

22MEHO104	ALTERNATE FUELS FOR IC ENGINES									
		CATEGORY	L	T	P	C				
		PE	3	0	0	3				
COURSE OBJECTIVES										
1	To expose potential alternate fuels and their characteristics									
2	To use appropriate synthetic fuels and fuel additives for better combustion characteristics									
3	To utilize alcohol fuels effectively for low emissions									
4	To elaborate on the utilization of Bio-Diesel and its types as a suitable fuel in CI engines									
5	To utilize different gaseous fuels and predict their performance and combustion characteristics									
UNIT I			INTRODUCTION				9	0	0	9
Availability, Need, Suitability, Properties, Merits and Demerits of Potential Alternative Fuels – Alcohols, Bio- Diesel, Hydrogen, Liquefied Petroleum Gas, Natural Gas, Biogas, Fuel standards Fuel standards – ASTM & EN										
UNIT II			SPECIAL AND SYNTHETIC FUELS				9	0	0	9
Different synthetic fuels, Merits and demerits, Dual, Bi-fuel and Pilot injected fuel systems, Fuel additives – types and their effect on performance and emission characteristics of engines, Ethers – as fuel and fuel additives, properties and characteristics										
UNIT III			ALCOHOL FUELS				9	0	0	9
Alcohols – Properties, Production methods and usage in engines. Performance, combustion and emission Characteristics in engines. Issues & limitation in alcohols										
UNIT IV			BIO-DIESEL FUELS				9	0	0	9
Vegetable oils and their important properties. Fuel properties characterization. Methods of using vegetable oils – Blending, preheating, Transesterification and emulsification – Performance, combustion and emission Characteristics in diesel engines										
UNIT V			GASEOUS FUELS				9	0	0	9
Biogas, Natural gas, LPG, Hydrogen – Properties, problems, storage and safety aspects. Methods of utilization in engines. Issues & limitation in Gaseous fuels										
TOTAL(45L) : 45 PERIODS										
REFERENCE BOOKS:										
1	Keith Owen and trevorooley, Automotive Fuels Handbook, saepublications, 1990									
2	Pundir B.P, I.C. Engines Combustion and Emission, 2010, narosapublishinghouse									
3	Pundir B.P, Engine Combustion and Emission, 2011, narosapublishinghousekeith									
4	Richardl. Bechtold, Automotive Fuels guidebook, saepublications, 1997									

COURSE OUTCOMES:		Bloom Taxonomy Mapped
Upon completion of this course, the students will be able to:		
CO1	Analyze potential alternate fuels and their characteristics	Analyze
CO2	Use appropriate synthetic fuels and fuel additives for better combustion characteristics	Understand
CO3	Describe the properties of alcohol fuel and estimate the performance of alcohol fuels and its emissions	Understand
CO4	Explain the properties and combustion and emission characteristics of bio-diesel	Understand
CO5	Explain different gaseous fuels and predict their performance and combustion characteristics	Understand

COURSE ARTICULATION MATRIX

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	0	1	1	1	0	0	0	0	0	0	3	2	1
CO2	3	2	1	1	0	1	0	0	0	0	1	0	2	2	1
CO3	2	3	2	1	1	0	1	0	0	1	0	0	2	2	1
CO4	2	1	1	1	1	1	1	0	1	0	2	0	0	2	0
CO5	1	0	0	0	0	2	0	0	0	2	1	0	0	0	0
Avg	2.2	1.8	0.8	0.8	0.6	1	0.4	0.0	0.2	0.6	0.8	0.0	1.4	1.6	0.6
3/2/1 – indicates strength of correlation (3 – high, 2- medium, 1- low)															