

Year & Sem:	Course Code: ME4508	Course Name: Fuels & Combustion	No. of Credits: 4	L	T&PS	P
				2	2	0

INTRODUCTION: History of Fuels History of solid fuel, History of liquid fuels and gaseous fuels, Production, present scenario and consumption, Fundamental definitions, properties and various measurements, Definitions and properties of solid fuels, Definitions and properties of liquid and gaseous fuels, Various measurement techniques. SOLID FOSSIL FUEL (COAL): Coal classification, composition and basis, Coal mining, Coal preparation and washing, Combustion of coal and coke making, Action of heat on different coal samples, Different types of coal combustion techniques, Coal tar distillation, Coal liquefaction, Direct liquefaction, Indirect liquefaction, Coal gasification. LIQUID FOSSIL FUEL (PETROLEUM): Exploration of crude petroleum, Evaluation of crude, Distillation, Atmospheric distillation, Vacuum distillation, Secondary processing, Cracking, Thermal cracking, Visbreaking, Coking, Catalytic cracking, Reforming of naphtha, Hydrotreatment, dewaxing, deasphalting, Refinery equipments. GASEOUS FUELS: Natural gas and LPG, Producer gas, Water gas, Hydrogen, Acetylene, Other fuel gases. COMBUSTION TECHNOLOGY: Fundamentals of thermochemistry, Combustion air calculation, Calculation of calorific value of fuels, Adiabatic flame temperature calculation, Mechanism and kinetics of combustion, Flame properties, Combustion burners, Combustion furnaces, Internal combustion engines.

References/Text Books:

1. Modern Petroleum Technology, Vol 1, Upstream, Ed. by Richard A. Dave, IP, 6th ed., John Wiley & Sons. Ltd.
2. Modern Petroleum Technology, Vol 2, Downstream, Ed. by Alan G. Lucas, IP, 6th ed., John Wiley & Sons. Ltd.
3. Combustion, Irvin Glassman, 2nd ed., Academic Press.
4. Modern Petroleum Refining Processes, B.K. Bhaskar Rao, 4th ed., Oxford & IBH Publishing Co. Pvt. Ltd.
5. Report on the project "Coal Combustion Study", sponsored by Tata Iron and Steel Company Ltd., Jamshedpur.
6. Fuels Combustion and Furnaces, John Griswold, Mc-Graw Hill Book Company Inc.
7. Fuels and Combustion, Samir Sarkar, 3rd. ed Universities Press.
8. Petroleum Refinery Engineering, W.L. Nelson, 4th ed. Mc-Graw Hill Book Company.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.

Video Lectures (Web Links):

- 1.
- 2.