



VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

Department of Metallurgical & Materials Engineering

Lecture Plan – Ferro-Alloys Technology

Course Coordinator: Mr. Gourahari Behera Assistant Professor MME Department	Course Name	L	T	P	C
	Ferro-Alloys Technology	3	0	0	3
	Total Contact Periods – 40				
	Prerequisites: Unit Process of Extraction				
	Department: Metallurgical & Materials Engineering				
	Session: 2016-17 (Even Semester)				
	Level: Undergraduate (VIII-Semester)				

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

Text Books

1. Ryss, M. A., & Khodorovskii, I. N. (1967). *Production of ferroalloys*. Foreign Languages.
2. Elyutin, V. P. (1957). *Production of ferroalloys: Electrometallurgy*. state scientific and technical Publishing House for literature on ferrous and nonferrous metallurgy.

Reference Books

1. Gasik, M. (Ed.). (2013). *Handbook of ferroalloys: theory and technology*. Butterworth-Heinemann.
2. Bhardwaj, B. P. (2014). *The Complete Book on Ferroalloys*. NIIR PROJECT CONSULTANCY SERVICES.



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Sl. No	TOPIC	HOURS
1.	Introduction to the course	1
2.	Survey of Ferro-alloys industries in India and rest of the World	1
3.	Energy and emissions issues of the ferroalloys industry	1
4.	Future outlook for the ferroalloys industry	1
5.	Physico-chemical principles of ferro-alloys making	1
6.	Principles of carbothermic and metallothermic reduction	1
7.	Classification of Ferro-alloys Processes by Reductant type	1
8.	Classification of Ferro-alloys Processes by Technological Features	1
9.	Processes in Materials Production	1
10.	Thermodynamics of Pyrometallurgical Processes	1
11.	Introduction to Ferroalloys Processing Technology	1
12.	Ferroalloys Basic Furnace Design and Operation	1
13.	Ferrochrome, Ferrosilicon, Ferromanganese, and Silicomanganese Furnaces	1
14.	Silicon Metal and Ferronickel Furnaces	1
15.	Submerged arc furnaces (SAFs) for ferro-alloy production	1
16.	Selection for transformer capacity, secondary voltage and current in SAFs	1
17.	Effect of furnace dimensions, size and spacing of electrodes	1
18.	Need of mechanical equipment, charging devices in ferro-alloy furnaces	1
19.	Dust collection system in ferro-alloy production	1
20.	Electrodes used in ferro-alloy furnaces: graphitized and self-baking electrodes	1
21.	Electrodes used in ferro-alloy furnaces: properties and uses	1
22.	Environmental Issues of Ferroalloys Furnace Operations	
23.	Production of ferro-manganese by Carbothermic reduction	1
24.	Production of Ferrochrome by Carbothermic reduction	
25.	Production of Ferrosilicon by Carbothermic reduction	1
26.	Production of Silico-calcium by Carbothermic reduction	1
27.	Production of FeCr by Metallothermic reduction	1
28.	Production of FeTi by Metallothermic reduction	1
29.	Production of FeB by Metallothermic reduction	1
30.	Production of FeNb by Metallothermic reduction	1
31.	Production of FeMo by Metallothermic reduction	1
32.	Technology of Zirconium Ferroalloys	1
33.	Production of FeV by Metallothermic reduction	1
34.	Recovery of vanadium from ores and production of FeV	1
35.	Technology for Producing Ferroalloys with Rare Earth Metals	1
36.	Technology of Ferroalloys with Alkaline-Earth Metals	1
37.	Complex Ferroalloys and Other Master Alloys	1
38.	Charge calculations in production of ferro-alloys	1
39.	Use of plasma arc for production of ferro-alloys	1
40.	Use of ferro-alloys in Iron and Steel industries (deoxidation and alloy making)	1