

# PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF ENGINEERING & TECHNOLOGY, BARGARH



## LESSON PLAN Session-2022-2023

Discipline: Metallurgical Engg. Semester: 4th

Name of the Teaching Faculty: Anadi Charan Tena

Subject: SIFANo. of Days/per week class allotted 04Semester From Date: 14.2.23To Date: 23.5.23No. of Weeks: 15

Week	Class Day	Theory / Practical Topics
1st Topic-1	1st	Reviews of sponge iron making processes
	2nd	Historical development. Reasons of rapid growth.
	3rd	Chronological evaluations
	4th	Conventional Vs. Direct steel making Direct reduction
2nd Topic-2	1st	Thermodynamics of sponge iron making
	2nd	Direct reduction reactions
	3rd	Reactions between coal, oxygen and $CO_2$
	4th	Reaction between ore and $CO$ .
3rd	1st	Reaction mechanism in coal based DRI
	2nd	Reaction mechanism in gas-based DRI
	3rd	Reduction by $CO$ and $H_2$
	4th	Reaction by carbon, Boudouard reaction



Signature of the Faculty

Subject: SIFA No. of Days/per week class allotted 04

Semester From Date: 14.2.23 To Date: 23.5.23 No. of Weeks: 15

Week	Class Day	Theory / Practical Topics
4th	1st	Carbon deposition reaction
	2nd	Kinetics in DRI
	3rd	Reducibility of iron ore, factors
	4th	Rate controlling factors
5th Topic-3	1st	Major DRI processes
	2nd	Coal based DR processes
	3rd	Coal based processes using reactors.
	4th	Coal based processes, contd.
6th	1st	Gas based DR processes
	2nd	Gas based DR processes (contd.)
	3rd	Gas based DR processes
	4th	Uses of DRI in iron and steel making

  
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Week	Class Day	Theory/Practical Topics
7 <sup>th</sup> Topic 4	1 <sup>st</sup>	Parameters of sponge iron making Raw materials
	2 <sup>nd</sup>	physical and chemical tests
	3 <sup>rd</sup>	Tests on non-coking coal
	4 <sup>th</sup>	Effect of ore size on reduction, Carbon enrichment
8 <sup>th</sup>	1 <sup>st</sup>	Flow of solids in the reactor or kiln.
	2 <sup>nd</sup>	Process parameters.
	3 <sup>rd</sup>	Process parameters, contd.
	4 <sup>th</sup>	Process parameters, non-magnetic, Kiln discharge
9 <sup>th</sup> Topics 5	1 <sup>st</sup>	plant operation, abnormalities, operation parameters
	2 <sup>nd</sup>	operational abnormalities
	3 <sup>rd</sup>	Major problems in DRI Kiln operation
	4 <sup>th</sup>	Shut down procedure.

  
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Subject: SIFA No. of Days/per week class allotted 04

Semester From Date: 14-2-23 To Date: 23-5-23 No. of Weeks: 15

Week	Class Day	Theory/Practical Topics
10 <sup>th</sup>	1 <sup>st</sup>	Start-up process
	2 <sup>nd</sup>	Accretion formation
	3 <sup>rd</sup>	Accretion control
	4 <sup>th</sup>	Process plant operation
11 <sup>th</sup> Topic-6	1 <sup>st</sup>	Quality control in DRI plant Sampling
	2 <sup>nd</sup>	chemical analysis
	3 <sup>rd</sup>	chemical analysis contd.
	4 <sup>th</sup>	Scheme of quality control
12 <sup>th</sup>	1 <sup>st</sup>	Scheme of quality control mechanism
	2 <sup>nd</sup>	Determination of Fe(T), Fe(M)
Topic-7	3 <sup>rd</sup>	Environmental management
	4 <sup>th</sup>	Aer pollution, fugitive dust generation

  
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Subject: SIFA No. of Days/per week class allotted 09

Semester From Date: 14-2-23 To Date: 23-5-23 No. of Weeks: 15

Week	Class Day	Theory /Practical Topics
13 <sup>th</sup>	1st	Water pollution
	2nd	Solid waste generation
	3rd	Wastes and chemicals
	4th	Health and Safety, environmental standards
14 <sup>th</sup>	1st	Production of ferro-alloys, alloying elements
	2nd	Different ferro-alloys
	3rd	Carbothermic, aluminothermic reactions
	4th	Production of Fe-Ti, Fe-Mn
15 <sup>th</sup>	1st	Production of Fe-W, Fe-Co
	2nd	Production of Fe-Si, Fe-Mo
	3rd	Production of charge-chrome, Fe-V, refining
	4th	Refining processes.



Signature of the Faculty