MME: Automobile Engineering

Programme: B. Tech. (ME) Year: 2020-21 Semester: V sem., Odd
Course: Program Elective Credits: 3 Hours: 40 (L)

Course Context and Overview (100 words):

Automobile engineering is playing very important role in transport and allied sectors contributing in the progress of the country. The major objective of the course is to provide the students with basic and applied knowledge of the automobile systems and components. This will help the students to develop the skills in understanding the basic principles, mechanisms, design concepts and real life applications of different automotive systems and components. The competition among the automobile manufactures has resulted in many innovations that are being adopted and they are included. The further detailed objectives are as following:

1. To understand the basic types of automotive vehicles with overview of their components
2. To understand basic prime movers including engines, and motor drives
3. To study and analyze automotive chassis.
4. To study and analyze automotive drive trains.
5. To explain working of various sub-systems of the automotive vehicle e.g. Ignition system, lighting, safety systems etc.
6. To study and demonstrate the heating, ventilation and air-conditioning systems of the automotive vehicle

Prerequisite Courses: Nil

(Course name and course code)

Course outcomes (COs):

On completion of this course, the students will have the ability to:	
CO1 Identify and distinguish different types of the automobile vehicles with study of their major components/parts	Unit 1
CO2 Assemble and disassemble different types of automotive engines	Unit 2

CO3 Demonstrate and analyze various chassis systems e.g. suspension system, steering system etc.	Unit 3
CO4 Demonstrate and analyze various automotive drive systems e.g. clutches, transmission system etc.	Unit 5
CO5 Demonstrate and analyze various automotive sub-systems e.g. ignition system, lighting system etc.	Unit 4
CO6 Describe and demonstrate Heating, ventilation and air-conditioning (HVAC) system of automobile	Unit 6

Course Topics:

Topics	Lecture Hours		Student development
1. Introduction to automobile engineering			Employability
1.1 Definition and History	1	4	
1.2 Types and classification of an Automobile vehicle e.g. Engine/electric/hybrid, two wheeler and four wheeler.	2		
1.3 Basic Components and structure of automobile vehicle.	1		
UNIT - II **2. Introduction to prime movers for automotive vehicles:**		3	Employability
2.1 Two and four stroke engines, SI and CI engines	2		
2.2 Prime movers for Hybrid vehicles	1		
UNIT-III **Automotive Chassis:**		7	Employability
2.1 Types Of Body and Frame	1		
2.2 Suspension System	2		
2.3 Steering system, Steering Geometry	2		

2.4 Brakes, Antilock Braking System	1		
2.5 Tires and Wheels	1		
UNIT – IV **3. Automobile Systems and Components:**		6	Skill development
3.1 Security systems e.g. Air Bag	2		
3.2 Turbocharger system	1		
3.3 Sensors and Actuators used in Modern Vehicles	1		
3.4 Electrical and Electronics Systems – Battery, Starting and Charging System, Battery and Electronics Ignition systems, Lighting	2		
UNIT-V **4. Automotive Drive Trains**		7	Employability
4.1 Clutches – Operation and Service	2		
4.2 Manual Transmission type of Gear Boxes	2		
4.3 Drive shaft, Universal Joint, Differentials and Drive axles.	1		
4.4 Automated Manual Transmission System, Torque Converter	2		
UNIT-VI **5. Automotive HVAC**		3	Skill development
5.1 Ventilation and Heating	2		
5.2 Air conditioning	1		

Textbook references (IEEE format):

Text Book:

1. Crouse W. H, and Anglin D. L. *Automotive Mechanics*, McGraw Hill, Tenth Edition
2. Singh Kripal, *Automobile Engineering*, Standard Publisher, Vol. 1
3. Gupta S. K., *A text book of Automobile Engineering*, S Chand and Company Limited

Reference books:

1. Singh Kripal, *Automobile Engineering*, Standard Publisher, Vol. 2
2. Heywood John B, *Internal combustion Engines Fundamentals*, McGraw Hill, Latest Edition.
3. Kohli, P. L., *Automotive Electrical Equipment's*, McGraw Hill, Latest Edition

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):

Evaluation Methods:

Item	Weightage
Assignment(s)	25
Quiz(s)	20
Mid term	25
End term Examination	30

Prepared By:

Dr. Kamal Kishore Khatri

Last Update: 05-08-2020