

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

AUTOMOBILE ENGINEERING

Subject Name: **Automobile Systems**

Subject Code: **150202**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Internal Assessment (I)
4	0	2	6	70	30	50

Sr. No.	Course content
1.	Vehicle Classification and Layouts: Study various vehicle layouts as front engine and front wheel drive, front engine & rear wheel drive, rear engine & rear wheel drive, Components of transmission system, Four wheel drives.
2.	Chassis Frames and Body: Types of Chassis frames & body, Material, Unitized construction.
3.	Performance of Vehicle: Vehicle motion, Resistances during motion, Power required for acceleration and constant velocity motions, Tractive efforts and draw bar pull, Power required and engine characteristics, Gear ratio requirement, Motion on gradient.
4.	Clutch: Functions, Type of clutches, Single, Multiple, Centrifugal, Electromagnetic and hydraulic clutches, Lining material, Release mechanism, Fluid flywheel.
5.	Gear Box: Types of gear boxes, Sliding mesh, Constant mesh, Synchromesh, Epicyclic gear boxes, Gear ratios, Transfer case, Semi-automatic transmission system.
6.	Automatic transmission: Requirements, types, Torque converter, Hydro-static and hydro-dynamic transmission, Continuously variable transmission, Belt and friction drive.
7.	Brakes: Function, Internal expanding brakes, Brake lining material, Properties, Calculation of braking force and shoe geometry, Hydraulic braking system, Brake oil, Bleeding of brakes, Pneumatic braking system, Vacuum brakes, Exhaust brakes, Electrical brakes, Parking brake and braking efficiency.

8.	Drive line and Axles: Propellers shaft, Types of drive as torque tube and hotch kiss drive, Final drive types, Bevel, Hypoid, Worm and worm wheel, Type of drive axles & differential, Fully or semi-floating and three quarter floating, Dead axle.
9.	Wheels and Tyres: Types of wheel rims, Tread patterns, Types of tyres, Cross ply, Radial & tubeless tyres, Specifications of tyres.
10.	Steering and Front Axle: Steering requirements, Condition for correct steering, Steering system and linkages, Steering gears, Steering geometry, Ackermann linkages, Wheel alignment, Toe-in, Toe-out, Caster, Camber, Under steer and over steer conditions, Power steering, Steering wheel shimmy, Types of front axle, Elliot & reverse elliot type.
11.	Suspension System: Purpose, Types of suspension system, Front and rear suspension, Coil spring, Leaf spring, Torsion bars, Shock absorbers, Air and rubber suspension, Plastic suspensions, Hydro-pneumatic suspension, Independent suspension.

List of Practical:

1. To study about vehicle layouts.
2. To study about different types of clutch.
3. To study about the performance of vehicle.
4. To study about the different types of gear boxes.
5. To study about rear axle, final drive and differential.
6. To study about Automatic Transmission system.
7. To study about different types of tyres and wheels.
8. To study of different types of automobile brakes.
9. To study of steering systems.
10. To study about different types of suspension system.

Reference Books:

1. Automotive mechanics by W. Crouse, TMH.
2. Automobile Engineering Vol-I & II by Dr. K.M. Gupta.
3. Automobile Engineering, Vol-I by Dr. Kripal Singh.
4. Motor vehicle by Newton and steed.
5. Automobile engineering by GBS Narang.
6. Vehicle Technology by Heinz Heizler.
7. Automobile system by W. Judge.