



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	V

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
ME 311	I.C. Engine	3	0	0	3	50	50	100	200
Course Objectives	The fundamental of internal combustion engine in general.	Course Outcomes	CO1	Recognize the types, constructions, terminologies and cycles associated with IC engines and solve related problems. (Applying)					
	The fuel and combustion in SI and CI Engine.		CO2	Identify the types of fuels, methods of fuel supply in SI and CI engines and solve related problems (Applying)					
	The cooling and lubrication in the engine.		CO3	Apprehend associated combustion in SI and CI engine and solve related problems. (Applying)					
	The measurement and control of emission.		CO4	Categorize different types of cooling and lubrication systems. (Applying)					
			CO5	Perform measurement and testing of engine performances and emissions. (Analysing)					

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

SYLLABUS

No.	Content	Hours	COs
I	Introduction of Engines: Engines & Their Type, Thermodynamic Principles, Classifications & Construction of IC Engines, Terminologies, Fuel Air Cycles, Actual Cycles.	06	CO1
II	Fuels: Types, SI Engine Fuels & Their Rating, CI Engine Fuels & Their Rating, Alternating Fuels and Types.	04	CO2
III	Carburettors: Carburetion, Simple Carburettor, Modern carburettors, Petrol Injection, Calculation of Air Fuel Ratio.	04	CO2
IV	Fuel Injection & Mixing: Air & Solid Injection, Injection Pumps, Types of Nozzles, Injection Timing, Mechanical and Pneumatic Governor, Spray, Swirl, Squish and Tumble.	04	CO2
V	Combustion in S.I. Engines: Stages of Combustion, Factors Influencing the Flame Speed, Rate of Pressure Rise, Rate of Heat Release, Knocking, Combustion Chamber Design.	03	CO3
VI	Combustion in C.I. Engines: Stages, Ignition Delay, Influencing Factors, Diesel Knock, Comparison of Knocking in SI and CI Engine, Combustion Chamber Design.	03	CO3
VII	Cooling & Lubrication System: Types of Losses, Temperature Distribution Inside Cylinder, Air and Liquid Cooling and Types, Rating of Lubricants, Wet and Dry Sump Lubrication Systems.	05	CO4
VIII	Measurement & Testing: Frictional Power, Indicated Power, Brake Power, Measurement of Fuel and Air Supply, Heat Balance, Performance Maps.	04	CO5
IX	Engine Emission and Control: Air Pollution due to IC Engines, Euro I-VI Norms, HC, CO and NO _x Emission and Control, Catalytic Converter.	03	CO5
Total Hours		36	

Essential Readings

1. V. Ganesan, "Internal Combustion Engines", Tata McGraw Hill, 4th Edition, 2012.
2. J.B. Heywood, "Internal Combustion Engine Fundamentals", McGraw Hill, 1st Edition, 2011.

Supplementary Readings

1. R. Stone, "Internal Combustion Engines", The Macmillan Press Limited, 4th Edition, 2012.
2. C.R. Ferguson and A.T. Kirkpatrick, "Internal Combustion Engines", John Wiley & Sons, 3rd Edition, 2015.
3. V. Sajithand S. Thomas, "Internal Combustion Engines", Oxford University Press, 1st Edition, 2017.