PMT5I103 FERROUS METALLURGY-I

Module I (14 Hours)

Raw materials and their properties: Iron ores, Limestones, Agglomerates and Coke. Preparation of ores: sintering and palletizing, blast furnace burdening and distribution, testing of raw materials for blast furnace, material balance.
Design: Blast furnace profile, stove and gas cleaning units; instrumentation, refractory used in blast furnace and stove.

Module II (14 Hours)

Reactions: Fe-C-O, Fe-O-H phase equilibria, Reactions in stack, bosh and hearth; formation of primary slag, bosh slag and hearth slag. Slag composition and its control, Metal-slag reactions, Control of hot metal composition.
Process Control: Factors affecting fuel consumption and productivity, Recent developments in Blast furnace operations like, Bell-less top charging system, High top pressure, Humidified & Oxygen enriched blast and Auxiliary fuel injection through tuyers.

Module III (12 Hours)

Irregularities in blast furnace operation and their remedies.
Alternative routes of iron making: Introduction, Processes of Sponge Iron production; SL/RN, MIDREX, HyL processes. Smelting Reduction Processes; COREX, ROMELT, Hismelt.

Books for reference:

1. *K. Biswas, Principles of Blast Furnace Iron Making, SBA publication, Calcutta, 1999*
2. *Ahindra Ghosh and Amit Chatterjee: Ironmaking and Steelmaking Theory and Practice, Prentice-Hall of India Private Limited, 2008*
3. *G. R. Bashforth, The Manufacture of Iron and Steel, vol.I, Chapman, London, 1962.*
4. *David H. Wakelin (ed.): The Making, Shaping and Treating of Steel (Ironmaking Volume), The AISE Steel Foundation, 2004.*
5. *Dipak Mazumdar, A First Course in Iron and Steel Making, University Press-IIM-2015*