MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT Park, OMR, Chennai - 603103

LESSON PLAN

Department of Mechanical Engineering

Name of the Subject	**Automobile Engineering**	**Name of the handling Faculty**	**S.Syed Abuthahir**
Subject Code	**ME8091**	**Year / Sem**	**III/VI**
Acad Year	**2020-2021**	**Batch**	**2018-2022**

Course Objective

- To understand the construction and working principle of various parts of an automobile.
- To have the practice for assembling and dismantling of engine parts and transmission system

Course Outcome

CO1 - Recognize the various parts of the automobile and their functions and materials

CO2 - Discuss the engine auxiliary systems and engine emission control.

CO3 - Distinguish the working of different types of transmission systems.

CO4 - Explain the Steering, Brakes and Suspension Systems.

CO5 - Predict possible alternate sources of energy for IC Engines.

Lesson Plan

Sl. No.	Topic(s)	T / R* Book	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
UNIT I - VEHICLE STRUCTURE AND ENGINES							
1	Types of automobiles vehicle construction and different layouts	**T1**	**1**	**PPT / BB**	**L2**	CO1	PO1,PO2, PO3,PSO1
2	Chassis and its Types	**R2**	**1**	**PPT / VIDEO**	**L2**	CO1	PO1,PO2, PO3,PSO1
3	Frame & Body of an Automobile	**T1**	**2**	**PPT / BB**	**L2**	CO1	PO1,PO2, PO3,PSO1
4	Vehicle aerodynamics (various resistances and moments involved)	**R2**	**1**	**PPT / BB**	**L4**	CO1	PO1,PO2, PO3,PSO1
5	IC Engines – Components of an IC Engine	**R2**	**1**	**NPTEL**	**L2**	CO1	PO1,PO2, PO3,PSO1
6	Functions of IC Engines and its functions	**T1**	**1**	**PPT / BB**	**L2**	CO1	PO1,PO2, PO3,PSO1
7	Materials of IC Engines	**R2**	**1**	**PPT / BB**	**L2**	CO1	PO1,PO2, PO3,PSO1
8	Variable Valve Timing (VVT)	**R2**	**1**	**PPT / BB**	**L3**	CO1	PO1,PO2, PO3,PSO1

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

Evaluation method : Assignment and Tutorial

UNIT II - ENGINE AUXILIARY SYSTEMS							
9	Electronically controlled gasoline injection system for SI engines	**T1**	1	**PPT / BB**	**L2**	CO2	PO1,PO2, PO3,PSO1
10	Electronically controlled diesel injection system -Unit injector system, Rotary	**T1**	2	**PPT / BB**	**L2**	CO2	PO1,PO2, PO3,PSO1
11	Electronically controlled diesel injection system - CRDI system	**T1**	1	**PPT / VIDEO**	**L2**	CO2	PO1,PO2, PO3,PSO1
12	Electronic ignition system - Transistorized coil ignition system	**R1**	1	**PPT / VIDEO**	**L2**	CO2	PO1,PO2, PO3,PSO1
13	Electronic ignition system - Discharge ignition system	**T1**	1	**PPT / VIDEO**	**L2**	CO2	PO1,PO2, PO3,PSO1
14	Turbo chargers (WGT, VGT)	**T1**	1	**PPT / VIDEO**	**L2**	CO2	PO1,PO2, PO3,PSO1
15	Engine emission control by three way catalytic converter system	**T1**	1	**PPT / VIDEO**	**L2**	CO2	PO1,PO2, PO3,PSO1
16	Emission norms (Euro and BS)	**R2**	1	**NPTEL**	**L2**	CO2	PO1,PO2, PO3,PSO1
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
Evaluation method : Assignment and Tutorial							
UNIT III - TRANSMISSION SYSTEMS							
17	Clutch - Types and Construction	R1	2	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
18	Gearboxes- Manual & Automatic	R1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
19	Gear Shift Mechanisms	T1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
20	Over drive and Transfer box	T1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
21	Fluid Flywheel and Torque Converter	T1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
22	Propeller shaft, Slip joints and Universal joints	R1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
23	Differential and Rear Axle	R1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
24	Hotchkiss Drive and Torque Tube Drive	R1	1	**PPT / BB**	**L2**	CO3	PO1,PO2, PO3,PSO1
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
Evaluation method : Assignment and Tutorial							
UNIT IV - STEERING, BRAKES AND SUSPENSION SYSTEMS							
25	Steering Geometry	**T1**	**1**	**NPTEL**	**L2**	CO4	PO1,PO2, PO3,PSO1
26	Types Of Steering Gear Box	**T1**	**2**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1
27	Power Steering	**T1**	**1**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1
28	Types Of Front Axle	**T1**	**1**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1
29	Types Of Suspension Systems	**R1**	**1**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1
30	Pneumatic And Hydraulic Braking Systems	**R1**	**1**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1
31	Antilock Braking System (ABS)	**R1**	**1**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1

32	Electronic Brake Force Distribution (EBD) And Traction Control	**R1**	**1**	**PPT / BB**	**L2**	CO4	PO1,PO2, PO3,PSO1
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
Evaluation method : Assignment and Tutorial							
UNIT V - ALTERNATIVE ENERGY SOURCES							
33	Use Of Natural Gas, Liquefied Petroleum Gas, Bio-Diesel in Automobile	**T1**	**2**	**PPT / BB**	**L2**	CO5	PO1,PO2, PO3,PSO1
34	Use Of Bio-Ethanol, Gasohol And Hydrogen In Automobiles	**T1**	**1**	**PPT / BB**	**L2**	CO5	PO1,PO2, PO3,PSO1
35	Engine Modifications Required	**T1**	**1**	**PPT / BB**	**L2**	CO5	PO1,PO2, PO3,PSO1
36	Performance, Combustion And Emission Characteristics Of SI Engine With These Alternate Fuels	**T1**	**1**	**PPT / BB**	**L2**	CO5	PO1,PO2, PO3,PSO1
37	Performance, Combustion And Emission Characteristics Of CI Engine With These Alternate Fuels	**T1**	**2**	**PPT / BB**	**L2**	CO5	PO1,PO2, PO3,PSO1
38	Electric And Hybrid Vehicles	**T1**	**1**	**NPTEL**	**L2**	CO5	PO1,PO2, PO3,PSO1
39	Fuel Cell	**T1**	**1**	**PPT / BB**	**L2**	CO5	PO1,PO2, PO3,PSO1
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any **Practical Training In Dismantling And Assembling Of Engine Parts And Transmission Systems at CTI Training Institute, Guindy**							
Evaluation method : Assignment and Tutorial							
Content Beyond the Syllabus Planned							
1	Dismantling and Assembly of IC Engine at CTI Training Institute, Guindy						
2	Electrical Vehicle						
Text Books							
1	Jain K.K. and Asthana .R.B, “Automobile Engineering” Tata McGraw Hill Publishers, New Delhi, 2002.						
2	Kirpal Singh, “Automobile Engineering”, Vol 1 & 2, Seventh Edition, Standard Publishers, New Delhi, 13th Edition 2014.						
Reference Books							
1	Ganesan V. “Internal Combustion Engines”, Third Edition, Tata McGraw-Hill, 2012.						
2	Heinz Heisler, “Advanced Engine Technology,” SAE International Publications USA, 1998.						
3	Joseph Heitner, “Automotive Mechanics,” Second Edition, East-West Press, 1999.						
4	Martin W, Stockel and Martin T Stockle , “Automotive Mechanics Fundamentals,” The Good heart - Will Cox Company Inc, USA						
5	Newton ,Steeds and Garet, “Motor Vehicles”, Butterworth Publishers,1989.						
Website / URL References							
1	https://nptel.ac.in/courses/112/103/112103262/						
2	https://nptel.ac.in/content/storage2/courses/112104033/pdf_lecture/lecture2.pdf						
3	https://www.youtube.com/watch?v=FeXZq_w9mZo						
4	https://nptel.ac.in/courses/108/103/108103009/						
Blooms Level							
Level 1 (L1) : Remembering		Lower	Fixed	**Level 4 (L4) : Analysing**		Higher	Projects /

Level 2 (L2) : Understanding			Orde r Thin	Hou r Exa	**Level 5 (L5) : Evaluating**							Order Thinking	Mini Projects
Level 3 (L3) : Applying					**Level 6 (L6) : Creating**								
Mapping syllabus with Bloom's Taxonomy LOT and HOT													
Unit No	**Unit Name**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	LOT	HOT	**Total**			
Unit 1	VEHICLE STRUCTURE AND ENGINES	0	6	1	1	0	0	7	1	8			
Unit 2	ENGINE AUXILIARY SYSTEMS	0	8	0	0	0	0	8	0	8			
Unit 3	TRANSMISSION SYSTEMS	0	8	0	0	0	0	8	0	8			
Unit 4	STEERING, BRAKES AND SUSPENSIC	0	0	0	0	0	0	0	0	0			
Unit 5	ALTERNATIVE ENERGY SOURCES	0	0	0	0	0	0	0	0	0			
Total		0	22	1	1	0	0	23	1	24			
Total Percentage		**0.00**	**###**	**4.17**	**4.17**	**0.00**	**0.00**	**95.83**	**4.17**	**100.00**			

CO PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO 7**	**PO8**	**PO9**	**PO10**	**PO1 1**	**PO12**	**PSO1**	**PSO2**
CO1	**3**	**2**	**1**										**1**	
CO2	**3**	**1**	**1**										**1**	
CO3	**3**	**2**	**1**										**1**	
CO4	**3**	**2**	**1**										**1**	
CO5	**2**	**2**	**1**										**1**	
CO6														
Avg														

Justification for CO-PO mapping

CO1	PO1:Applying of engineering concept is more predominent, PO2: Applying the analyze the problems considered moderately, PO3: A very small impact is given to the problems. PSO1: Concepts helps in life long learning
CO2	PO1:Applying of engineering concept is more predominent, PO2: Applying the analyze the problems considered moderately, PO3: A very small impact is given to the problems. PSO1: Concepts helps in life long learning
CO3	PO1:Applying of engineering concept is more predominent, PO2: Applying the analyze the problems considered moderately, PO3: A very small impact is given to the problems. PSO1: Concepts helps in life long learning
CO4	PO1:Applying of engineering concept is more predominent, PO2: Applying the analyze the problems considered moderately, PO3: A very small impact is given to the problems. PSO1: Concepts helps in life long learning
CO5	PO1:Applying of engineering concept is more predominent, PO2: Applying the analyze the problems considered moderately, PO3: A very small impact is given to the problems. PSO1: Concepts helps in life long learning

3	**High level**	**2**	**Moderate level**	**1**	Low level

Name & Sign of Faculty Incharge :

Name & Sign of Subject Expert :

Head of the Department :

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