## **Lesson Plan For**

## Principles of Extractive Metallurgy (2023-24)

## **Department of Metallurgical Engineering**

## **UGIE Rourkela**

Discipline: Metallurgical engineering

Subject: Principles of Extractive Metallurgy (Th-3)

Semester :4<sup>th</sup>

Total period allotted: 60

Periods per week: 4

Name of the Teaching Faculty: Arpita Nayak

week	Class No.		Lecture Topics
1	1	Definition of	Define ores and
		metallurgical terms	minerals
	2		Define gangue, flux
			and slag
	3		Define matte and
			speiss
	4		Define metals and
			alloys
2	5	Principles of	Explain drying
	6	pretreatment of ores	Define and explain
		for metal extraction	calcination
	7		Explain different
			agglomeration process
			like briquetting
			nodulising, vacuum
			extrusion, sintering,
			palletizing.
	8		Explain different
			agglomeration process
			like briquetting
			nodulising, vacuum
			extrusion, sintering,
			palletizing.
3	9		Briquetting
	10		Nodulizing,

	11		Vacuum extrusion,
	12		Sintering, Palletizing.
4	13	General Methods of	Pyrometallurgical
		Extraction	processes
			Pyrometallurgical
			processes
	14		Explain roasting and
			different roasting
			methods
	15		Explain roasting and
	16		different roasting
			methods
5	17		Explain Ellingham
			diagram (oxides) and
			predominance area
			diagram
	18		Explain Ellingham
			diagram (oxides) and
			predominance area
			diagram
	19		Explain smelting and
			different smelting
			practices, Flash
			smelting, hearth
			smelting, matte
	20		smelting
	20		Explain smelting and
			prostions Flash
			gractices, Flash
			smelting, nearth
			smelting, matte
6	21		Explain the method of
0	21		distillation and
			sublimation
	22		Explain the method of
			distillation and
			sublimation
	23		Explain the process of
			converting of matte
			and pig iron
	24	1	Explain the process of
			converting of matte
			and pig iron

8	25		Explain
			hydrometallurgical
			process
	26		Explain
			hydrometallurgical
			process
	27		Explain different
			stages of
			hydrometallurgical
			proces
	28		Explain different
			stages of
			hydrometallurgical
			proces
9	30		Write the flow
			diagram of
			hydrometallurgical
			extraction
	31		Write the flow
			diagram of
			hydrometallurgical
			extraction
	32		Explain leaching and
			different leaching
			methods
	33		Explain leaching and
			different leaching
			methods
10	34		Electrometallurgical
			process
	35		Define electrolysis,
			ionic conductivity,
			EMF series
	36		Faraday's law of
			electrolysis
	37		Explain electro
			wining,
11	38		Electro refining
	39		Explain refining,
			process
	40	Basic approaches to	Zone refining
		retining	
	41		Fire refining
12	42	Principle of metal	Explain principles of
		extractions	metallurgical
			thermodynamics

	43		Zeroth law of
			thermodynamics
	44		1st law of
			thermodynamics
	45		2nd law of
			thermodynamics
13	46		3rd law of
			thermodynamics
	47		Application of Laws
		-	of Thermodynamics
	48		Explain on details the
			concept of Internal
		-	Energy, enthalpy
	49		entropy and
			entropy change, Free
			energy of a chemical
		-	reaction.
14	50		State Henry's law
	51		State Sivert's Law.
	52	Reaction Kinetics	Explain first order
		-	reaction
	53		Significance of 1st
15	54	-	order reaction
15	54		Explain the application
			of first order reaction
			of metallurgical
	55	-	Eurlain the application
	33		of first order reaction
			of metallurgical
			nrocesses
	56	-	Class Test
	57	4	Class test
16	50		Davision
10	58		Kevision