BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK
DEPARTMENT OF AUTOMOBILE ENGINEERING

LESSON PLAN

SUBJECT: ELECTRIC & HYBRID VEHICLE AND EMISSION CONTROL

FACULTY: KULADEEP MOHAPATRA

ACCADEMIC SESSION: 2022-23

SEMESTER: 6th

Sd/-
H O D (Automobile Engg.)

Sr. Lecturer
Automobile Engg. Dept.
BOSE, Cuttack

AUTOMOBILE ENGINEERING DEPATMENT

VISSION:

To develop competent, disciplined imaginative Automobile engineers, equipped with core competency and technical skills useful to the learning / teaching community and the industrial fraternity.

MISSION:

M1: To provide with operational and technical inputs to get innovative and research ideas in the field of automotive engineering.

M2: To give inputs for higher education with management qualities for the betterment of the society.

M3: Skilling with modern engineering tools necessary to meet and solve engineering problems.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: To provide technical skills to diagnose and apply the concept of automotive system

PEO2: To prepare to design, fabricate and innovate in automobile sector to face the industrial challenges.

PEO3: To inculcate with good communication skills, ethics and entrepreneurship skills to play the key role in automotive industry.

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DEPARTMENT OF CIVIL ENGINEERING
LESSON PLAN

Discipline:-**Automobile Engg.**	Semester :- **6th**	Name of the teaching faculty :- **KULADEEP MOHAPATRA**
Subject Name :- **ELECTRIC & HYBRID VEHICLE AND EMISSION CONTROL**	No. Of Days/Week Class Allotted :- **04 Periods/Week (Monday, Tuesday, Wednesday , Thursday – 1 Period Each)**	Semester from Date - **14/02/2023** To Date - **23/05/2023** **No. of Weeks: 15**
Week	**Class Day**	**Theory topics**
1st	14.02.2023	**Introduction of electric vehicle** **1. ELECTRIC VEHICLE** 1.1 Introduction 1.2 Need for electric vehicle
	15.02.2023	1.3 Problems of electric vehicles – (range and batteries, charging, lack of performance, purchaseprice, safety and reliability)
	16.02.2023	1.4 Advantage of electric vehicle 1.5 Disadvantage of electric vehicle
2nd	20.02.2023	1.6 Major component of electric vehicle – (motor, battery, charger, controller, DC converter,)
	21.02.2023	1.6 Energy management system
	22.02.2023	**CLASS TEST**
	23.02.2023	**2. CLASSIFICATION OF EVs** 2.1 Battery electric vehicle(BEV)
3rd	27.02.2023	2.2 Its advantage, disadvantage and application
	28.02.2023	2.3 Hybrid Electric Vehicle (HEV)
	01.03.2023	2.4 Its advantage, disadvantage and application
	02.03.2023	2.5 Plug-In Hybrid Electric vehicle(PHEV)
	06.03.2023	2.6 Its advantage, disadvantage and application

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4th	09.03.2023	2.7 Energy sources (battery, ultra capacitors, flywheels ,fuel cells) Requirements of EVs energy sources
5th	13.03.2023	2.8 Battery – requirement of EV batteries, selection of battery, deep cycle battery
	14.03.2023	2.9 Types of battery for EVS lead-acid battery and their advantages and disadvantages.
	15.03.2023	2.9 Working principle of Lithium-ion battery, its advantages and dis advantages.
	16.03.2023	2.10 Ultra capacitor and its working principle. 2.11 Flywheel and its advantage and disadvantage
6th	20.03.2023	**QUIZ TEST**
	21.03.2023	**3. ELECTRIC MOTOR**
	22.03.2023	3.1 Electric motor
	23.03.2023	3.2 Requirements of EV motor
7th	27.03.2023	3.3 Brushed DC motor
	28.03.2023	3.4 Brushless DC motor
	29.03.2023	3.5 Switched reluctance motor
8th	03.04.2023	3.6 AC induction motor
	04.04.2023	3.7 Indian electric vehicle (4 wheeler, 3 wheeler, 2 wheeler)
	05.04.2023	**CLASS TEST / INTERNAL**
	06.04.2023	**4. HYBRID VEHICLES** 4.1 Hybrid electric vehicle (HEV)
9th	10.04.2023	4.2 Advantage and disadvantage of HEV
	11.04.2023	4.3 Components of HEV
	12.04.2023	4.4 Working of hybrid vehicle
	13.04.2023	4.5 Hybridization (micro hybrid, mild hybrid, full hybrid)

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10th	17.04.2023	4.6 Fuel cell electric vehicle (FCEV) working principle.
	18.04.2023	4.6 advantages and disadvantages of FCEV
	19.04.2023	**CLASS TEST**
	20.04.2023	**5. VEHICLE EMISSION CONTROL TECHNOLOGIES** 5.1 Advanced Engine Design
11th	24.04.2023	5.2 Variable Valve Timing
	25.04.2023	5.3 Turbo charging Systems
	26.04.2023	5.4 Catalytic Converters.
	27.04.2023	5.5 The Two-Way Catalyst
12th	01.05.2023	5.6 The Three-Way Catalyst
	02.05.2023	5.7 Diesel Oxidation Catalyst (DOC)
	03.05.2023	5.8 Selective Catalytic Reduction (SCR)
	04.05.2023	5.9 Nitrogen–Oxide (NOx) Adsorber Catalyst
13th	08.05.2023	5.10 The Diesel Particulate Filter (DPF)
	09.05.2023	5.11 Exhaust Gas Recirculation (EGR)
	10.05.2023	5.12 Crankcase Emission Control System
	11.05.2023	**REVISION CLASS**
14th	15.05.2023	**MOCK TEST -1**
	16.05.2023	**REVISION AND QUESTION DISCUSSION**
	17.05.2023	**MOCK TEST -2**
	18.05.2023	**REVISION AND QUESTION DISCUSSION**
15th	22.05.2023	**MOCK TEST -3**
	23.05.2023	**REVISION AND QUESTION DISCUSSION**