III Year I Semester	L	T	P	To	C
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AE 327 AUTOMOTIVE CHASSIS DEPT. ELECTIVE - I)

Course Description & Objectives:

To understand different types of chassis and to gain knowledge about different types of steering geometry and types of front axle. To educate the students regarding the ergonomics of an automobile and to educate about modern drive line.

Course Outcomes:

On successful completion of this course students will be able to:

1. Understand the different types of chassis frames.
2. Gain knowledge about different steering geometry and types of front axle.
3. Study about the various suspension systems
4. Study about modern drive line.
5. Learn about the different braking systems like power brake, assisted brakes, disc brakes.

UNIT I: Introduction:

Layout with reference to power plant, steering location and drive, frames, Frameless constructional details, materials, testing of frames, integral body construction.

UNIT II: Front Axle Steering System:

Front axle type, rigid axle and split axle, Constructional Details, Materials, Front wheel geometry viz., camber, castor, kingpin inclination, toe-in and toe-out. Condition for true rolling motion of road wheels during steering. Steering geometry. Ackermann and Davis steering. Construction details of steering linkages. Different types of steering gear box. Steering linkages layout for conventional and independent suspensions. Turning radius, instantaneous centre, wheel wobble and shimmy. Over-steer and under-steer. Power and power assisted steering.

UNIT III: Drive Line Study:

Effect of driving thrust and torque –reaction .Hotchkiss drives. Torque tube drive, radius rods. Propeller shaft. Universal joints. Final drive- different types. Two speed rear axle. Rear axle construction-full floating, three quarter floating and semi-floating arrangements. Differential-conventional type, Non-slip type, Differential locks and differential housing.

UNIT IV: Braking System

Type of brakes, Principles of shoe brakes. Constructional details – materials, braking torque developed by leading and trailing shoes. Disc brake, drum brake theory, constructional details, advantages, Brake actuating systems. Factors affecting brake performance, Exhaust brakes, power and power assisted brakes. Testing of brakes.

UNIT V: Suspension Systems:

Types of suspension, Factors influencing ride comfort, Types of suspension springs-independent suspension- front and rear. Rubber, pneumatic, hydro-elastic suspension. Shock absorbers. Types of wheels. Construction of wheel assembly. Types of tyres and constructional details. Static and rolling properties of pneumatic tyres, tubeless tyres and aspect ratio of tubed tyres.

TEXT BOOKS:

1. K. Newton, W.Steeds and T.K.Garret, “The Motor Vehicle”, 13th Edition, Butterworth Heinemann, India, 2004.
2. P.M.Heldt, “Automotive Chassis”, Chilton Co., New York, 1982.
3. W.Steed, “Mechanics of Road Vehicles”, Illiffe Books Ltd., London. 1992.

REFERENCES:

1. Harban Singh Rayat, “The Automobile”, S. Chand & Co. Ltd, New Delhi, 2000.
2. G.J.Giles, “Steering Suspension and Tyres”, Illiffe Books Ltd., London, 1975.
3. Kirpal Singh, “Automobile Engineering”, Standard publishers, Distributors, Delhi, 1999.
4. G.B.S.Narang, “Automobile Engineering”, Khanna Publishers, Twelfth reprint New Delhi, 2005.
5. R.P.Sharma, “Automobile Engineering”, Dhanpat Rai & Sons, New Delhi, 2000.