UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING,
ROURKELA
Session: **2024-25**

Discipline: Metallurgical Engineering	Semester: 3rd	Name of the Teaching Faculty: Smt. PARASMITA BISWAL	
Subject: Fuels & Refractories-(TH-03)	No. of days/per week class allotted:4	Semester from Date: 01. 07. 2024 to Date: 08.11.2024 No. of weeks: 17	
Week	**Class Day**	**Module**	**Lecture Topics**
1	1	Chapter-01: Fuels	Definition of the Fuel.
	2		Classification and types of fuel.
	3		Discussion about importance of Solid, Liquid and Gaseous fuels
	4		-do-
2	5		Discussion on different fuels and its resources of india
	6	Chapter-02: 2.1 :Solid Fuels	Explaining the origin of coal
	7		Definition and the composition of coal
	8		Discussion on characteristics and significance of constituents
3	9		-do-
	10		Discussion on coking properties and swelling index of coal
	11		Class test -01 doubt clearing class
	12		Discussion on the scope and objectives of carbonization of coal
4	13		-do-
	14		Differentiate between high temperature carbonization and low temperature carbonization
	15		State the merits and demerits of H.T.C and L.T.C
5	16		-do-
	17		Doubt clearing class
	18	Chapter-03: Liquid Fuels	Discuss different tests carried out for coke(Shatter and Micum index)
	19		Explain origin and constitution of petroleum
6	20		Discussion on the properties of petroleum products
	21		-do-
	22		Discussion on the distillation process of crude petroleum-01
7	23		Discussion on the distillation process of crude petroleum-02
	24		Production and uses of coal tar in details.
	25		-do-
	26		Production and uses of coal tar in details.

8	27		Doubt clearing Class
	28	Chapter-04: Gaseous Fuels	Explain the production and utilization of following gaseous fuels: Methane, water gas, producer gas
	29		Explain the production and utilization of following gaseous fuels: carbureted water gas, coke oven gas
	30		Explain the production and utilization of following gaseous fuels: blastfurnace gas, natural gas, mixed gas.
9	31	Chapter-05: Combustion	Discuss the elementary principle of combustion, Hess's law of constant heat summation, Kirchoff's law.
	32		Work out simple combustion calculation.
	33		-do-
	34	Chapter-6 : Refractories	Define and Classify Refractories
10	35		Explain the desirable properties of Refractories in details
	36		-do-
	37		Discuss the raw – materials, methods of manufacturing and properties of silica, fire clay, magnesia
	38		Discuss the raw – dolomite, chrome magnesite
11	39		Discuss the raw – graphite and magnesia carbon bricks.
	40		Discuss the raw – materials, methods of manufacturing and properties of silica, fire clay, magnesia
	41	Chapter-6.1 & 6.2 : Special Refractories	Discuss about the special refractories like high alumina
	42		Discuss about the special refractories like mullite, SIC, Zirconia
12	43		-do-
	44		Criteria for selection and types of refractories selected for reheating furnaces
	45		Criteria for selection and types of refractories selected for blast furnace, L.D., open hearth
	46		Criteria for selection and types of refractories selected for arc furnace, ladle, soaking pit, coke oven
13	47		Discussion on the criteria of selection of metallurgical coal.
	48	Chapter-3.1 Testing of liquid fuels	Define specific gravity, viscosity, flash point, cloud point
	49		Define pour point, aniline point, octane number and cetane number
	50		Discuss the methods of testing of following properties: Specific gravity

14	51		-do-
	52		Important question discussion
	53		Practicing combustion calculation
	54		Revision about chapter -05 and 06
15	55		Important question discussion
16	56		Important question discussion
	57		Practicing combustion calculation
17	60		Important question discussion
	63		Important question discussion