

Program : Diploma in Automobile Engineering	
Course Code : 5053C	Course Title: Two and Three Wheeler Technology
Semester : 5	Credits: 4
Course Category: Program Elective	
Periods per week: 4 (L:4, T:0, P:0)	Periods per semester: 60

Course Objectives:

- To identify different areas of two and three wheeler technology.
- To find the applications of all the areas in day to day life.
- To appreciate the working and construction of different engines/ components.
- To understand the importance of electric two and three wheelers.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge of basics on automobile engine components		Basic Automobile engineering	1
Basic and practical knowledge on Petrol Engine Components		Petrol Engine Service Lab	3
Practical Knowledge of diesel engine systems.		Diesel Engine Service Lab	4

Course Outcomes:

On completion of the course, the student will be able to:

CO _n	Description	Duration (Hours)	Cognitive level
CO1	Outline the classification of two wheelers, chassis and frames of two wheelers.	14	Understanding
CO2	Illustrate the principle, construction and working of different types of engines and fuel systems	15	Understanding
CO3	Explain the functions, construction and working of suspension system.	15	Understanding

CO4	Identify the features of three wheelers and electric auto rickshaw	14	Applying
	Series Test	2	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	2				2		
CO3	3		2				
CO4	3			2	2		

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	Understand classification of two wheelers, chassis and frames of two wheelers		
M1.01	Understand the classification of two wheelers	3	Understanding,
M1.02	Illustrate the constructional details of Frame And Body	3	Understanding,
M1.03	Know the Wheels And Tyres used in 2 and 3 wheelers	3	Understanding,
M1.04	Summarize the Constructional details of Lithium iron battery	5	Understanding,

Contents:

Classification & layouts of two wheelers (motorcycles, scooters, mopeds). Layout of mopeds, scooter and motor cycle. Load on the frame, Components of frame, Mounting provisions of frame, Tubular frame. Engine based frame, Twin spar frame, Monocoque frame, Frame material, Body work.

Ergonomic considerations. Spoked wheel, Pressed steel wheels, Alloy wheels. Requirements of tyres, Designation of tyres. Cross ply and radial ply tyres, Tyre with tube and tubeless tyres. Inflation pressure. Working principle, construction, charging and discharging, capacity rating of lithium-iron battery, Battery management system of lead acid battery and lithium iron battery.

CO2	Illustrate the principle, construction and working of different types of engines and fuel systems		
M2.01	Understand the Working principle of two stroke and four stroke engines.	2	Understanding,
M2.02	Illustrate the Valve timing and port timing diagram,	2	Understanding,
M2.03	Explain the scavenging in two stroke engines	2	Understanding,
M2.04	Outline the Lubrication and cooling	2	Understanding,
M2.05	Summarize the Cranking System	2	Understanding,
M2.06	Explain about the Ignition system	3	Understanding,
M2.07	Understand the Electric Two Wheelers	2	Understanding,
	Series Test – I	1	
Contents: Working principle of two stroke and four stroke engines. Recent developments in engine. Fuel used – Gasoline, CNG, Diesel AND electric power plant. Types of scavenging and relative merits and demerits with scavenging systems. Systems requirements for Engine lubrication and cooling. Basic cranking mechanism (Roller type ratchet, Lock pawl type ratchet and regular ratchet wheel). Kick start mechanism. Lay out of kick start mechanism (Transmission kick start layout, primary kick start layout) . Auto start mechanism. Conventional ignition system- battery and magneto. Electronic Ignition System – Capacitor discharge ignition, ECU and various sensors used. Drivetrain layout of electric two wheeler Batteries, Electric motor, Motor controller, Charger and charging. Merits and demerits of electric two wheelers, High performance of electric wheelers			
CO3	Explain the functions, construction and working of suspension system.		
M3.01	Illustrate the Steering geometry and effects	3	Understanding,
M3.02	Understand the Suspension system	3	Understanding,
M3.03	Explain the Spring and shock absorber assembly	3	Understanding,
M3.04	Outline the Telescopic suspension	3	Understanding,
M3.05	Explain the Transmission system	3	Understanding,
Contents: Trail, Castor angle or Rack angle, wheel base. Steering column Construction			

Handle bar types and construction. Springer forks suspension, Girder forks suspension, Trailing and leading link suspension, telescopic fork suspension. Single link type front suspension, Double link type front suspension. Hardtail type rear suspension. Swing arm type rear suspension.

Layout of two wheeler and three wheeler transmission system. Belt, chain and gear drive. Multi - plate clutch, centrifugal clutch. Assist slipper clutch. Gear box - Constant mesh gear box with ball lock mechanism. Sequential gear box. CVT - Continuous variable transmission Cush drive.

CO4	Identify the features of three wheelers and electric auto rickshaw		
M4.01	Outline the various Classification of three wheelers	1	Understanding
M4.02	Illustrate the Layout of passenger auto rickshaw	2	Understanding
M4.03	Illustrate the Layout of loading auto rickshaws	2	Understanding
M4.04	Make use of different types of loading auto rickshaws	1	Applying
M4.06	Explain the Suspension system in three wheelers	2	Understanding
M4.07	Identify various brakes used in three wheelers	2	Applying
M4.08	Illustrate the working and construction of Frame and body	1	Understanding
M4.09	Summarize the construction and working of Electric Three Wheeler	3	Understanding
	Series Test – II	1	

Contents:

Drive train layout of passenger auto rickshaw, Drive train layout for loading auto rickshaw, Rear suspension system of passenger auto rickshaw. Swinging arm suspension, triangulation in swinging arm suspension.

Rear suspension system of loading auto rickshaw, Layout of braking system hydraulic and mechanical of auto rickshaw. BLDC motor and AC induction motor construction and working. Cloud based mobility platform for vehicle tracking and monitoring (NEMO). Layout of electric auto rickshaw.

Text / Reference:

T/R	Book Title/Author
T1	Two and Three wheeler Technology - Dhruv U. Panchal
R1	Irving. P. E., “Motor Cycle Engineering”, Temple Press Book, London – 1992.
R2	Newton Steed, “The Motor Vehicle”, McGraw Hill Book Co. Ltd., New Delhi
R3	Two wheeler and three wheeler, Ramalingam K K SCITECH Publication, Chennai
R4	Siegfried Herrmann, “The Motor Vehicle”, Asia Publishing House, Bombay.

Online Resources:

Sl.No	Website Link
1	https://youtu.be/kTuybtMAiN8
2	https://youtu.be/DUK6gjbsLpQ
3	https://youtu.be/3E1SXG7VkQk