UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA Session: 2022-23			
Discipline: **Metallurgical Engineering**	Semester: **3rd**	Name of the Teaching Faculty: **Goutam Kumar Majhi**	
Subject: **Ferrous Metallurgy-I (TH-04)**	No. of days/per week class allotted:**4**	Semester from Date: **15. 09. 2022** to Date: **21.01.2023** No. of weeks: 15	
Week	**Class Day**	**Module**	**Lecture Topics**
1	1	Chapter -1: Raw Materials for Iron Making	Introduction about iron making and blast furnace
	2		Raw materials for iron making and their function
	3		Various minerals available in India
	4	Chapter -2: Quality requirements of raw materials	Types of iron ores, composition and characteristics
2	5		Various parameters to evaluate iron ore
	6		Metallurgical coal, difference between coal and coke
	7		Properties of coke required to be used in blast furnace
	8		Various types of flux
3	9		Basicity of slag
	10		Evaluation of flux
	11	Chapter-3: Burden Preparation	Required physical and chemical properties of b/f burden
	12		-do-
4	13		Agglomeration and its type
	14		Working principle of Sintering machine
	15		Mechanism and advantages of sintering
	16		Pelletising, steps involved in pelletisation
5	17		Mechanism and operation of pelletising process
	18	Chapter-4: Blast Furnace Fuel	Function of coke in blast furnace
	19		Quality requirement of coke for b/f use

	20		Preparation of coke in coke oven
6	21		Different types of coke oven
	22		Auxiliary fuels for blast furnace
	23		Various factors affecting fuel consumption in blast furnace
	24		Tutorial Class
7	25	Chapter-5: Blast furnace Operation	Blowing in process in b/f
	26		Blowing out, banking and Tapping
	27		Fanning and Back draughting
	28		Disposal of slags , Slags granulation & their utilization
8	29	Chapter-6: Blast furnace Accessories	Refractory lining in various part of blast furnace
	30		Cooling arrangements in b/f
	31		Cast house, drilling and mudgun machine
	32		Tuyere arrangements and RMHS
9	33		Charging system in b/f
	34		Blower, boiler and pumps
	35		Design and operation of stove
	36		Gas Cleaning system
10	37	Chapter-7: Blast Furnace irregularities and Remedies	Hanging and scaffolding
	38		Slip and Chilled herth
	39		Pillaring and Herth breakout
	40		Choking of gas line and Flooding and coke ejection through tap hole
11	41		Leaking tuyeres tap holes and coolers And Channelling
	42	Chapter-8: Chemistry of Blast Furnace operation	Blast furnace Profile
	43		-do-
	44		Direct and indirect reaction
12	45		Reduction reactions of iron oxide
	46		C-CO-CO_2 reaction
	47		Reaction in different parts of blast furnace
	48		-do-
13	49		Various zones exist in blast furnace
	50		Slag metal reactions

	51	Chapter- 9: Modern Development of Blast furnace operation	Bell less charging system its advantages
	52		HTP operation
14	53		Humidification and oxygen enrichment
	54		External de-siliconisation and desulphurisation
	55		Revision Class for Chapter 1,2 &3
	56		Revision Class for Chapter 4,5&6
15	57		Revision Class for Chapter 7,8&9
	58		Class test
	59		Important question discussion
	60		Important question discussion

Learning Resources:

Sl.No	Title of the Book	Name of Authors	Name of Publisher
1.	Iron & Steel	Basforth Vol- I	Chapman & Hall
2.	Iron making	Tupkaray R.H.	Khanna Publication
3.	Iron & Steel Making	A.K.Biswal	SBA Publication
4.	An Introduction to physical chemistry of iron & steel making	Ward-Hodder	Stoughton in education
5.	Blast Furnace Iron Making	A.K.Biswas	SBA Publisher.