

# AMAE-12 AUTOMOTIVE CHASSIS

## UNIT-1 LAYOUT, FRAME, FRONT AXLE AND STEERING SYSTEM

- 1.1 Basic construction of chassis, Types of Chassis layout, with reference to Power Plant location and drive, various, types of frames, Loads acting on vehicle frame, Types of Front Axles and Stub Axles, Front Wheel Geometry. Condition for True Rolling Motion.
- 1.2 Ackerman's and Davi's Steering Mechanisms, Steering Linkages, Different Types of Steering Gear boxes, Slip Angle, Over-Steer and Under-Steer, Reversible and Irreversible Steering, Power Steering.

## UNIT-2 DRIVE LINE, FINAL DRIVE AND DIFFERENTIAL

- 2.1 Driving Thrust and its effects, torque reactions and side thrust, Hotchkiss drive,
- 2.2 Torque tube drive, radius rods and stabilizers, Propeller Shaft, Universal Joints,
- 2.3 Constant Velocity Universal Joints, Final drive, different types of final drive, Worm and Worm wheel, straight bevel gear, spiral bevel gear and hypoid gear final drive.
- 2.4 Differential principle. Constructional details of differential unit, Differential housings, and Non-Slip differential, differential locks.

## UNIT-3 REAR AXLES, WHEELS, RIMS AND TYRES

- 3.1 Construction of rear axles,
- 3.2 Types of Loads acting on rear axles, Full -Floating, Three-Quarter Floating and Semi-Floating Axles, Twist beam rear axle, Types, Multi axles vehicles.
- 3.3 Wheels and Rims, Types of Tyres and their constructional details.

## UNIT-4 SUSPENSION SYSTEM

- 4.1 Requirement of Suspension System,
- 4.2 Types of Suspension Springs, Constructional details and characteristics of Single Leaf, Multi-Leaf spring, Coil and Torsion bar Springs, Rubber,
- 4.3 Pneumatic and Hydro- elastic Suspension Spring Systems, Independent Suspension System, Shock Absorbers, Types and Constructional details of Leaf and Coil Springs.

## UNIT-5 BRAKE SYSTEMS

- 5.1 Need for Brake systems, Stopping Distance, Time and Braking Efficiency,
- 5.2 Effect of Weight Transfer during Braking,
- 5.3 Classification of brakes, Braking Torque, drum brake and disc Brake Theory,
- 5.4 Types and Construction of Hydraulic Braking System, Mechanical Braking System, Pneumatic Braking System, Power-
- 5.5 Assisted Braking System, Servo Brakes, Retarders- antilock braking systems (ABS).

### References Books:

1. Heldt P.M., "Automotive Chassis" Chilton Co., New York, 1990
2. Giri. N.K., "Automotive Mechanics" Khanna Publishers, New Delhi, 2005.
3. Milliken & Milliken, "Race Car Vehicle Dynamics", SAE, 1995