

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**

**COURSE CURRICULUM  
COURSE TITLE: VEHICLE BODY ENGINEERING  
(Code:3340201)**

<b>Diploma Programme in which this course is offered</b>	<b>Semester in which offered</b>
<b>Automobile Engineering</b>	<b>4<sup>th</sup> Semester</b>

### 1. RATIONALE

As a supervisor or self employed, the diploma graduate is supposed to fabricate and repair various vehicle bodies. The knowledge and skills of vehicle body technology is required to manage vehicle body fabrication and repair. In the automotive field auto body repair is experiencing a faster growth than any other service area. Collision repair plus the normal up-keep of the automobile body requires increasing numbers of well trained auto body technicians. This course is designed to provide students the required level of knowledge and skills of vehicle body technology.

### 2. LIST OF COMPETENCIES

The course content should be taught and curriculum should be implemented with the aim to develop different types of skills leading to the achievement of the following competencies.

- **Supervise vehical body manufacturing and repair work.**

### 3. COURSE OUTCOMES (CO's).

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Classify vehicle body according to body shape
- Use various hand & power tools require for vehicle body repair & alignment
- Describe repair procedure of vehicle body damages
- Describe body insulation and other vehicle body services such as glass and door service etc.
- Identify and describe various materials used in construction of vehicle body parts/components
- Describe various painting and repainting methods
- Identify different paint defects, its causes and corrections

### 4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	ESE	PA	ESE	PA	150
3	0	2	5	70	30	20	30	

**Legends:** L-Lecture; T – Tutorial/Teacher Guided Student Activity; P - Practical; C – Credit;; ESE - End Semester Examination; PA - Progressive Assessment.

## 5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
<b>Unit – I Development and construction of vehicle body</b>	1a. Differentiate chassis, frame & body 1b. Describe classification according to body shape (car & bus) 1c. Explain fundamental body structure	1.1 Introduction to chassis, frame and body 1.2 Methods of construction 1.3 Basic body construction & its classification 1.4 Integral body construction 1.5 Design feature of integral body-frame (safety body cell & crumple zone) 1.6 General information-body repairs 1.7 Driver seat & drivers visibility 1.8 Space & safety in vehicle
<b>Unit – II Body repair tools and shop equipments</b>	2a. Describe various hand & power tools require for vehicle body repair & alignment 2b. Explain safety Measures	2.1 Basic hand tools 2.2 Power tools 2.3 Body shop equipments 2.4 Frame & underbody repair tools & equipments 2.5 Electronic straightening & measurement system 2.6 Safety Measures
<b>Unit– III Minor Body Repairs</b>	3a. Describe repair procedure of minor vehicle body damages 3b. Describe Corrosion protection	3.1 repair with washer welder 3.2 repair with hammer and dolly 3.3 panel filling with plastic body and filler-forming with solder 3.4 Panel shrinking (drawing operation) 3.5 Repairing of rusted body panels
<b>Unit– IV Major Body Repairs</b>	4a. Describe repair procedure of major vehicle body damages.	4.1 Diagnosis of damage. 4.2 Front end Collision 4.3 Rear end Collision 4.4 Side swipe collision 4.5 Roll-over damage 4.6 Fibre glass repairs & replacement 4.7 Body aligning. 4.8 Panel replacement.
<b>Unit– V Miscellaneous Body services</b>	5a. Describe glass and door service 5b. Describe body insulation and other vehicle body service	5.1 Interior trim and upholstery 5.2 Glass and door service 5.3 Body insulation and sealing 5.4 Exterior trim
<b>Unit-VI Body Materials</b>	6a. Describe various materials used in vehicle body components	6.1 Characteristics of Sheet Metal 6.2 Types of Glass 6.3 Types of Resins

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
		6.4 Plastic parts 6.5 Composite materials GRP (glass reinforced plastic) , FRP (fiber reinforced plastic),
<b>Unit-VII Painting &amp; Refinishing</b>	7a. Describe various painting methods 7b. Describe Paints & painting Equipment & tools 7c. Describe Repainting process 7d. Describe Paint Defects, causes & corrections	7.1 Paint types & characteristics 7.2 Painting methods & techniques a. Spraying b. Immersion 7.3 Painting equipments 7.4 Painting procedure with surface preparation 7.5 Refinishing facilities 7.6 Refinishing equipments and tools 7.7 Different types of paint defects occurring during painting & immedietly after drying, their causes & remedies

#### 6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY )

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks (Duration –42 Hours)			
			R Level	U Level	A Level	Total
1.	Development And Construction of Vehicle Body	03	03	04	-	07
2.	Body Repair Tools And Shop Equipments	03	03	04	-	07
3.	Minor Body Repairs	08	03	05	04	12
4.	Major Body Repairs	10	03	08	05	16
5.	Miscellaneous Body services	08	03	07	04	14
6.	Body Materials	04	03	04	-	07
7.	Painting & Refinishing	06		03	04	07
	<b>Total</b>	<b>42</b>	<b>18</b>	<b>35</b>	<b>17</b>	<b>70</b>

**Legends:** R = Remember, U = Understand, A= Apply and above Level (Bloom's revised 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.

## 7. SUGGESTED LIST OF PRACTICAL/EXERCISES

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

*Note: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*

*Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme*

S. No.	Unit No.	Practical/Exercises (Any Seven) (Outcomes in Psychomotor Domain)	Apprx. Hr Required
1	I	Observe & prepare report of various bodies repairing work	04
2	II	Demonstrate use of different tools required for body repairing work	04
3	II	Demonstrate safety measures in body building shop	04
4	III	Demonstrate works carried out for minor repairing	04
5	IV	Observe and record work carries out for major repairing	04
6	IV	Demonstrate various joining process	04
7	V	Demonstrate upholstery works.	04
8	VI	Demonstrate glasses and door fitting and repairing process	04
9	VII	Demonstrate the use of various paints and coating used for vehicles	04
10	VII	Demonstrate finishing process	04
Total			28

## 8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

- Visit to automobile body repair shops, and observe and record processes.
- Seminars using power point presentations to get understanding of different types of body structure, types of materials, major and minor body repairing procedure etc.,
- internet based assignments, teacher guided self learning activities, course/library/internet/lab based mini-projects.....etc. These could be individual or group-based.

## 9. INSTRUCTIONAL STRATEGIES

- Lecture cum discussion using animation and videos.
- Visit of authorized workshop for body repairing works.

## 10. SUGGESTED LEARNING RESOURCES

### A. List of Books

Sr.No.	Author	Title of Books	Publication
1	Anil Chhikaara	Automobile Engineering body Repair Technique Vol 4	Satya Pracation ,New Delhi
2	Anil Chhikaara	Automobile Engineering paint Technique Vol 5	Satya Pracation ,New Delhi
3	Gilcs J Pawlowski	Vehicle body engineering	Century Publications ISBN
4	Automotive Refinishing	Harry T. Chudy	Prentice Hall, Inc., London
5	John Fanton	Vehicle body layout and analysis	Mechanical Engineering Publications (1980) ISBN:- 0852984456
6	Alexander Tait, Andre,G. Deroche. Necholas.N. Hilde brand	The Principles of Auto body repairing and Repainting	Prentice Hall, Inc., London
7	Haynes	The Haynes Automotive Body Repair & Painting Manual	Delmar Cengage Learning; 1 edition ISBN:- 1850104794

### B. List of Major Equipment/ Instrument

Different hammer, Dolly blocks, Body pullers, power lock stand, air spray gun etc..

### C. List of Software/Learning Websites

- i. <https://www.youtube.com/watch?v=gcKx2ZqhlcU>
- ii. [https://www.youtube.com/watch?v=ORFa\\_iPtAeY](https://www.youtube.com/watch?v=ORFa_iPtAeY)
- iii. <https://www.youtube.com/watch?v=I3OIxtpWX7Y>
- iv. <https://www.youtube.com/watch?v=t4TdwcPbEiE>
- v. <https://www.youtube.com/watch?v=u0IJjKh-dWE>
- vi. <https://www.youtube.com/watch?v=LtwX8rrcEUQ>
- vii. <https://www.youtube.com/watch?v=SnDCcnzQapo&list=PL91B84909AEC3F3E4>
- viii. <https://www.youtube.com/watch?v=A3Cw58U0I4Q&list=PL91B84909AEC3F3E4>
- ix. <https://www.youtube.com/watch?v=qUehclZVeIs>

## 11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

### Faculty Members from Polytechnics

- **Prof. M. J. Pathak**, H.O.D., Automobile Engineering Department, Sir Bhavsinhji Polytechnic Institute, Bhavnagar.
- **Prof. D.J.Gohel**, Lecturer, Automobile Dept., C.U. Shah Polytechnic, Surendranagar
- **Prof. A.C. Suthar** Lecturer, Automobile Engineering Department, M.L.Institute of Diploma Studies, Bhandu

- **Prof. Sulay Patel**, I/C H.O.D., Automobile Engineering Department, L.J. Polytechnic, Ahemdabad.

**Coordinator and Faculty Members from NITTTR Bhopal**

- **Dr. K.K.Jain**, Professor, Department of Mechanical Engineering
- **Dr. C. K. Chugh**, Professor Department of Mechanical Engineering