

PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF
ENGINEERING & TECHNOLOGY, BARGARH



LESSON PLAN
Session-2022-2023

Discipline: Metallurgical Engg. Semester: 4th, (P.M.)

Name of the Teaching Faculty: Basudev Kumbhar

Week	Class Day	Theory/Practical Topics
1	1	Introduction to crystal structure of metals Definition of crystal and crystallography.
	2.	Definition of space lattice and unit cell
	3.	Comparison of different types of crystal lattices, bcc lattices and primitive lattices.
	4.	Definition with sketch B.C.C, F.C.C & H.C.P.
2	5.	Miller indices, planes and directions.
	6.	Isotropy and anisotropy in metallic materials.
	7.	Imperfections in metallic materials.
	8.	Differentiate between types of imperfections: point defect,
3	9.	line defect, surface defect and volume defect.
	10.	Introduction to solidification of pure metals and alloy.
	11.	Alloys and solution.
	12.	Solidification and crystal.

Signature of the Faculty 

Subject: Physical Metallurgy No. of Days/ per week class allotted 04
 Semester from Date 14/02/2023 To Date 23/05/2023 No. of Weeks: 13

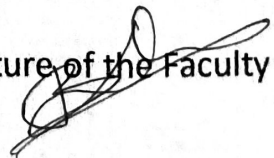
week	Class Day	Theory/Practical Topics
4	13.	Explanation role of free energy thermodynamic potential in conversion of liquid to solid.
	14.	super cooling, under cooling, degree of super cooling.
	15.	Mechanism of solidification/crystallization nucleation.
	16.	critical size, nucleus, spontaneous-nucleation, relation bet ⁿ ration of nucleation and grain growth.
5	17.	Shape of crystals and solidification of Ingot.
	18.	Introduction to equilibrium diagram.
	19.	Definition of equilibrium diagram.
	20.	Importance of equilibrium diagram.
6	21.	Equilibrium diagram of binary alloys.
	22.	Types of equilibrium diagram.
	23.	Explanation of isomorphous equilibrium diagram with examples.
	24.	Explanation of eutectic type and eutectoid equilibrium diagram with examples.

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7.	25.	Explanation of peritectic type and peritectoid equilibrium diagram with example
	26.	Definition of phase rule, lever rule.
	27.	Apply phase rule, and lever rule in each equilibrium diagram.
	28.	Draw iron carbon equilibrium diagram and describe different phases and micro-constituents in iron-carbon diagram.
8	29.	Discussion of role of carbon with iron to differentiate steel and cast iron.
	30.	Application of lever rule in iron and carbon diagram.
	31.	Differentiate between iron-carbon, iron-cementite, and iron-graphite diagram.
	32.	Introduction to solid solution.
9	33.	Definition of solution, alloying.
	34.	Explanation different types of solid solution.
	35.	Differentiate bet ⁿ substitutional and interstitial solid solution.
	36.	Chemical compound, Mechanical mixture and intermetallic compound.

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10	37.	Differentiate between ordered and disordered solid solution.
	38.	Definition of Hume Rothery Rule and describe the different factors governing the formation of solid solution.
	39.	Discuss different Introduction to cast iron, Define Cast-Iron, differentiate bet ⁿ steel and Cast Iron
	40.	Alloy steel and alloy-cast iron.
11	41.	Discuss different types of cast iron with their composition.
	42.	Define graphitization and role of graphitization in cast iron.
	43.	Draw structures of cast-iron
	44.	Introduction to metallurgical microscope.
12	45.	Differentiate bet ⁿ metallurgical microscope & biological microscope.
	46.	Describe different types of metallurgical microscope.
	47.	working principle of metallurgical microscope
	48.	Define magnifying power & resolving power, spherical and chromatic aberration.

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