

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VII

METALLURGY ENGINEERING

Subject Name: **Advance Ferrous Metallurgy (Department Elective-I)**

Subject Code: **172106**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	1	0	4	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Thermodynamics and kinetics of iron oxide reduction. Kinetics of solid-solid and solid-gas reactions.	8
2.	Problems of Indian Steel Plants. High temperature properties of iron-bearing materials.	4
3.	Modern developments in blast furnace, charging system and coal injection, equipment and theoretical considerations. Mini blast furnace.	6
4.	Methods of Sponge iron production and their importance under Indian conditions. Uses as feed material for Iron and Steel Industries. Reduction smelting processes.	6
5.	Pre-treatment of hot metal. Physico-chemical aspects of pre-treatment processes. Status of hot metal treatment in India.	6
6.	Electric Arc Furnace (EAF) steel making. Design of EAF-AC, DC electric arc. Latest trends in EAF design and operation.	6
7.	Secondary steel making processes. Alloy steel making in EAF using secondary refining. Continuous casting.	6
8.	Roll of synthetic slags. Electro-slag refining. Slag-metal reaction in iron and steel making.	6
9.	Ferro-alloy production. Application of plasma technology.	6

Text Books/ References Books:

1. Principles of secondary Processing and Casting of Liquid Steel-Ahindra Ghosh, Oxford & IBH, New Delhi.
2. Electrometallurgy of Steel and Ferro-alloys, Vol. I & II – F.P.Edneral, Mir Pub., Moscow.
3. International Symposium on *Blast Furnace Iron Making*, Jamshedpur, Nov. 1985, Organised by the Indian Institute of Metals and Tata Iron & Steel Company Ltd.
4. Workshop on *Production of Liquid Iron using coal*, Eds. H.S.Ray et al, Allied Publishers Ltd., New Delhi, 1994.