

Branch Name:	Automobile Engineering
Program Code:	ET408
Course Title:	Automotive Mechanics
Course Code:	2ET4080403
Pre-requisite Course:	-----

Course Objectives:

1. To understand the types of mechanism used and forces acting on the vehicle.
2. To understand the steering system and its vibrations.
3. To understand about the vehicle performance.
4. To understand the dynamometer and morse test.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	Introduction to Automotive Mechanics • Explain various terminologies of mechanics. • Differentiate various types of mechanism used in Automobile system. • Describe various forces and moments acting on a vehicle. • Explain SAE Tire axis system.	06	25
2	Vehicle Steering and Vibrations • Ackerman steering Mechanism • Condition for true rolling • Turning circle radius (along with calculations) • Definitions and Terminologies related to Vibration • Types of Vibrations • Sources of vibrations in a vehicle. • Vibration isolation in a vehicle.	06	30
3	Vehicle Performance • Power for propulsion • Relation between engine speed and vehicle speed • Road Performance Curves on the basis of available power • Weight Distribution and reaction at wheel in Three wheeled vehicles & Four wheeled vehicles • Stability of a vehicle on slope • Factors affecting braking efficiency	10	20
4	Engine Performance • Describe various terminologies related to performance of engine. • Describe working of common dynamometer used for measuring power. • Analyze results of Morse test • Prepare heat balance sheet from given data.	06	25

List of Practical:

1. Describe various mechanisms used in automotive mechanics.
2. Derive the equation for Ackerman steering Mechanism.
3. Prepare a list of sources of vibration in vehicle.
4. Enlist various factors affecting vehicle vibration and human comfort.
5. Explain various resistances acting on a vehicle.
6. Describe Morse test along with its procedure.

Reference Books:

1. Fundamentals of Vehicle Dynamics Thomas D. Gillespie SAE International (2021)
2. Automobile Mechanics Dr. N K Giri Khanna Publishers, Delhi (2008);
3. Theory of Machines R S Khurmi, J K Gupta S. Chand & Co. Ltd, New Delhi (2022);
4. Vehicle Dynamics Martin Meywerk Wiley Publishing company, New York, United States. (2015)
5. Vehicle Dynamics Basilio Lenzo Springer, Cham (Publisher) Denmark. (2022)

List of Open-Source Software/learning website:

1. <https://www.howacarworks.com>
2. <https://swayam.gov.in>
3. <https://auto.howstuffworks.com>
4. <https://nptel.ac.in/courses/112106270>
5. <https://tinyurl.com/2ms7yzd4> for video link
6. <https://tinyurl.com/3zrfjwn8> for web link

Course Learning Outcomes (CLO):

1. Interpret various terminologies used in Automotive Mechanics.
2. Appreciate the importance of true rolling condition for steering to minimize side forces, vehicle vibrations and vibration isolation.
3. Evaluate the vehicle performance based on given situation.
4. Evaluate various parameters affecting Engine performance.

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	L	L	M	L							L	M	L	M	
CLO2	L		M	L	M				L				L		M	
CLO3	M	L	M	M	M								M	L	M	
CLO4		M	M	M	M		L		L				M	L	M	

H: High, M: Medium, L: Low