin inclination, toe in and toe out
3.2.1. Explain Dynamics of vehicle- yawing, pitching, rolling, bouncing .

MODULE IV

4.1.0 Wheels,Tyres and Breaks

4.1.1 Understand types of wheels – spoked wheels, disc wheels and cast wheels
4.1.2 Distinguish wheel size and wheel balance
4.1.3 Distinguish tube-less tyres and tubed tyres.
4.1.4 Distinguish parts of tyre – Carcass – bead – tread – side walls.
4.1.5 Distinguish types of tyres – bias ply tyre – radial ply tyre.
4.1.6 Distinguish tyre material and tread pattern
4.1.7 Distinguish inflation pressure and tyre wear.
4.1.8 Distinguish types of brakes .
4.1.9 Distinguish hydraulic brake system
4.1.10 Explain mechanical brake system.
4.1.11 Explain dual brake system
4.1.12 Explain the functioning of a master cylinder
4.1.13 Explain leading and trailing brake.
4.1.14 Explain brake shoes, brake lining and brake drum materials.
4.1.15 Explain bleeding of brakes
4.1.16 Explain functioning of disc brake and pneumatic brake system.

4.2.0 Appreciate the modern trends in Automobile Engineering

4.2.1 Explain the working of gasoline injection system (MPFI)
4.2.2 Explain the working of electronic ignition system
4.2.3 Explain the working of Digital injection system
4.2.4 Explain the working of common rail fuel injection system (CRDI)
4.2.5 Explain the working of semi and fully automatic transmission system.
4.2.6 Explain the working of parking aid with ultra sonic sensors.
4.2.7 Explain the working of central locking system and power windows.
4.2.8 Explain the working of electronic control module (ECM)

CONTENT DETAIL

MODULE I

Study the working of different power systems of I C Engines.

Different systems of I C engines, Fuel systems, - components – air fuel ratio for different engine speeds.-A C mechanical pump –carburetion – functions of carburetor –working –Solex carburetor – S .U. carburetor –fuel systems of diesel engine –fuel filter – working of bosch pump – injector and injection nozzle –- working of coil ignition and magneto ignition system – electronic ignition system – cooling system – classification of cooling system – radiators – different types of coolants-thermostat- temp indicators – water pump – I C engine lubrication – properties of lubricants – viscosity index-flash & fire- pour – splash system – forced system – governing systems– quantity governing – quality governing – hit and miss governing.
Emission from automobiles - pollution from CI engines - pollution from SI engines– nitrogen oxides – soot – carbon monoxide – hydrocarbons – aldehides –pollution control techniques – noise specification – effects – source of noise – mechanical combustion – transmission – brakes – wind and body – noise reduction.

MODULE II

Understand the working of transmission systems.

Transmission systems in automobile – working – clutch functions – requirements of clutch – single plate - multi plate – diaphragm – automatic and centrifugal clutch.fluid coupling.- gear box – functions- working– types- sliding mesh – constant mesh – synchromesh — epicyclic gear box – torque converter over drive. Propeller shaft – universal joint – C V joint – final drive – differential.

MODULE III

Understand the working of suspension systems and steering..

Stub axle – wheel mountings – types of live rear axle – semi floating – three quarter floating and full floating axles – independent suspensions – leaf spring – spring shackle – air suspension – steering wheel - steering column – steering gears – worm and worm sector – rack and pinion – recirculating ball – power steering – centre point steering – steering geometry – camber –caster – king pin inclination – toe in and out.

MODULE IV

Understand wheels tyres and brakes.

Types of wheels – spoked wheel – Disc wheels – cast wheels – size of wheel – wheel balance – tubeless tyres and tubed tyres – parts of tyre – carcass – bead – tread – side walls – ply-rating – bias –radial – tyre material – tread pattern – inflation pressure – tyre wear – brakes – hydraulics – pneumatic – mechanical – dual brake system – master cylinder – leading and trailing brake – break shoes – lining – drum material – bleeding of brakes – disc brake – pneumatic brake and antilock braking system.

Understand newer developments in vehicles.

Gasoline injection system (MPFI) – electronic ignition – digital ignition – common rail diesel injection (CRDI) –semi and fully automatic transmission – parking aid with sensors – centre locking system –power windows – emission standards – Euro II – Euro III. ; Bharath 2 & 3.

TEXT BOOKS

1. Automobile Engineering Ist and IInd Volume - Kirpal Singh
2. Automobile Engineering - K.Ramalingam.
3. Automobile Engineering - R.K.Rajput.

REFERENCE BOOKS

1. Automobile Engineering 2 nd edition - Ramaligam. , Seitech Publications..
2. Automobile Engineering - R.B.Gupta , Khanna Publishers
3. Automonile Engineering - Station Aby.
4. Automotive Mechanics - Heitner
5. Automotive engines - Crouse & Anglin