

Course code	Course Name	L-T-P - Credits	Year of Introduction
AU205	AUTOMOTIVE CHASSIS	3-1-0-4	2016
Prerequisite : Nil			
Course Objectives <ul style="list-style-type: none"> To study about various components of Automobile chassis with their constructional details and understanding the concept of working various components. To know the application of the components in various automobiles 			
Syllabus Introduction- Types of automobiles- chassis layout - Frames and body- chassis – Frames - integral body. Design features of a body – Body accessories – Drive axles - Differential – Suspension – Wheels and Tyres – Wheel geometry- Steering mechanisms – Braking system			
Expected outcome. <ul style="list-style-type: none"> After this course the student will be able to explain the constructional details and the structure of drive line, steering, braking system and suspension system in a vehicle. 			
Text Books: <ol style="list-style-type: none"> Kripal Singh, Automobile Engineering, Vol I and Vol II, Standard Publisher, New Delhi , 2006 P.S. Gill, A Textbook Of Automobile Engineering-II, S.K. Khataria & Sons., 2nd Edition, 2012 R.K. Rajput, A Text–Book of Automobile Engineering, Laxmi Publications Private Limited, 2007 3 N.K. Giri, Automotive Mechanics, Kanna Publishers, 2007 			
References: <ol style="list-style-type: none"> Heldt P.M., Automotive Chassis, Chilton Co., New York, 1990 Newton Steeds and Garret, Motor Vehicles, 13th Edition, Butterworth, London, 2005. Heinz Haisler, Advanced Vehicle Technology, Butterworth, London, 2005. 			
Course Plan			
Module	Contents	Hours	Sem.ExamMarks
I	Introduction: Profile of Automobile Industry, Types of automobiles, general considerations relating to chassis layout and power plant Location, relative merits & demerits of different layouts, description of different types of chassis layout. Frames and body: Role and requirement of a chassis frame. loads acting on frames	9	15%
II	Types of chassis – Light, medium and heavy duty vehicle chassis, ladder chassis, Types of Frames (conventional, integral construction and perimeter frame) materials, cross members and X members, frame sections, defects in frames, frame repairs, frame alignment. integral body. Design features of a body – Types of bodies, coach built, convertibles. Body accessories, bumpers..	9	15%
FIRST INTERNAL EXAMINATION			
III	Torque reaction, driving thrust, Hotchkiss drive, torque tube drive, propeller shaft, universal joints, types,	9	15%

	Construction and Design of Drive Axles, Types of Loads acting on drive axles, Full – Floating, Three–Quarter Floating and Semi–Floating Axles, Axle Housings and Types, Differential principle and types, Differential housings, Non–Slip differential, Differential locks, double reduction and twin speed final drives, multi axle vehicles		
IV	Suspension: Objectives, types of springs, spring materials, leaf spring – Single and Multileaf, helper springs, coil spring, torsion bar, rubber & pneumatic suspension, Hydro-elastic suspension, shock absorbers – types and constructional details. Wheels and tyres: Types of wheel, construction of wired wheel, disc wheel, tyre type & construction, aspect ratio, specification of tyres, tyre rotation, static & rolling properties of pneumatic tyres	9	15%
SECOND INTERNAL EXAMINATION			
V	Types of Front Axles and Stub Axles, Front Wheel Geometry, viz., Castor, Camber, King Pin Inclination and Toe-in, Condition for True Rolling Motion of Wheels during Steering, Ackerman's and Davis Steering Mechanisms, Steering Linkages, Different Types of Steering Gear mechanisms, Slip Angle, Over–Steer and Under–Steer, Reversible and Irreversible Steering, Power and Power–Assisted Steering	9	20%
VI	Theory of Automobile Braking, Stopping Distance Time and Braking Efficiency, Effect of Weight Transfer during Braking, Theory of Drum Brakes, Leading and Trailing Shoes, Braking Torque, Constructional Details of Drum Brake and its Activators, Disc Brake Theory, Types and Construction, Hydraulic Braking System, Mechanical Braking System, Pneumatic Braking System, Power–Assisted Braking System, Servo Brakes, Retarders, Types and Construction, Anti–Lock Braking Fundamentals.	9	20%
END SEMESTER EXAM			

Question Paper Pattern

Maximum marks: 100

Time: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.