**DISPLINE- METALLURGY**

**Name of the teacher- Sadashiba Patra**

Semester-4th -Session-2023-24

From-16/01/2024 to 26/04/2024

Subject-Theory-2(Physical Metallurgy)

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| **Wk no** | **Day** | **Units to be convert** | **Remark** |
| **WK-1**  **16/01/24 to 20/01/2024** | Day-1 | Introduction to Metallurgy & Physical Metallurgy |  |
| Day-2 | Broad idea regarding solids, liquids, gases & crystals. |
| Day-3 | Crystals & Crystallography |
| Day-4 | Space lattice & unit cell |
| **WK-2**  **22/01 to 27/01/2024** | Day-1 | Types of crystal lattices, Bravis lattice & primitive cell. |  |
| Day-2 | Define with sketch, BCC, FCC & CPH structure. |
| Day-3 | Study of various parameters like packing factor, co-ordination no, effective no of atoms per unit cell. |
| **WK-3**  **29/1/2024 to 03/02/2024** | Day-1 | Miller indics of planes & directions. |  |
| Day-2 | Isotropy & Anisotropy in metallic materials. |
| Day-3 | Review & test on chapters covered till date. |
| Day-4 | Introduction to imperfections in metallic crystals & type. |
| Day-5 | Study of various types of point defects. |
| **WK-4**  **05/02/2024 to 10/02/2024** | Day-1 | Study of various types of line defects. |  |
| Day-2 | Study of volume and surface defects. |
| Day-3 | Definition of alloys and solid solutions. |
| Day-4 | Solidification & crystallisation . |
| Day-5 | Role of free energy/ thermodynamic potential in conversion of liquid to solid. |
| **WK-5**  **12/02/2024 to 17/02/2024** | Day-1 | Super cooling, under cooling & degree of super cooling. |  |
| Day-2 | Mechanism of solidification. |
| Day-3 | Nucleation, critical size of nucleaous. |
| Day-4 | Spontaneous(Homogeneous & Heterogeneous nucleation) Relation between rate of nucleation and crystal growth. |
| **WK-6**  **19/02/2024**  **To 24/02/2024** | Day-1 | Ingot structure & shape of crystals. |  |
| Day-2 | Review of chapter-2 |
| Day-3 | Test on chapter-2 |  |
| Day-4 | Introduction to equilibrium diagram, definition & difference from phase diagram/importance of phase diagram. |  |
| Day-5 | Drawing of equilibrium diagram of binary systems. |
| **WK-7**  **26/02/2024 To 02/03/2024** | Day-1 | Types of Equilibrium diagram. |  |
| Day-2 | Explanation of isomorphous type of equilibrium diagram with example. |
| Day-3 | Peritectic & peritectoid type of equilibrium diagrams. |
| Day-4 | Phase rule & lever Rule.  Application of phase rule & lever rule. |
| Day-5 | Introduction to Fe-Fe3c phase diagram. |
| **WK-8**  **04/03/2024 To 09/03/2024** | Day-1 | Drawing of Fe-Fe3c phase diagram. |  |
| Day-2 | Practice of drawing Fe-Fe3c phase diagram. |
| Day-3 | Different phases, microconstituent of Fe-Fe3c system. |
| Day-4 | Role of carbon in iron to differentiate steel & cast iron. |
| Day-5 | Application of Lever rule to Fe-Fe3c system. |
| **WK-9**  **11/03/2024 TO 16/03/2024** | Day-1 | Difference between Fe-Fe3c & Fe-c diagram. |  |
| Day-2 | Review of equilibrium diagram. |
| Day-3 | Class test on equilibrium diagram. |
| Day-4 | Class test on Fe-Fe3c diagram. |
| Day-5 | Introduction solution, solid solution & alloys. |
| **WK-10**  **18/03/2024 TO 23/03/2024** | Day-1 | Study of various types of solid solutions. |  |
| Day-2 | Difference between solid solution, chemical compound, mechanical mixture, intermediate compound. |
| Day-3 | Various intermediate compounds, difference between ordered & disordered solid solutions, super lattices. |
| Day-4 | Hume Ruthery’s Rule and factors governing formation of solid solution. |
| Day-5 | Class test on solid solution. |
| **WK-11**  **25/03/2024 TO 30/03/2024** | Day-1 | Introduction to cast iron, Difference between steel & C.T, Alloy steel & alloy cast iron. |  |
| Day-2 | Types of cast iron & properties. |
| **WK-12**  **01/04/2024 TO 06/04/2024** | Day-1 | I.A. Tast |  |
| **WK-13**  **08/04/2024 TO 13/04/2024** | Day-1 | Review of I.A test questions & microstructure of different cast irons. |  |
| Day-2 | Review of cast iron. |
| Day-3 | Introduction to metallurgical microscope, its difference from biological microscope. |
| Day-4 | Working principle of optical. Metallurgical microscope. |
| **WK-14**  **15/04/2024 TO 20/04/2024** | Day-1 | Working principle of electron microscope and comparison between the electron & optical metallurgical microscope. |  |
| Day-2 | Study of magnifying power & resolving powder. |
| Day-3 | Spherical & chromatic aberration. |
| Day-4 | Sample preparation for metallographic study(Sample cutting, grinding, Rough polishing intermediate polishing, fine polishing. |
| **WK-15**  **22/04/2024 TO 27/04/2024** | Day-1 | Review of metallurgical microscope . |  |
| Day-2 | class test on metallurgical microscope. |
| Day-3 | Review of previous year question. |
| Day-4 | Very similar test. |
| Day-5 | Very similar test |