

Lesson Plan

Subject: Sponge Iron & Ferrous Alloy Name of faculty: Sagarika Palei

Semester: 4th Class allotted: 4p/week Branch: METALLURGICAL Session: 2024(S)

Discipline	Semester	Fromdate:	Todate:	TeachingAid
Subject:	No.ofdays/per week	Theory/Practical–Topics/Lesson		
Week	Date/Period			
1	16/01/2024 TO 20/01/2024	Chapter-1: Review of Sponge Iron Making Processes: 1.1 Historical Development. 1.2 Reasons for Rapid growth of DR process 1.3 Chronological Evolutions of some of the DRI Processes 1.4 Conventional versus DRI Steel Making 1.5 Direct Reduction of Iron Ore.		WhiteBoard Marker Smart board
2	22/01/2024 TO 27/01/2024	Chapter-2: Thermodynamics of Sponge Iron Making 2.1. Principles of Direct Reduction Reactions. 2.2. Reaction between Coal, Oxygen and Carbon dioxide. (Set-I). 2.3. Reaction between Iron ore and CO (Set-II). 2.4. Reaction Mechanism in Coal based DRI).		WhiteBoard Marker Smart board
3	29/01/2024 TO 03/02/2024	2.5. Reaction Mechanism in Gas based DRI. 2.6. Reduction by Carbon monoxide 2.7. Reduction by Hydrogen 2.8. Boudourd reaction and Reduction by Carbon		WhiteBoard Marker Smart board
4	05/02/2024 TO 10/02/2024	2.9. Carbon Deposition 2.10. Kinetics in DRI 2.11. Factors Influencing the Reducibility of Iron Ore. 2.12. Rate Controlling Theories		WhiteBoard Marker Smart board
5	12/02/2024 TO 17/02/2024	Chapter-3: Major direct reduction processes 3.1 Coal based DR process using rotary kilns. SL/RN,CODIR ,ACCAR, TDR , OSIL ,Krupp-Rein processes. 3.2 Coal based processes using reactors other than rotary kilns. Rotary hearth processes based on Inmetco , fastmet,lt mk-3, Tunnel kiln processes kinglor-meter,hogans		WhiteBoard Marker Smartboard



Signature of HOD

Sagarika Palei
Signature of faculty

Week	Date/Period	Theory/Practical–Topics/Lesson	Teaching Aid
6	19/02/2024 TO 24/02/2024	3.3 Gas based direct reduction: HYL processes, MIDREX Fluidwise bed processes-FIOR-HIB 3.4 Uses of DRI in iron making and steel making	WhiteBoard Marker Smartboard
7	26/02/2024 TO 02/03/2024	Chapter-4: Parameters of Sponge Iron Making: 4.1 Raw materials of Sponge Iron Making 4.2. Chemical and Physical Tests on iron ore: Chemical composition, Reducibility, Strength, Tumbling, Abrasion and Shatter Index, Porosity, Bulk Density, Thermal Degradation Index (TDI). 4.3. Tests on Non Coking Coal: Proximate and Ultimate Analysis, Reactivity, Calorific Value, Coking Index, Swelling Index, Ash Fusion Temperature, Bulk Density. 4.4. Effect of Iron Ore size on Reduction	Marker WhiteBoard
8	04/03/2024 TO 09/03/2024	4.4. Effect of Iron Ore size on Reduction 4.5 Carbon Enrichment of Sponge Iron 4.6 How Carbon Enrichment of Sponge Iron is performed 4.7. Flow of Solids in the Reactor or Kiln 4.8. Process Parameters of Sponge Iron Production: Raw materials, Iron Ore Feed Rate, Coal Feed Rate, C/Fe Ratio, Dolomite Feed, Rate, Reduction Coal to Blow Coal Ratio, Ratio of coarse and Fines in Blow Coal, Blow Coal Pressure, Temperature Profile, Kiln Speed, Ore Retention Time and Cooler Discharge end Pressure. 4.9. Nonmagnetic Percentage in the Kiln Discharge	WhiteBoard Marker Smartboard
9	11/03/2024 TO 16/03/2024	Chapter-5: DRI Plant Operation and Abnormalities: 5.1. Daily Operating Parameters. 5.2 Operational Abnormalities: Process Pressure Fluctuations, Temperature Deviations, Back Spill, Loss of Process Fan(s), High Temperature of Cooler Discharge, Loss of Product Quality 5.3 Major Problems of DRI Kiln Operation: Injection Coal Jam, Feed Pipe Jam, Transfer Chute Jam, Main Drive Problem, Refractory Failure their causes and remedies.	WhiteBoard Marker Smartboard
10	18/03/2024 TO 23/03/2024	5.4. Shutdown Procedure: Normal Shutdown Schedule for a 500 TDP Kiln. 5.5. The Start Up process: Heating of the Reactor Refractory 5.6. Accretion Formation 5.7. Key notes on process plant operation. Retention Time and Cooler Discharge end Pressure	Marker WhiteBoard Smartboard
11	27/03/2024 TO 30/03/2024	6.1. Sampling: Sponge Iron and the Raw materials 6.2. Chemical Analysis of Sponge Iron, Iron Ore, Lime Stone/Dolomite and Coal 6.3. Scheme of Quality Control of input Raw Materials: Reactor Feed Iron Ore, Reactor Feed Coal, Back –Spill Coal, Slinger Coal,	WhiteBoard Marker Smartboard
12	02/04/2024 To 06/04/2024	6.4. Determination of Total Iron (FeT), Ferrous Iron and metallic Fe. Chapter-7: Environmental Management in DRI Plants: 7.1. Air Pollution Mitigation Measures 7.2. Fugitive Dust Generation 7.3. Water Pollution Mitigation Measures	Marker WhiteBoard Smartboard

13.	08/04/2024 To 13/04/2024	7.4. Solid Waste Generation and Disposal 7.5. Hazardous Wastes and Chemicals 7.6. Occupational Health and Safety 7.7. Environmental Monitoring 7.8. Environmental Standards	White Board Marker Smart board
14	15/04/2024 To 20/04/2024	Chapter - 8: Production of Ferro-alloys: 8.1. Introduction to Ferro-alloying elements. 8.2. Different Ferro alloys. 8.3. General methods of producing Ferro alloys: carbothermic and aluminothermy reductions	White Board Marker Smart board
15	22/04/2024 TO 26/04/2024	8.4. Refining of Ferro alloys. 8.5. Production of individual Ferro alloys: Ferro manganese, Ferro chrome, charge chrome, ferrosilicon Fe-Ti, Fe-W, Fe-Mo and Fe-V	White Board Marker smart Board


 Signature of HOD


 Signature of faculty