SEMESTER S7

VEHICLE BODY ENGINEERING

Course Code	PEAUT741	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objectives:

1. To provide a comprehensive understanding on vehicle body design and classification
2. To equip students to analyse and apply materials and manufacturing techniques
3. To introduce advanced technologies and enhance vehicle safety and aerodynamics

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction to Vehicle Body Engineering:** Classification of Coach Work type: Stylish Forms, Coach and Bus body style, layout of cars, buses and coach with different seating and loading capacity, Commercial vehicle types, Vans and Pickups **Terms Used in Bus Body Building –** Angle of Approach and Departure, Ground Clearance, Fender, Floor Longitudes, Post, Seat rails, Cant Rails, waist rails, roof sticks, Roof Longitude, Rub Rail, Skirt Rail, Wheel Arch Structure, Post Diagonals, Gussets, Industry standards and regulations that affect vehicle body design and construction	9
2	**Vehicle Body materials** –Aluminium Alloys, Steel, Alloy steels, Plastics, metal Matrix composites, Glass reinforced plastics and high strength composites, Thermoplastics, ABS, Load Bearing Plastics, semi rigid PUR Foams and Sandwich Panel Construction, Recycling of vehicle materials and sustainable practices in material selection and manufacturing. **Paints and Adhesives –** Paints, Adhesives and its properties, Corrosions, and their prevention	9
3	**Vehicle Aerodynamics -** Objectives, Vehicle drag and types, various types of forces and moments influencing drag, Effect of forces and moments, Side	9

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	wind effects on force and moments, Introduction to CFD tools used in the design process for aerodynamic analysis. **Various body optimization –** Techniques for minimum drag, Wind Tunnels-Types and Principles, Flow Visualization techniques, Airflow Management System	
4	**Vehicle Safety -** Passive and Active vehicle Safety equipment's – Seat belt, Collapsible steering column, tilt able steering wheel, Air Bags, Electronic system for activating Air bag, Impact of emerging technologies such as electric vehicles (EVs) and Autonomous vehicles on vehicle body engineering.	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand various vehicle body styles, including commercial types, and key building terms.	**K2**
CO2	Explore about materials and coatings used in vehicle bodies, including their properties and corrosion prevention methods.	**K2**
CO3	Optimize aerodynamic principles and techniques to reduce drag and enhance vehicle efficiency.	**K2**
CO4	Examine and evaluate passive and active safety features to improve occupant protection.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	2										
CO3	3	2	3	2								
CO4	3	2	3	2	3							

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Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	The Principles of Automobile Body Design	Kingston Forbes	Creative Media Partners	2022
2	Vehicle Body Engineering	Giles J Pawlowski	Business books limited	1989
3	Body Engineering	Sydney F page	Chapman and Hall ltd, London	1956

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Wind Tunnel Testing	Jewel B. Barlow	John Wiley and Sons, 2nd edition	1974
2	The Passenger Car body	SAE International		2000
3	Vehicle Body Layout and Analysis		Mechanical Engg, Publication Limited	2000

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