

Devi Ahilya University, Indore, India Institute of Engineering & Technology				B.E. IV year (Mechanical Engineering)					
Subject Code & Name	Instruction Hours Per Week			Marks					
4ME155, AUTOMOBILE ENGINEERING	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max.	100	50	50	50	250
Duration of Theory Paper 3 Hours				Min.	35	25	25	25	110

Objectives & Pre requisites: To understand the principles and working of different systems of automobiles. Engineering Mechanics, Theory of Machines.

COURSE CONTENT

UNIT-1

Chassis and Body Engineering

Chassis classification, Types of frames, Vehicle body types & construction, Body materials, Driver's visibility and methods for improvement, Safety aspects of vehicles, Location of engine, Front wheel and rear wheel drive, Performance of Vehicle.

UNIT-2

Steering System

Front axle beam, Stub axle, Front wheel assembly, Principles of types of wheel alignment, Front wheel geometry viz. camber, Kingpin inclination, Castor, Toe-in and Toe-out, Condition for true rolling motion, Centre point steering, Directional stability of vehicles, Steering Gears, Power steering, Slip angle, Cornering power, Over steer & Under Steer. Wheels and tyres, Specifications, Types, Construction and tread pattern.

UNIT-3

Suspension System

Vehicle Dynamics and requirement of suspension, Suspension types & construction, Shock absorber, Types of leaf springs coil spring, Air spring, Torsion bar, Location of shackles, Brakes-classification & construction, Mechanical, Hydraulic & Pneumatic power brake systems, Air-bleeding of Hydraulic brakes, ABS, Performance- Braking efforts, Efficiency, Stopping Distance & time, tendency of over turning.

UNIT-4

Transmission System

Clutches-requirement, Types and construction, Gear boxes-purpose, Types and construction, Synchronizer, Gear shifter mechanism, Determination of gear ratio for vehicles, Gear box performance at different vehicle speed, Automatic transmission, Torque converters, Fluid coupling, Propeller shaft, Universal joints, CV joints, Differential gear box, Rear axle types & construction.

UNIT-V

Electrical and Control Systems

Types of storage battery, Construction and operation of lead acid battery, Testing of battery, Principle & operation of starting mechanism, Different Bendix drive systems, Starter relay switch, Electric fuel gauge, Fuel pump, Horn, Wiper, Lighting system, Head light dazzling, Signaling devices and circuit, Battery operated vehicles. Microprocessor based control system for automobiles. Intelligent automobiles control systems.

General: Car air conditioning systems and components, Indian standards for automotive vehicles exhaust emission-Bharat and Euro norms, Indian Motor vehicle act- preliminary information

BOOKS RECOMMENDED:

- [1] Singh Kirpal, *Automobile Engineering, Vol.1*, Standard Pub, 9e
- [2] Giri N.K., *Automotive Technology*, Khanna Pub, 4e 2009
- [3] Newton & Steeds, *Automobile Engineering*, Butterworth Int.
- [4] Heitner Joseph, *Automotive Mechanics, Principles and Practices*, East-West Pub.
- [5] Crouse W.H., *Automotive series Part-I to VI*, Tata McGrawhill, 9e
- [6] Crouse W.H., *Automotive Emission*, Tata McGrawhill
- [7] BIS and Euro –I and Euro-II, *Emission standards*.

4ME155 AUTOMOBILE ENGINEERING

LABORATORY EXPERIMENTS

1. Study of chassis frame and body.
2. Study of steering linkage mechanism and Steering Boxes.
3. Study of Front and Rear suspension systems.
4. Study of hydraulic brake system.
5. Study of single plate clutch.
6. Study of sliding mesh, constant mesh, synchromesh gearboxes.
7. Study of transmission system-Propeller shaft, Differential, Rear axles.
8. Study of electrical circuit and, battery.