

GUJARAT TECHNOLOGICAL UNIVERSITY

AUTOMOBILE ENGINEERING (02) AUTOMOBILE CHASSIS AND BODY ENGINEERING SUBJECT CODE: 2160205 B.E. 6th SEMESTER

Type of course: Advanced / application

Prerequisite:-Manufacturing Process-I and Automotive manufacturing

Rationale: Subject is designed to cover various aspects and considerations to be concerned over vehicle body and chassis building with its safety aspects.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		C	Theory Marks			Practical Marks		
			ESE (E)		PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	0	3	70	20	10	0	0	0	100

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Vehicle Chassis: Introduction, Chassis frame operating and design considerations, Chassis frame components, sections used, types of joints, Types of chassis frame, Vehicle components location and attachment.	05	12
2	Car Body: Classification of vehicle based on body types, Types of car bodies, Integral body construction details: Requirements of body, Loads on the vehicle body: Static load, Acceleration and Braking, Moments and Torque due to driving conditions (torsion and bending moments), Types of materials used in body construction, Analysis and Selection of body member sections, Body sub frame and underfloor structure, car front and rear end structure, Vehicle Structure Analysis by Simple Structural Surface (SSS) Method: Saloon and simple van. Crashworthiness: features and requirements for occupant protections, crumple zones; Description of Body zones/assemblies/components, Body trims, Engine, transmission and body structure mounting;	14	30
3	Bus Body and Commercial Vehicle body: Classification of bus bodies – Based on distance traveled, Based on capacity of the bus and based on style & shape. Types of metal section used in the construction and regulations. Construction of conventional and integral type buses and comparison. Classification of commercial vehicle bodies. Construction of Tanker body and Tipper body. Driver cabin design for compactness Design of frames for bus and commercial vehicles.	11	28

4	<p>Ergonomic and Safety: Introduction of ergonomics, anthropometric dimensions of standard occupant, Concept of H-point referencing, interior design for ergonomics and comfort, seat design for ride comfort, suspension seats, split frame seating, back passion reducers, dash board instruments, pedal controls and electronic displays. Driver seat design of bus body and commercial vehicle body.</p> <p>Safety aspects in design, Types of safety (Active and Passive), Safety features: overview of requirement for occupant protection (frontal, side, rear and rollover impact) and pedestrian safety, Airbags and Seatbelts, Visibility: Regulation, Driver's visibility, Methods of improving visibility, Introduction of crash test, Chassis and body alignment test.</p>	12	30
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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	15	10	10	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table

Reference Books:

1. Jnusz Pawlowski, "Vehicle Body Engineering", Business books limited.
2. J H Smith, "An Introduction to Modern Vehicle Design", Butterworth-Heinemann.
3. J Brown, A J Roberstson, S Serphento, "Motor Vehicle Structure: Concepts and Funtamentals, Butterworth-Heinemann.
4. Heinz Heizler, "Advanced Vehicle Technology", Butterworth-, London.
5. David A. Crolla, "Automobile Engineering :Power train, chassis system and vehicle body",Elsveir
6. V D Bhinse, "Ergonomics in Automotive Design", CRC Press.
7. SAE J4004
8. John Fenton, Handbook of Automotive Body and Systems Design, Wiley India.
9. John Fenton, Handbook of Automotive Body Construction and Design Analysis, Wiley India.
10. ARAI / GTR for occupant and pedestrian protection.

Course Outcome:

After learning the course the students should be able to:

1. Understand and have knowledge about different aspects related to body and chassis.
2. Understand various safety provisions.
3. Design the chassis and able to select the section of same.
4. Design the cabin and frame component to transfer the force and optimize from safety and cost point of view.

List of Open Source Software/learning website:

1. <http://nptel.ac.in/>
2. www.learnerstv.com

Active learning assignments: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.