

PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF ENGINEERING & TECHNOLOGY, BARGARH



LESSON PLAN Session-2023-2024

Discipline: Metallurgical Engg. Semester: 4th

Subject: PM

Name of the Teaching Faculty: Anadi charan Jena

Subject: PMNo. of Days/per week class allotted : 04Semester From Date : 16-01-2024 To Date : 26-04-2024No. of Weeks : 15

| Week | Class Day | Theory /Practical Topics |
|----------------|-----------|---|
| 1st Topic-1 | 1st | Define crystal and crystallography |
| | 2nd | Explain space lattice and unit cell |
| | 3rd | Different crystal lattices |
| | 4th | Sketch of BCC, FCC, HCP structures |
| 2nd | 1st | Miller indices, planes and directions |
| | 2nd | Isotropy and anisotropy properties |
| | 3rd | Imperfections of metallic materials |
| | 4th | Different types of defects or imperfections |
| 3rd Topic-2 | 1st | Definition of solid solution and alloys |
| | 2nd | Define solidification of metals |
| | 3rd | Crystallisation of materials |
| | 4th | Role of free energy in liquid-solid conversion. |

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Signature of the Faculty

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| 4 th | 1 st | Define super cooling, undercooling |
| | 2 nd | Degree of supercooling |
| | 3 rd | Mechanism of solidification |
| | 4 th | Nucleation and grain growth |
| 5 th | 1 st | Types of nucleation, critical size of nucleus. |
| Topic-3 | 2 nd | Explanation of equilibrium diagram |
| | 3 rd | Importance of equilibrium diagram |
| | 4 th | Equilibrium diagram of binary alloys |
| 6 th | 1 st | Types of equilibrium diagram |
| | 2 nd | Isomorphous equilibrium diagram |
| | 3 rd | Eutectic type equilibrium diagrams |
| | 4 th | Eutectoid type equilibrium diagrams |


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| 7 th | 1 st | peritectic type equilibrium diagrams |
| | 2 nd | peritectoid equilibrium diagrams |
| | 3 rd | phase rule / Lever Rule |
| | 4 th | Applications of phase rule in equilibrium diagrams |
| 8 th | 1 st | iron-carbon equilibrium diagrams |
| | 2 nd | Different phases and micro constituents |
| | 3 rd | Role of carbon in iron and steel |
| | 4 th | Lever rule to iron-carbon equilibrium diagram. |
| 9 th | 1 st | Differentiate between iron-carbon, iron-cementite and iron-graphite diagrams |
| Topic 9 | 2 nd | Define solid solution |
| | 3 rd | Types of solid solution |
| | 4 th | Alloying purposes, Types of alloys. |

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| 10 th | 1 st | Different types of solid solution |
| | 2 nd | Substitutional solid solution |
| | 3 rd | Interstitial solid solution |
| | 4 th | Chemical compounds |
| 11 th | 1 st | Intermetallic compounds, properties |
| | 2 nd | Ordered solid solution |
| | 3 rd | Disordered solid solution |
| | 4 th | Hume Rothery Rule |
| 12 th | 1 st | Factors governing the formation of solid solution |
| Topic-5 | 2 nd | Define cast iron, Types of cast iron |
| | 3 rd | Differentiate between steel and cast iron |
| | 4 th | Differentiate between alloy steel and alloy cast iron |

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| 13 th | 1 st | Type 1 cast iron with compositions |
| | 2 nd | Graphitisation in cast iron |
| | 3 rd | Draw the structures of cast iron |
| Topic-6 | 4 th | Metallurgical and biological microscopes |
| 14 th | 1 st | Differentiate between the two |
| | 2 nd | principles of Metallurgical microscopes |
| | 3 rd | Types of metallurgical microscopes |
| | 4 th | working principle with figures |
| 15 th | 1 st | Define magnifying and resolving power |
| | 2 nd | Define spherical and chromatic aberration |
| | 3 rd | Electron microscopy |
| | 4 th | Sample preparation for metallographic study. |


Signature of the Faculty