

Discipline: Metallurgical Engineering		Semester: 3rd semester	Name of the Teaching Faculty: Ms. Sitanjali Khuntia
Subject: Fuels and Refractories Sub code: Th-03		No of days /week class allotted: 04	Semester from Date: 05-10-2021 to <u>28-01-2022</u>
Month	week	Class Day	Theory topics
Oct	2 nd	1 st	Definition of fuel, different types of fuel
	4 th	1 st	Classification of the fuel
		2 nd	Importance of solid, liquid & gaseous fuels
	5 th	1 st	Different Fuel Source in India
		2 nd	Explain the origin of coal
		3 rd	State the composition of coal
		4 th	Discuss the characteristics & significance of constituents.
Nov	1 st	1 st	Distinguish between proximate & ultimate analysis of coal and calculations
		2 nd	Define the calorific value of coal
		3 rd	Describe coking properties & swelling index of coal
	2 nd	1 st	Discuss the criteria of selection of metallurgical coal
		2 nd	Discuss the scope objective of carbonization of coal
		3 rd	Explain the carbonization of coal
		4 th	Differentiate between HTC & LTC
	3 rd	1 st	State the merits & demerits of LTC & LTC.
		2 nd	Discuss the different tests carried out of coke (Shatter & Micum index)
		3 rd	Liquid Fuel classification and types of liquid fuel
		4 th	Explain origin & constitution of petroleum
	4 th	1 st	Discuss the properties of petroleum products
		2 nd	Discuss the distillation process of crude petroleum: refining of petroleum
		3 rd	Explain the production of coal tar
		4 th	Explain the production & uses of coal tar
	5 th	1 st	Defining different properties of petroleum products; specific gravity of liquid fuels, viscosity
	Dec	1 st	1 st
2 nd			Definition and explanation of octane number of gasoline & cetane number of diesel.
3 rd			Some other properties like vapor pressure, freezing point, smoke point, char value, diesel index etc.
2 nd		1 st	Explain the production of coal tar, differentiate between low temperature tar and high temperature tar and uses of different grade of coal tar fuels
		2 nd	Explanation of production & utilization of different gaseous fuels
		3 rd	Classification of different gaseous fuel and origin of different fuels
		4 th	Production and utilization of Methane from coal bed mines, characteristics and uses
3 rd		1 st	Wood gas, sewage gas, gobar gas, Water gas production and utilization
		2 nd	Production and uses of Carbureted water gas
		3 rd	Coke oven gas, steel plant fuels production and utilization

		4 th	Blast furnace gas and LD converter gas production and utilization
	4 th	1 st	Natural gas, liquified petroleum gas (LPG) and refinery gases in details
		2 nd	Production and utilization of producer gas
		3 rd	Explanation of Mixed gas
		4 th	Discussion of the elementary principle of combustion
	5 th	1 st	Detail explanation of Hess's law of heat summation
		2 nd	Explanations of Kirchoff's Law
		3 rd	Some important factors to remember for numerical calculations of combustion reactions
		4 th	Work out simple combustion Reactions on solid fuels related
Jan	2 nd	1 st	Work out simple combustion Reactions on gaseous fuel related
		2 nd	Some other simple numerical on combustion Reactions
		3 rd	Work out simple combustion Reactions for practice
		4 th	Refractories: introduction and definition
	3 rd	1 st	Classification of different refractories
		2 nd	Detail Explanation of the desirable properties of refractories
		3 rd	Method of manufacture of refractories and selection of refractories
		4 th	Discuss raw materials and properties of silica, fireclay brick, magnesia
	4 th	1 st	Discuss raw materials and the properties of dolomite, chrome magnesite, graphite and magnesia carbon bricks
		2 nd	Discuss about High alumina bricks, SiC, Zirconia bricks, mullite
		3 rd	Explains the reasons behind failures of refractories and uses of refractories
		4 th	Criteria for selection & types of refractories selected for blast furnace, LD, open hearth, arc furnace, ladle, soaking pit, coke oven reheating furnace, copper smelting flash & reverberatory furnaces.
	5 th	1 st	Quiz Test