

PMM333: ADVANCED IRON AND STEEL PROCESSING

L	T	P	Cr
3	1	0	3.5

Course Objective(s): To become familiar with iron making and steel making. To become conversant with the role of thermodynamics and kinetics in IMISM. To get a feel for what is happening in the steel industry.

Iron Making: Modern blast furnace, Raw materials for iron making, Metallurgical coke, Treatment of iron ores, Agglomeration and sintering, Testing of burden materials, Blast furnace operation, Reactions in blast Furnace, Modern trends in blast furnace practice, Sponge iron production.

Steel Making: Introduction to steel making, Lay-out of steelmaking shop, Steels and their classification, Thermodynamics and kinetics of refining, Thermal principles of refining, Deoxidation of steel, Plain and alloy steel production, Source for metallic iron, Oxidation agents, Fluxes, Source of heat, Deoxidizers and alloying additions.

Bulk Steel Making Processes: Bessemer furnace, Open hearth furnace, Electric arc furnace, LD furnace, Kaldo furnace, LDAC furnace, OBM furnace, Hybrid furnace, Secondary steelmaking process. Casting pit practice, Solidification of steel in ingot moulds, Ingot defects and remedies, Gases in steel, Vacuum treatment of liquid steel, Continuous casting of steel, Iron and steel making in India.

Course Learning Outcomes (CLO):

Student will be able to:

1. Apply the principles of physical chemistry and transport phenomena (heat, mass and momentum) to the process steps in Iron and Steelmaking as practiced in integrated steel plants;
2. Understand basic layout of blast furnace, steelmaking shop and continuous casting process;
3. Understand the Functioning of an integrated steel plant/corporate center and R&D ventures.

Recommended Books:

1. *Tupkary, R.H., Tupkary, V.R., An Introduction to Modern Iron Making, Tata McGraw Hill (2005).*
2. *Ghosh Ahindra, Chatterjee Amit, Ironmaking and Steelmaking: Theory and Practice, PHI learning (2008).*