DISCIPLINE - Metallurgy

Semester - 4th

Session - 2021-22

From 3/2/22 to 30/4/22

No of classes per week - 5

Subject - Physical Metallurgy.

Name of the teacher - Sadashiba Patra.

Week	Day	Units to be covered	Remark
Week-1 3/2/22 to 5/2/22	Day-1 1.0	Introduction to Physical Met.	
	Day-2 1.0	Broad idea relating to solids, liquids & gases. and crystals	
Wk-2 7/2/22 to 12/2/22	Day-1 1.1	Crystals, crystallography	
	Day-2 1.2	Space lattice & unit cell	
	Day-3 1.3	Types of crystal lattices Bravis lattices & primitive cell.	
	Day-3 1.4	(1.4) Define with sketch BCC, FCC & HCP	
	Day-4 1.4	Study of various parameters like P.F, co-ordination NO, atoms per unit cell etc.	
	Day-5 1.5	Miller indices of planes & directions (1.5)	
Week-3	Day-1 1.6	(1.6) Isotropy & Anisotropy in metallic materials	
	Day-2	Review & test on chapters covered till date	
	Day-3 1.7	1.7. Introduction to imperfections in metallic materials & types	

WK	Day	Units to be covered	Remark
	Day-4 1.8	1.8. Study of point defects	
	1.8 Day-5	1.8. Study of line defect	
WK 4 21/2 to 26/2/22	1.8 Day-1	1.8 Study of volume & surface defect.	
	Day-2 2.1	2.1. Deffination of Alloys & solid solutions	
	Day-3 2.2 2.3	2.2. Solidficatiion & crystallisation 2.3. Role of free Energy thermodynamic potential in conversion of liquid to solid.	
	Day-4.	2.4. Super Cooling, undercooling & degree of super cooling.	
	Day-5.	2.5. Mechanism of solidfication/crystallisation.	
WK-5 28/2 to 05/3/22	Day 1.	2.5. Nucleation, Critical size of nucleous.	
	Day-2	2.5 Spontaneous (Homogeneous & Heterogeneous) nucleation, Relation between rate of nucleation & crystal growth.	
	Day-3	2.6 Ingot structure & shape of crystals	
	Day-4	Review of Chapter-2.	
		Test on Chapter-2	

WK-6 7/3 to 12/3/22	Day-1	3.1 Defn of Equilibrium diagram & diff. from phase diagram.	
	Day-2.	3.2. Importance of Equilibrium diagram. 3.3. Drawing of Equilibrium diagram of binary systems	
	Day-3	3.4 Types of Equilibrium diagram.	
	Day-4.	3.5. Explain isomorphous equilibrium diagram with example.	
	Day-5.	3.6. Explain Eutectic & eutectoid equilibrium diagra with example.	
WK-7 14/3/22 to 19/3/22	Day-1	3.7 Peritectic & peritectoid type of phase diagram.	
	Day-2	3.8. Phase rule & lever rule. 3.9. Application of phase rule & lever rule.	
	Day-3	3.10 Introduction to iron-carbon phase diagram	
WK-8 21/3 to 26/3/22	Day-1	3.10. Draw Fe-Fe_3C phase diagram	
	Day-2	3.10. Practice of drawing Fe-Fe_3C diagra.	
	Day-3.	3.10 Diff. phases & microconstituents of Fe-Fe_3C system	

Wk-8	Day-4.	3.11. Role of carbon with iron to differentiate steel & cast iron.	
	Day-5	3.12 - Application of lever Rule in Fe-Fe_3C diagram.	
Wk-9 28/3 to 2/4/22	Day-1 3.13	Diff. between Fe-C, Fe-Fe_3C & iron graphite diagram.	
	Day-2	Review of Equilibrium diagram.	
	3.	Class test on Equilibrium diagram.	
	4.	Class test on Fe-Fe_3C diagram.	
	Day 1. 4.1.	Introduction to 4.1. Solution & Alloy.	
Wk-10 4/4 to 9/4/22	Day-2. 4.1 4.2	4.1. Define Solⁿ, solid Solⁿ and Alloy, & 4.2. Types of Solid Solⁿ	
	Day-3. 4.3	4.3. Diff. between substitutional & interstial solⁿ, chemical comp, mechanical mixture, intermetallic compound.	
	Day-4. 4.4	4.4. Ordered & disordered solid solⁿ	
	Day-5. 4.5	4.5. Hume Rothery Rule & describe the factors	

Wk-11	Day-1.	Class Test on Edcd solⁿ.	
11/4 to 16/4/22	Day-2.	5.1 Introduction to cast iron. Diff. bet steel & C.I, Alloy steel & alloy cast iron.	
	Day-3	5.2. Types of C.I.	
Wk-12 18/4 to 23/4/22	Day-1	5.3. Define graphitisation & role of graphitisation in C.I	
	Day-2.	Class Test on cast iron.	
	Day-3.	5.4. Micro structure of diff C.I	
	Day-5	6.1 Metallurgical & biological microscope. Types.	
Wk-13 25/4 to 30/4/22	Day-1.	6.2. Types of Met. Microscope.	
	Day-2	6.3, Working principle of Metallurgical microscope 6.4. Define magnifying power, resolving power,	
	Day-3	6.4- Spherical & chromatic aberations Introduction to Electron microscope	
	Day-4.	6.5. Electron microscope principle.	
	Day-5.	6.6. Prepare a sample of study of micro structure i.e sampling, cutting, grinding, Rough polishing & intermediate & fine polishing & etching.	Kochy 5/2/22