COURSE TITLE : AUTOMOBILE ENGINEERING
COURSE CODE : 4022
COURSE CATEGORY : B
PERIODS/ WEEK : 4
PERIODS/ SEMESTER : 60
CREDIT : 4

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	Systems in IC Engines,	12
2	Power transmission system in automobiles.	15
3	Know the working of suspension system. Understand the different types of Wheels & Tyres Understand the brakes in Automobiles	18
4	Modern trends in automobile engineering. Understand the Emissions in Automobiles	15
TOTAL		60

Remarks based on feedback from students, faculty, industry (revision 2010):

COURSE OUTCOME :

Sl.No.	Sub	Student Will Be Able To
1	1	Understand the different systems in IC engines.
	2	Comprehend the power transmissions system in automobile.
	3	Appreciate the working of suspension system.
2	4	Understand the different types of wheels & tyres
	5	Comprehend the different brake systems in automobiles
	6	Appreciate the modern trends in automobile engineering.
3	7	Understand the emissions in automobiles

SPECIFIC OUTCOME

MODULE I

1.1.0 Understand the working of different systems of I.C. Engines
1.1.1 Illustrate the fuel system of petrol engine and functions of each components
1.1.2 Define carburetion and functions of carburetor
1.1.3 Explain with simple sketches, the working of simple carburetor (An idea about Solex carburetor)
1.1.4 Illustrate the fuel system of diesel engine and functions of each components
1.1.5 Explain with sketches the working of coil ignition and magneto ignition systems

1.1.6 State the functions of cooling system and classify
1.1.7 Compare air cooling and water cooling systems
1.1.8 Describe the function of radiators
1.1.9 List the different types of coolants
1.1.10 Explain the working of thermostat, temperature indicator and water pump in cooling system
1.1.11 Comprehend the different properties of lubricants and its purpose in IC engines
1.1.12 Describe splash system, forced system and (mist)/petroil system
1.1.13 Explain Governing system and types

MODULE II

2.1.0 Understand the working of Transmission system in Automobiles
2.1.1 Illustrate the working of the transmission system and its components in Automobiles
2.1.2 State the functions and list the requirements of a good clutch
2.1.3 Explain with sketches the working of a single plate and multiple 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, constant mesh and Synchromesh gear box.
2.1.6 Explain the working principle of a Epicyclic gear box, and overdrive.
2.1.7 Explain with sketches the function, construction and working of propeller shaft, universal joint, CV joint and final drive
2.1.8 Illustrate the function and working principle of differential.
2.1.9 Explain stub axle and wheel mountings
2.1.10 Explain the types of live rear axle
2.1.11 Describe semi floating rear axle, three quarter floating axle and full floating axle.

MODULE III

3.1.0 Understand the working of suspension system in Automobile
3.1.1 State the function of suspension system and its advantages.
3.1.2 Explain rear suspension – Independent, leaf spring, spring shackle & shock absorbers.
3.1.3 Explain the types of steering gears – worm and worm sector, rack and pinion and re-circulating ball steering gear
3.1.4 Illustrate steering geometry – camber, caster, king pin inclination, toe in and toe out
3.1.5 Describe Dynamics of vehicle - yawing, pitching, rolling, bouncing
3.2.0 Understand the different types of Wheels and Tyres
3.2.1 Understand different types of wheels – spoked wheels, disc wheels and cast wheels
3.2.2 Distinguish wheel size and tyre size
3.2.3 Distinguish tube-less tyres and tubed tyres.
3.2.4 Describe tyre material
3.2.5 Distinguish inflation pressure and tyre wear.
3.3.0 Understand the different brake systems in Automobiles.
3.3.1 Illustrate mechanical and hydraulic brake system
3.3.2 Describe dual brake system
3.3.3 Explain the functions of a master cylinder, brake shoes and brake lining.
3.3.4 Explain leading and trailing of brake.

3.3.5 Explain bleeding of brakes
3.3.6 Explain functioning of disc brake and pneumatic brake system.

MODULE IV

4.1.0 Understand the modern trends in Automobile Engineering
4.1.1 Describe the working of electronic ignition system
4.1.2 Illustrate the working of multi point fuel injection system (MPFI) and common rail direct fuel injection system (CRDI)
4.1.3 Describe turbo charger and inter cooler
4.1.4 Explain the working of fully automatic transmission system.
4.1.5 Describe air suspension system.
4.1.6 Explain power steering, central locking and power window.
4.1.7 Explain the working of electronic control module (ECM)
4.1.8 Know about protection system in Automobiles - Air bag, Anti lock braking system (ABS), Self inflating tyres, roll over protection system, electronic stability control (ESC),Blind spot detection and parking aid with ultra sonic sensors
4.2.0 Understand the Emissions in Automobiles
4.2.1 Explain emissions from automobiles
4.2.2 Explain pollution control and emission standards

CONTENT DETAILS

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 -fuel systems of diesel engine -fuel filter - working of Diesel pump - fuel system of diesel engine - components-injectors Coil ignition and magneto ignition system.
Cooling system and classification- air cooling and water cooling systems- radiators -types of coolants - thermostat- temperature indicators and water pumps in cooling system –
Properties of lubricants - purpose in IC engines- splash system- forced system and (mist)/ petroil system- governing system in IC Engines- types- Quantity- Quality- hit and miss
romutomobil

MODULE II

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 — epicycle gear box - torque converter over drive. Propeller shaft - universal joint - C V joint - final drive -differential.
Stub axle - types of live rear axle - semi floating - three quarter floating and full floating axles

MODULE III

Understand the working of suspension systems and steering.

Independent suspensions - leaf spring - spring shackle - air suspension -steering wheel - steering column - steering gears - worm and worm sector - rack and pinion –re circulating ball - power steering - centre point steering - steering geometry - camber -caster -king pin inclination - toe in and toe out.

Understand wheels & tyres .Types of wheels - Disc wheels - cast wheels - size of wheel and Tyre- tubeless tyres and tubed tyres - ply-rating -bias -radial -tyre material - inflation pressure - tyre wear

Understand Brakes

brakes - hydraulic -pneumatic - mechanical - dual brake system - master cylinder - leading and trailing brake -break shoes - lining - material - bleeding of brakes - disc brake - pneumatic brake

MODULE IV

Understand newer developments in vehicles.

Working of electronic ignition system - multi point fuel injection system (MPFI) and common rail fuel injection system (CRDI) - turbo charger and inter cooler- automatic transmission system. -air suspension System. - Power steering- central locking and power window.-electronic control module (ECM)- Electronic wheel alignment& balancing

Know about protection system in Automobiles –

Air bag- Anti lock braking system (ABS) - Self inflating tyres- roll over protection system- electronic stability control (ESC)-Blind spot detection and parking aid with ultra sonic sensors

Introduction to alternate fuels used in automobiles

Understand the emissions in automobiles

Emissions from automobiles- nitrogen oxides - soot - carbon monoxide - hydrocarbons - aldehides - pollution control techniques - pollution control and emission standards- Euro IV- Bharat Stage IV+.

TEXT BOOKS

1. Automobile Engineering vol.I&2 - Kirpal Singh
2. Automobile Engineering - K.Ramalingam.
3. Automobile Engineering -R.K.Rajput.
4. Automobile Engineering - Sudhir Kumar Saxena – University science press

REFERENCE

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