GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3160212
Semester – VI

Subject Name: Two and Three Wheeler Technology

Type of course: Basics and Fundamental

Prerequisite: Nil

Rationale: Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Introduction:** History and classification of Two and Three wheeler vehicles, Layout of different two and three wheeler vehicles, Basic systems	04
2	**Power Plant**: Classification of engines used for two and three wheeler vehicles, Construction, working and types of two stroke engines, Port timing diagrams, Construction and working of four stroke engines, selection criteria and design considerations for suitable engine for two and three wheeler vehicles, Different types of fuel supply systems, Construction and working of a carburetor, different types of carburetor used for two wheeler engines, Fuel injection system, Types of lubricants, Different types of lubrication system, Scavenging process for two stroke engines, Scavenging methods, Basic engine cranking mechanism, Different types of cranking mechanism for two and three wheeler vehicles	10
3	**Transmission**: Layout of transmission system in two and three wheeler vehicle, Types of primary reduction, Requirements of clutch, Types of clutch used for two and three wheeler vehicles, Clutch release mechanism, Types of gearbox for two and three wheeler vehicles, different gear shifting mechanisms, Continuous variable transmission (CVT), Chain drive, Belt drive, Shaft drive, Cush drive	08
4	**Steering and Suspension System**: Steering Geometry for two wheeler vehicles and Effects, Steering Column Construction, Handlebar–Types & Construction, Suspension Requirements for two and three wheeler vehicles, Design Considerations for Suspension System, Spring & Shock Absorber Assembly, Types of front suspension system, types of rear suspension system, Suspension damping control system	10
5	**Brakes, Wheels and Tires**: Design Considerations for brakes, Drum brake and Disc brake for two wheeler vehicles, Brake control systems, Anti-lock braking system for two wheeler vehicles, Types of wheels, Construction details of tires, Types of tires	04

6	**Frame for Two Wheelers**: Design considerations for frame, Components of frame, Types of frames, Frame material, Body work, Ergonomics considerations	**04**
7	**Electrical Systems and Instruments**: Battery, Charging system, Ignition system, Lighting system, Horn, Handlebar controls, Instruments and indicators, Recent developments in electrical system for two and three wheeler vehicles	**05**
	Total	**45**

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	**40**	**20**	**0**	**10**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create 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. Panchal. D, Two and Three Wheeler Technology, PHI learning PVT LTD., New Delhi, 2015.
2. Foale .T, Motorcycle Handling and Chassis Design, Spain, 2002.
3. Lear. G, Mosher. L., Motorcycle Mechanics, Prentice-Hall, New Jersey, 1977.
4. Zimmerman. M, The Essential Guide to Motorcycle Maintenance, Motorbooks, 2016.
5. Workshop manuals for motorcycles and rickshaws

Course Outcomes: Students will be able to understand the construction and working of different systems and components of two and three wheeler vehicles.

Sr. No.	**CO statement**	**Marks % weightage**
CO-1	Classify types of two and three wheeler vehicles and explain different layouts.	10
CO-2	Demonstrate working of different engines and supporting systems.	25
CO-3	Illustrate transmission, suspension and steering systems.	35
CO-4	Exemplify construction and working of different chassis components like brakes, wheels, tires and frames.	20
CO-5	Identify and explain different electrical systems.	10

Term Work:
The term work shall be based on the topics mentioned above.

List of Practical:

1. To identify the major components on two and three wheeler vehicle layout.
2. To study about two stroke and four stroke engines.
3. To study about fuel supply and lubrication system used for two and three wheeler vehicles.
4. To study about scavenging process of two stroke engine.
5. To study construction and working of different types of clutches.
6. To demonstrate different transmission system and its components.
7. To study about steering and suspension systems of two and three wheeler vehicles.
8. To demonstrate working of different types of brakes.
9. To study about construction of different types of frames.
10. To study the different electrical systems.

Major Equipment:

1. Two stroke and Four stroke Engines
2. Cut section models for Fuel supply and lubrication systems
3. Single plate, Multi-plate and Centrifugal clutch assemblies
4. Cut section of Constant mesh, Sequential, Differential and CVT gearbox assemblies
5. Cut section of Leaf springs, Telescopic suspension and Mono suspension system
6. Single and double cradle frames, Engine based frame
7. Layout of Electrical systems

List of Open Source Software/learning website:

1. http://nptel.ac.in/
2. www.learnerstv.com
3. http://auto.howstuffworks.com/
4. nptel.iitk.ac.in/