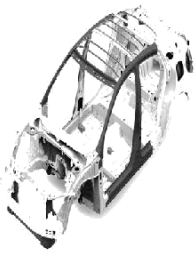

16AE3

VEHICLE BODY ENGINEERING

Hours Per Week :

L	T	P	C
3	1	-	3

Total Hours :

L	T	P
45	-	-

WA/RA	SSH/HSH	CS	SA	S	BS
2	40	2	3	2	-

Course Description and Objectives:

This course offers fundamental knowledge on various types of bodies for small and heavy four wheel vehicles, their aerodynamics and materials for their fabrication.The objective of this course is to impart basic knowledge on different bus and car body layouts, design and material selection for fabrication.

Course Outcomes:

The student will be able to:

- understand the concept of car body design, passenger safety, crumple zone and crash testing
- use the concepts of wind tunnel testing and vehicle body optimization techniques
- familiarize with various types of bus body construction, seating layout, regulations and comfort
- understand various heavy vehicle bodies, driver's visibility and cabin design.
- gain knowledge on different materials and painting techniques for vehicle body.

SKILLS:

Identify different bus body layouts.

Design and analyze body shape for a given vehicle

Test and analyze the models of different vehicles

UNIT - 1 **L-10**

CAR BODY: Types: Saloon, Convertibles, Limousine, Estate car, Racing and sports car. Visibility: regulations, Driver's visibility, Tests for visibility, Methods of improving visibility and space in cars. Safety: Safety design, Safety equipments for cars. Car body construction; Design criteria, Prototype making, Initial tests, Crash tests on full scale model, Dummies and Instrumentation.

UNIT - 2 **L-10**

VEHICLE AERODYNAMICS: Objectives. Vehicle drag and types; Various types of forces and moments, Offects of forces and moments, Side wind effects on forces and moments, Various body optimization techniques for minimum drag, Wind tunnel testing: Flow visualization techniques, Scale model testing, Component balance to measure forces and moments.

UNIT - 3 **L-10**

Bus Body: Types: Mini bus, Single decker, Double-decker, Two level and articulated bus. Bus body layout; Floor height, Engine location, Entrance and exit location, Seating dimensions. Constructional details: Frame construction, Double skin construction,Ttypes of metal sections used, Regulations, Conventional and integral type construction.

UNIT - 4 **L-9**

COMMERCIAL VEHICLE: Types of body; Flat platform, Drop side, Fixed side, Tipper body, Tanker body, Light commercial vehicle body types. Dimensions of driver's seat relation to controls. Drivers cab design.

UNIT - 5 **L-6**

BODY MATERIALS, TRIM AND MECHANISMS : Steel sheet, Timber, Plastic, GRP, Properties of materials; Corrosion, Anticorrosion methods.Selection of paint and painting process.Body trim items.Body mechanisms.

TEXT BOOKS:

1. Jornsen Reimpell, Helmut Stoll and Jurgen Betzler, "The Automotive Chassis: Engineering Principles", 2nd edition, Butterworth-Heinemann, 2001
2. J Powloski, "Vehicle Body Engineering", Business Books Ltd., London.2000

REFERENCE BOOKS:

1. John Fenton, "Vehicle Body Layout & Analysis", Hutchinson, London, 1980.
2. J.G. Giles, "Body Construction and Design", Vol. 6.,llefe Books/Butterworth and Co..2002
3. Crouse W. H. and Anglin D. L., "Automotive Chassis", 10th edition, McGraw Hill Education (India) Private Limited, 2006.

ACTIVITIES:

- *Design and analyze different bus body layouts*
- *Estimate drag force on different body configurations*
- *Perform scaled model testing on different vehicle bodies*