VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

Department of Metallurgical & Materials Engineering

Lesson Plan-Unit Process of Extraction

Subject Name : **Unit Process of Extraction**

Credits : 3-1-0

Department : Metallurgical & Materials Engineering

Session : (Even Semester)

Level : Undergraduate (IV-Semester)

Course Coordinator : Mr. **Gautam Behera**

Category of : Compulsory course for all B.Tech IV Semester students MME Department.

Total class per week : 4

Marks Distribution		
End Term	Mid Term	Assignments + Class Test + attendance
70	**20**	**10**
Total -100 Marks		

Reference book :

1. Extraction of Non ferrous metals by H.S RAY,R.SRIDHAR,K.P ABRAHAM
2. Principle of extractive metallurgy: A. GHOSH,& H.S RAY,iin publication, kolkata.1984
3. Principles of extractive metallurgy: ROSENQUIST,T.MCGRAWILL-KOGAKSHU internation-1983

Lesson plan

Period	Module/number	Topic to be covered	Remark
1	I	Introduction To PEM	-
2	I	Relative Reactivity Among Metals	-
3	I	Difference Between metal and nonmetals	-
4	I	Classification of extractive metallurgy	-
5	I	Thermodynamic principle and Ellingham Diagram	-
6	I	Application of Ellingham diagram in Metallothermic and carbothermic reduction	-
7	I	Calcination and its application	-
8	I	Prelimnary treatment(calcination and roasting)	-
9	I	Other types of roasting	-
10	I	Industrial roaster equipment used for roasting	-
11	I	Introduction to sintering and its significance	-
12	I	Predominance area diagram	-
13	I	Carbothermic, direct and indirect reduction	-
14	I	Metallothermic reduction	-
15	I	Class test-1	-
16	I	Class test-2	-
17	I	Characterization of smelting and flux in details and properties of slag	-
18	I	Depolymerization	-
19	I	Matte smelting and its expression, matte grade	-
20	I	Flash smelting and their advantages	-
21	II	Introduction to hydrometallurgy	-
22	II	Doubt clearing class	-
23	II	Factors affecting leaching, concentrate for leaching	-

24	**II**	Types of leaching operation ,concentration profile	**-**
25	**II**	Overall leaching process	**-**
26	**II**	Leaching of gold ore	**-**
27	**II**	Factors affecting bacterial leaching	**-**
28	**II**	Quiz test-1	**-**
29	**II**	Recovery Of metals from leach liquor	**-**
30	**II**	Effect of impurity on cementation process	**-**
31	**II**	Ion exchange process and factors affecting IEP	**-**
32	**II**	Solvent extraction/liquid-liquid extraction	**-**
33	**II**	Example of purification of leach liquor	**-**
34	**II**	Factors affecting liquid-liquid extraction method	**-**
35	**III**	Introduction to Halide Metallurgy Criteria for choosing chlorine n fluorine Refining application of chlorination	**-**
36	**III**	Laws of electrolysis , aluminium extraction , current efficienency , current density,	**-**
37	**III**	Numerical related to electrometallurgy	**-**
38	**III**	Electrowinning and elctro refining difference, limiting current desity, total volatge requiremet for an electrolyitc cell	**-**
39	**III**	Series and parallel arrangement of electrodes	**-**
40	**IV**	Introduction to purification/Refining of metals	**-**
41	**IV**	Basic approaches of refining/purification	**-**
42	**IV**	Physical methods of refining	**-**
43	**IV**	Chemical methods of refining and vapour transport	**-**
44	**IV**	Numerical	**-**
45	**IV**	Revision of gate questions	**-**