



MANIPAL UNIVERSITY JAIPUR

School of Automobile Mechanical and Mechatronics Engineering
Department of Automobile Engineering
Course Hand-out

Automotive Chassis System | AU 1407 | 4 Credits | 3 0 2 4
Session: Jan 19 – May 19 | Faculty: Satish Namdev | Class: 2nd Yr/4th sem

A. Course Objectives: At the end of the course, students will be able to

- [1407.1] Describe the different types of load carrying structure and its application on automotive frames.
- [1407.2] Explain braking system and its importance in automobiles. Analyse and solve practical problems of braking based on stopping distance, brake efficiency and weight transfer during braking.
- [1407.3] Explain the different types of frames and test frame based on brake application of frame stresses and defects. Describe different type of chassis interpret, analyse the right type of chassis for the vehicle requirement. Explain need, classification and desirable properties of tyres.
- [1407.4] Explain Steering system and Analyse and solve problems of incorrect steering, wheels alignment and balancing.
- [1407.5] Analyse and solve practical problem of Axle and suspension system based on vehicle requirement to enhance problem solving skill.

B. SYLLABUS:

Load Distribution: Types of load carrying structures, closed, integral, open, flat types. **Frames:** Types of frames, general form and dimensions, materials, frame stresses, frame sections, cross members, proportions of channel sections, constructional details, loading points, sub frames, testing of frames, effect of brake application of frame stresses, defects, Numerical problems. **Chassis layout,** power location, types of automobiles, layout of an automobile with reference to power plant, weight distribution, stability, Numerical problems. **Brake:** Stopping distance and time, brake efficiency, weight transfer, brake shoe theory, determination of braking torque, classification of brakes, types, construction, function, operation, braking systems ,mechanical, hydraulic, disc, drum, Power brakes, Air brakes, vacuum brakes and electric brakes, Numerical problems. **Axles and Steering Systems:** Steering systems, Front Axles, Rear axles. **Suspension:** Types of suspension: springs, construction, operation and materials, leaf springs, coil springs, torsion bar, rubber springs, air bellows, pneumatic suspension, hydraulic suspension, telescopic shock absorbers, independent suspension, front wheel independent suspension, rear wheel independent suspension, types, stabilizer, trouble shooting, Numerical problems. **Wheels and Tyres.**

LAB: Study of Light duty Vehicle Chassis Frame. Study and Construction of Front Axle and Rear Axle. Study, Construction, Dismantling and Assembling of Braking System (Disc Brake, Drum Brake, Hydraulic Brake and Compressed air Brake). Study and Construction of Steering linkage along with dismantling and assembling of steering gear box. Study and construction of suspension system (Rigid axle suspension system and Independent suspension system).

C. Text Books

- T1. P.M. Heldt, *Automotive Chassis*, Chilton and Co, 1987.
- R1. G.B.S. Narang, *Automobile engineering*, Khanna Publications, New Delhi, 1982.
- R2. T.R. Banga and N. Singh, *Automobile Engineering*, Khanna Publications, 1993.
- R3. N.K. Giri, *Automotive Mechanics*, Khanna Publications, New Delhi, 2003.

