

Steel Making - Web course

COURSE OUTLINE

Types of steel; History of modern steelmaking; Status of steelmaking in India and world Steel production and consumption, Steelmaking fundamentals: Solution thermodynamics; Role of slag in steelmaking, properties of slag;

Steelmaking reactions such as oxidation of carbon, silicon, manganese, iron, phosphorous and chromium, Numerical problems; Role of refractory, Physico-chemical properties of refractory, Emerging trends in refractory;

Steelmaking practice; Basic oxygen steelmaking; Electric Steelmaking; Developments in steelmaking practice; Principles and practices of deoxidation and degassing and emerging ladle metallurgy processes;

Clean steel; Solidification and Casting processes; Ingot and continuous casting Final finishing operations like heat treatment and deformation processing;

Modelling of steelmaking; Future of steelmaking in India.

COURSE DETAIL

Module No	Lectures
1	<p>Steelmaking Fundamentals</p> <ol style="list-style-type: none"> 1. Types of steels,, History of modern steelmaking and Indian scenario 2. Steelmaking Fundamentals: Solution thermodynamics 3. Steelmaking Fundamentals: Role of slag in steelmaking 4. Physico-chemical properties of slag 5. Oxidation reactions: Iron and silicon 6. Decarburization and Manganese oxidation 7. Dephosphorization reaction 8. Oxidation and reduction of chromium 9. Refractory in steelmaking 10. Modern Trends in refractory
2	<p>Modern Steelmaking Practice</p> <ol style="list-style-type: none"> 11. Introduction to practices, pretreatment of hot metal, Basic Oxygen furnace: Design and Operation 12. Fundamentals of Converter steelmaking technology 13. Feed materials and practice, Combined blown steelmaking 14. Modern trends in BOF Technology 15. Steelmaking in electric arc furnace; design and operation 16. Development in Electric Furnace steelmaking



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Metallurgy and Material Science

Coordinators:

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17. DRI in electric steelmaking
18. Alloy Steelmaking
19. Novel steelmaking technologies: CONARC and EOF
20. Process control and automation

3 **Ladle Metallurgy**

21. Evolution of ladle treatments and requirements
22. Synthetic slag practice
23. Principles of deoxidation
24. Deoxidation practice
25. Principles of degassing
26. Degassing technologies
27. Clean steel : Impact of inclusions on steel properties
28. Sources of inclusions in steel and their control
29. Inclusion engineering
30. Numerical problems and exercises

4 **Solidification and casting and finishing operations**

31. Principles of solidification of steel
32. Ingot casting
33. Continuous casting
34. Developments in Continuous casting technology
35. Final finishing operation: Surface treatments
36. Final finishing operation: Heat treatment
37. Final finishing operation: Deformation processing
38. Modelling of steelmaking processes
39. Few case studies and discussions
40. Future of steelmaking India