



National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology in Mechanical Engineering	Year of Regulation	2018
Department	Mechanical Engineering	Semester	VIII

Course Code	Course Name	Credit Structure					Marks Distribution			
		L	T	P	C	INT	MID	END	Total	
ME 420	AUTOMOBILE ENGINEERING	3	0	0	3	50	50	100	200	
Course Objectives	To understand the detailed construction and working principle of different parts of an automobile.	Course Outcomes	CO1	Able to identify the various parts of the automobile and their functions and materials.						
	To have the practice for assembling and dismantling of different parts of an automobile including engine and transmission system.		CO2	Able to describe the engine auxiliary systems and engine emission control.						
	To find out alternate sources of energy and reduce vehicular pollution.		CO3	Able to understand and distinguish the working of different types of transmission systems.						
			CO4	Able to explain the Steering, Brakes and Suspension Systems.						
			CO5	Able to predict possible alternate sources of energy for IC Engines and reduce vehicular pollution.						

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0
2	CO2	3	2	0	0	0	0	0	0	0	0	0	2	2	0	0
3	CO3	3	2	0	0	0	0	0	0	0	0	0	2	2	0	0
4	CO4	3	2	0	0	0	0	0	0	0	0	0	2	2	0	0
5	CO5	3	2	0	0	0	2	3	0	0	0	0	2	2	0	0

SYLLABUS

No.	Content	Hours	COs
I	Automotive Structure and Engines Types of automobiles vehicle construction and different layouts, chassis, frame and body, Vehicle aerodynamics (various resistances and moments involved), IC engines –components–functions and materials, variable valve timing (VVT).	06	CO1
II	Auxiliary Systems of SI & CI Engine Electronically controlled gasoline injection system for SI engines, Electronically controlled diesel injection system (Unit injector system, Rotary distributor type and common rail direct injection system), Electronic ignition system (Transistorized coil ignition system, capacitive discharge ignition system), Turbo chargers (WGT, VGT), Engine emission control by three way catalytic converter system, Emission norms (Euro and BS).	08	CO2
III	Transmission Systems Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints, Differential and rear axle, Hotchkiss Drive and Torque Tube Drive.	08	CO3
IV	Steering, Brakes and Suspension Systems Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Types of Suspension Systems, Pneumatic and Hydraulic Braking Systems, Antilock Braking System (ABS), electronic brake force distribution (EBD) and Traction Control.	07	CO4
V	Alternative Energy Sources & Vehicular Emission Use of Natural Gas, Liquefied Petroleum Gas, Bio-diesel, Bio-ethanol, Gasohol and Hydrogen in Automobiles- Engine modifications required –Performance, Combustion and Emission Characteristics of SI and CI engines with these alternate fuels - Electric and Hybrid Vehicles, Fuel Cell.	07	CO5
Total Hours		36	

Essential Readings

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. .

Supplementary Readings

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 ,1978.