

25



GOVERNMENT POLYTECHNIC, NABARANGPUR
DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG.	Semester: 6TH	Name of the Teaching Faculty: Sri Deepak Ranjan Pattnaik
Subject: AUTOMOBILE ENGINEERING AND HYBRID VEHICLES (TH.2)	No. of days/per week class allotted: 04	Semester From date: 04.02.2025 To Date: 17.05.2025 No. of Weeks: 15
COURSE OUTCOMES	CO1: Understand automobile chassis, transmission, breaking and fuel system etc. CO2: Understand the concepts of Automobile Ignition and suspension systems. CO3: Understand the concepts of Cooling, Lubrication and Fuel systems. CO4: Understand the basics of electric vehicle kinematics, concepts of hybrid electric vehicles.	
Week	Class Day	Theory/Practical Topics
1 ST	1 ST	INTRODUCTION & TRANSMISSION SYSTEM Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram)
	2 ND	Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram) (Contd...)
	3 RD	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch.
	4 TH	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch (Contd...)
2 ND	1 ST	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box.
	2 ND	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box (Contd...)
	3 RD	Concept of automatic gear changing mechanisms.
	4 TH	Concept of automatic gear changing mechanisms (Contd...)
3 RD	1 ST	Propeller shaft: Constructional features.
	2 ND	Propeller shaft: Constructional features (Contd...)
	3 RD	Differential: Need, Types and Working principle.
	4 TH	Differential: Need, Types and Working principle (Contd...)
4 TH	1 ST	BRAKING SYSTEM Braking systems in automobiles: Need and types.
	2 ND	Mechanical Brake, Hydraulic Brake
	3 RD	Air Brake.
	4 TH	Air assisted Hydraulic Brake.
5 TH	1 ST	Vacuum Brake.
	2 ND	IGNITION & SUSPENSION SYSTEM Describe the Battery ignition and Magnet ignition system.
	3 RD	Describe the Battery ignition and Magnet ignition system (Contd...)
	4 TH	Spark plugs: Purpose, construction and specifications.
6 TH	1 ST	State the common ignition troubles and its remedies.
	2 ND	Description of the conventional suspension system for Rear and Front axle.

7 th	3 RD	Description of the conventional suspension system for Rear and Front axle (Contd...)
	4 TH	Description of independent suspension system used in cars (coil spring and tension bars)
	1 ST	Description of independent suspension system used in cars (coil spring and tension bars) (Contd...)
	2 ND	Constructional features and working of a telescopic shock absorber.
8 th	3 RD	Constructional features and working of a telescopic shock absorber (Contd...)
	4 TH	COOLING AND LUBRICATION Engine cooling: Need and classification.
	1 ST	Engine cooling: Need and classification (Contd...)
	2 ND	Describe defects of cooling and their remedial measures.
9 th	3 RD	Describe defects of cooling and their remedial measures (Contd...)
	4 TH	Describe the Function of lubrication.
	1 ST	Describe the Function of lubrication (Contd...)
	2 ND	Describe the lubrication System of I.C. engine.
10 th	3 RD	Describe the lubrication System of I.C. engine (Contd...)
	4 TH	FUEL SYSTEM Describe Air fuel ratio
	1 ST	Describe Carburetion process for Petrol Engine.
	2 ND	Describe Carburetion process for Petrol Engine (Contd...)
11 th	3 RD	Describe Multipoint fuel injection system for Petrol Engine.
	4 TH	Describe Multipoint fuel injection system for Petrol Engine (Contd...)
	1 ST	Describe the working principle of fuel injection system for multi cylinder Engine.
	2 ND	Describe the working principle of fuel injection system for multi cylinder Engine (Contd...)
12 th	3 RD	Filter for Diesel engine.
	4 TH	Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine.
	1 ST	Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine (Contd...)
	2 ND	ELECTRIC AND HYBRID VEHICLES Introduction, Social and Environmental importance of Hybrid and Electric Vehicles.
13 th	3 RD	Introduction, Social and Environmental importance of Hybrid and Electric Vehicles (Contd...)
	4 TH	Description of Electric Vehicles, operational advantages, presents performance and applications of Electric Vehicles.
	1 ST	Description of Electric Vehicles, operational advantages, presents performance and applications of Electric Vehicles (Contd...)
	2 ND	Description of Electric Vehicles, operational advantages, presents performance and applications of Electric Vehicles (Contd...)
14 th	3 RD	Battery for Electric Vehicles, Battery types and fuel cells.
	4 TH	Battery for Electric Vehicles, Battery types and fuel cells (Contd...)
	1 ST	Battery for Electric Vehicles, Battery types and fuel cells (Contd...)
	2 ND	Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations.
15 th	3 RD	Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations (Contd...)
	4 TH	Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations (Contd...)
	1 ST	Drive train.
	2 ND	Drive train (Contd...)
	3 RD	Solar powered vehicles.

LEARNING RESOURCES:

01. Automobile Engineering R.B.Gupta Satya Prakashan
02. Automobile Engineering Vol- I & II Dr Kirpal Singh Standard Publishers
03. Automobile Engineering C.P.Nakra Dhanpat Rai Publication
04. Automotive Engine W.H.Course McGraw Hill
05. Electric & Hybrid Vehicles – Design Fundamentals Iqbal Hussain CRC Press, 2
06. Statistical Electric & Hybrid Vehicles A.K. Babu Khanna Publishing House, New Delhi, 2018

Deepak R. Pattnaik
24.01.2025

Sign. Of Faculty Concerned

Academic Coordinator

H.O.D. /c

Principal, GP Nabarangpur