



**GALGOTIAS
UNIVERSITY**

Department of Mechanical Engineering

Vision, Mission, PEOs , PSOs& POs B.TechAutomobile Engineering

Vision

To be known as a premier department in automobile engineering, interdisciplinary research, innovation and application of knowledge for the benefit of society

Mission

MD1: Create a strong foundation in fundamentals of Automobile Engineering and Applied Mathematics.

MD2: Conduct interdisciplinary research leading to the delivery of innovative technologies through Problem and Research Based Learning.

MD3: Produce socially responsible, ethical Automobile Engineering graduates with ability to use modern tools and a mind-set of enquiry.

MD4: Provide an eco-system for aspirants to collaborate with peers to gain interpersonal skills.

Program Educational Objectives

PEO1: Graduates will be an Engineering professionals and innovators in core automotive industry, service industries or pursue research

PEO2: Graduates will be a team player to provide sustainable solutions for simple to complex interdisciplinary problems using modern tools and techniques

PEO3: Graduates will be engaged in professional activities with ethical practices to enhance the knowledge and contribute to the green environment.

**Department of Mechanical Engineering
Galgotias University, Uttar Pradesh**

SOENG / SOME / B.Tech / 1.1.1 / 7/21
ME



Program Specific Objectives

PSO1: Ability to apply engineering graphics and automotive skills to perform tasks in the area of automobile engineering

PSO2: Students are trained in the areas of design and analysis of automobile components.

Program Outcomes

1. **Engineering Knowledge** : Apply the knowledge of Mathematics, Science, and Engineering fundamentals, and an engineering specialization to solution of complex engineering problems.
2. **Problem analysis** : Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/development of solutions** : Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate considerations of public health and safety, and cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems** : Use research based methods including design of experiments, analysis and interpretation of data and synthesis of information leading to logical conclusions.
5. **Modern tool usage** : Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling complex engineering activities with an understanding of limitations.
6. **The engineer and society** : Apply reasoning within the contextual knowledge to access societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability** : Understand the impact of the professional engineering solutions in the societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable developments.
8. **Ethics** : Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.


Department of Mechanical Engineering
Galgotias University, Uttar Pradesh

SOEN4 / SOME / B.Tech / 1.1.1 / 8/21
ME



9. **Individual and team work** :Function effectively as an individual independently and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication** :Communicate effectively on complex engineering activities with the engineering community and with society at large such give and receive clear instructions.
11. **Project management and finance** :Demonstrate knowledge and understanding of engineering management principles and apply those to one's own work as a member and leader of a team to manage projects in multidisciplinary environments.
12. **Life-long Learning** :Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The Curriculum of B.Tech. Automobile Engineering is designed based on OBE and implemented in fulfillment of the Department mission and vision. Courses in this Program are designed at the undergraduate level keeping in mind the standard expected by all the stakeholders (students, parents, teachers, Automobile industry, and society), GATE requirements, and employability. The process of designing and revising the curricula is undertaken through a very transparent process involving faculty members at various stages – the departmental Board of Studies, the Board of Faculty and the Academic Council. The departments enjoy academic autonomy in designing and implementing their courses, subject to their approval by the higher academic bodies. External experts from academia and automobile industry are invited at various stages to offer their valuable suggestions and guidance for the planning and development of curricular aspects. The Outcomes of B.Tech. Automobile Program are chosen keeping in view the Graduate Attributes specified in the Washington Accord and the industry needs. Curricula has been developed to make pioneering contributions to automobile industry by introducing new courses such as Electric and Hybrid Vehicles, Pollution control. The key objective of B Tech curricula is transforming young graduate into a responsible, ethical, well-skilled graduate automobile engineer ready to serve the automobile sector.




Department of Mechanical Engineering
Galgotias University, Uttar Pradesh

SO ENG / SOME / B.Tech / 1.1.1 / 9/21
ME

Name of The Course	Automotive Chassis and Body Engineering			
Course Code	BAUT3004			
Prerequisite	BTME2008			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To broaden the understanding of details of car body aspects.
2. To introduce car body and bus body details used.
3. To broaden the understanding of students in the structure of vehicle chassis.
4. To introduce students to steering, suspension and braking systems.

Course Outcomes

CO1	Understand the construction details of various types of automotive chassis and basic functions of subsystems in the chassis.
CO2	Demonstrate knowledge of various types of suspension systems.
CO3	Demonstrate knowledge of various types of brake system
CO4	Demonstrate knowledge of steering system, wheels & tyres in the vehicles
CO5	Understand various safety provisions
CO6	Perform simulation on chassis system by applying varying loads

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit I: Introduction

8 lecture hours

General consideration relating to chassis layout, types of automobiles, layout of an automobile, weight distribution, stability, Terms used in body building construction, Angle of approach, Angle of departure, Ground clearance, Cross bearers, Floor longitudes, posts, seat rail, waist rail, cant rail, Roof stick, Roof longitude, Rub rail, skirt rail, truss panel, wheel arch structure.

Unit II: Vehicle Body

8 lecture hours

Car Body: Types, Regulations, drivers visibility, tests for visibility, methods for improving visibility and space in cars, safety design, safety requirements for car, car body construction.
 Bus Body Details: Types, bus body layout, floor height, engine location, entrance and exit locations,

Department of Mechanical Engineering
 Galgotias University, Uttar Pradesh

SOEN6 / SOME / B. Tech Auto / 1.1.1 / 10/21



seating dimensions, constructional details, frame construction.	
Unit III: Axle And Steering Systems	8 lecture hours
Axle parts and materials, loads and stresses, centre sections, section near steering head, spring pads, front axle loads, rear axles loads, types of rear axles, multi axles vehicles, steering heads, factors of wheel alignment, wheel balancing, centre point steering, correct steering angle, steering mechanisms, cornering force, self righting torque, under steer and over steer, Steering linkages, steering gears, special steering columns, power steering	
Unit IV: Brakes	8 lecture hours
Necessity, stopping distance and time, brake efficiency, weight transfer, brake shoe theory, determination of braking torque, classification of brakes, types, construction, function, operation, braking systems, bleeding of brakes, brake drums, brake linings, brake fluid, factors influencing operation of brakes such as operating temperature, lining, brake clearance, pedal pressure, linkages etc, Numerical problems. Brake compensation, Parking and emergency brakes	
Unit V: Suspension & Wheels and Tyres	5 lecture hours
Springs: Operation & materials, type leaf springs, air bellows or pneumatic suspension, hydraulic suspension, telescopic shock absorbers, independent suspension, front wheel independent suspension, rear wheel independent suspension, types, stabilizer, trouble shooting, Numerical problems. Types of wheels, construction, structure and function, wheel dimensions, structure and function of tyres, types of tyres, materials, tyre section & designation, factors affecting tyre life.	
Unit VI:	3 Lecture hours
Simulation on chassis system by applying varying loads	

Suggested Reading

1. P.M. Heldt (2010), Automotive Chassis, Chilton & Co.
2. S. S. Rattan (2004), Automotive Mechanics, N.K. Giri, Khanna Publications, New Delhi.
3. T.R. Banga & Nathu Singh, (1993), Automobile Engineering, Khanna Publications.
4. Joseph I Heintner, (1967), automotive mechanics, Affiliated East West press, New Delhi/Madras.


 Department of Mechanical Engineering
 Galgotias University, Uttar Pradesh



SOENH/SOME/D. Tech / 11.11/21