GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Automobile Engineering

Subject Code: DI04002061

Subject Name: Two and Three - Wheeler Technology

w.e.f. Academic Year:	2025-26
Semester:	4th
Category of the Course:	Professional Elective - I

Prerequisite:	Students should have fundamental knowledge of internal combustion engines, basic automotive systems, workshop practices, and electrical fundamentals to understand the working and maintenance of two and three-wheeler vehicles.
Rationale:	Two and three wheelers form a significant portion of the Indian and global transportation sector, serving as essential means for personal mobility, public transport, and last-mile delivery. There is a growing demand for skilled technicians and engineers capable of understanding, maintaining, and innovating in this domain. This course aims to equip students with fundamental and applied knowledge of the construction, operation, and maintenance of two and three-wheeled vehicles. It covers key systems such as engine, transmission, steering, suspension, brakes, and electrical systems. The course is designed to bridge the gap between theoretical concepts and hands-on skills, enabling students to contribute effectively in service centers, manufacturing units, and R&D environments.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Describe the history, types, applications, major manufacturers, and basic electric technology of two and three wheelers.	R & U& A
02	Explain the construction and operation of power and transmission systems	U& A
03	Describe the components, operation, and functions of electrical and Auxiliary systems	U& A
04	Explain the components, functions of steering, suspension, and frame systems	U& A
05	Describe braking systems, wheel types, and tyre construction with their applications	U& A

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction to Two and Three Wheelers** 1.1 Overview of Two and Three-Wheeler: (Definition, History and Evolution) 1.2 Types and Application of Two and Three-Wheeler 1.3 Major manufacturers and their models 1.4 Basic technology for Electric Two and Three-Wheeler	04	14%
2.	**Power and Transmission System** 2.1 Types of engines used in SI and CI (2-stroke, 4-stroke) 2.2 Difference between Valve Timing and Port Timing Diagrams 2.3 Scavenging -types, merits and demerits 2.4 Engine cooling and lubrication systems 2.5 Fuel systems (Carburettor and Fuel Injection) 2.6 Clutch types (Single plate, Wet multi-plate, Centrifugal) 2.7 Gearbox (Manual and CVT) 2.8 Final drive (Chain, Belt, Shaft drive)	14	26%
3	**Electrical and Auxiliary systems** 3.1 Electronic ignition systems (Conventional (Contact point type), Magneto, TCI, CDI) 3.2 Starting system (Kick Start, Electric Start (Self-start), Auto start) 3.3 Battery 3.4 Indicators & Lighting system 3.5 Dashboard instruments 3.6 Sensors and ECUs in modern two-wheelers	12	24%
4.	**Steering, Suspension and Frame**	9	20%

	4.1 Steering: Handlebar (2-Wheeler), Handlebar/Rack-and-pinion (3-Wheeler) 4.2 Control cables and linkages (clutch, brake, throttle) 4.3 Suspension (telescopic, swing arm, mono-shock, leaf spring) 4.4 Types of frames (underbone, backbone, cradle) 4.5 Materials used for frame 4.6 Ergonomics: Rider position and comfort for different vehicle types		
5.	**Braking, Wheels & Tyre Systems** 5.1 Braking: Disc brake, Drum brake, CBS, ABS 5.2 Wheels: Spoke wheel, Alloy wheel, Pressed steel wheel (3W) 5.3 Tyres: Tubed and tubeless tyres, tyre construction	6	16%
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	**45**	**45**			

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

Sr.No.	Title of Book	Author	Publication with place, year and ISBN
1	Irving. P.E	Motor cycle engineering	Temple press book, London, 1992.
2	Two and Three-Wheeler Technology	Dhruv U. Panchal	PHI Learning Pvt Ltd (1 Jan 2015) ISBN-10: 8120351436 ISBN-13: 978-8120351431
3	The complete guide to Motorcycle Mechanics	Motorcycle Mechanics institute, Phoenix Arizona	Motorcycle Mechanics institute, Phoenix Arizona ISBN:0-13-160549-6
4	A Practical Guide to maintenance and repair	Raymond Broad Lambretta	

(b) Open-source software and website:

1) https://nptel.ac.in
2) Bike Manufacturer Websites (Technical Data)
3) https://en.wikipedia.org/wiki/Three-wheeler
4) https://auto.howstuffworks.com
5) https://www.asdc.org.in

Suggested Course Practical List:

Sr.No	Unit No.	Practical Outcomes (PrOs) (Only Eight)		Apprx. Hrs. Required
1	1	Study and compare old vs. new models for 2W/3Wvehicles (design, engine tech, features)	Any One	02
2	1	Study and compare Electric vs IC engine 2W/3W models		02
3	1	Visit Two and Three-Wheeler manufacturing or service station and get technical details.		04
4	2	Perform Engine Run-Up Test	Any Two	04
5	2	Demonstrate Brake and Clutch adjustment as per specification for Two-wheeler		04
6	2	Perform Dismantling and assembling of Two and Three-wheeler gear box		04
7	2	Demonstrate Two-wheeler chain tension test		04
8	3	Study about common starting problems for Two and Three-wheeler	Any Two	04
9	3	Perform Battery Inspection and Maintenance for Two and Three-wheeler		04
10	3	Study and Testing of Turn Indicators and Headlight System for Two and Three-wheeler		04
11	3	Demonstration of Dashboard Instruments for Two and Three-wheeler		04
12	4	Perform Dismantling and assembling of three-wheeler steering system.	Any One	04
13	4	Study about different types of frames		04
14	5	Study about different types of Brakes for Two and Three-wheeler	Any One	04
15	5	Study about tyre construction and maintenance of Two and Three-wheeler		04
			Total	**30**

List of Laboratory/Learning Resources Required:

1) Basic Hand Tools and Power tools
2) Measuring and Testing Tools
3) Lifting & Supporting Equipment
4) Cleaning & Maintenance Tools
5) Electrical Service Tools

Suggested Project List:

1) Maintenance and Troubleshooting plan for Two and Three-wheeler
2) Fuel Consumption Analysis of Two and Three-wheeler
3) Safety and Advanced Technologies
4) Development of a Digital Service Manual for a Specific Bike Model

Suggested Activities for Students:

"Apart from classroom and laboratory-based learning, the following co-curricular activities are recommended to enhance the attainment of various course outcomes. Students are encouraged to undertake these activities individually or in groups and prepare a comprehensive short report for each activity."

1) Group discussion on topics covered in this course
2) Seminars using power point presentations
3) Prepare Chart/Demo model covered in this course
4) Short report on topic given by concern faculty

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