**METALLURGY DEPARTMENT**

Name of the teacher-PARASMITA BISWAL

Semester-5th Session-2022-23

From- Dt 15/09/2022 to dt 22/01/2023

**Subject-Theory-3(Heat treatment technology)**

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| **Wk no** | **Class/Day** | **Chapters to be covered:** | **Theory topics to be covered :** |
| **Week -1** | Day-1 | **Chapter-01:Solid state phase transformation** | Solid State Phase Transformation. |
| **Week -2** | Day-1 | Give an introduction to diffusion, state fick’s law |
| Day-2 | Discuss the formation of austenite. |
| Day-3 | Explain the mechanism of formation of austenite |
| Day-4 | Discuss austenitic grain size |
| **Week -3** | Day-1 | Explain the methods of determination of austenitic grain size. |
| Day-2 | State the importance of grain size |
| Day-3 | Explain the method of measurement of grain size. |
| Day-4 | Discuss the methods of control austenitic grain size. |
| **Week -4** |  |  | PUJA VACATION |
| **Week -5** | Day-1 | **Chapter-01:Solid state phase transformation** | Discuss decomposition of austenite and pearlitic transformation |
| Day-2 | Explain the process of construction of T-T-T diagram and CCT diagram. |
| Day-3 | Discuss the TTT Diagram for hypo eutectoid, eutectoid and hyper eutectoid steel. |
| Day-4 | Explain bainitic transformation. |
| **Week 5** | Day-1 | Explain martensitic transformation. |
| Day-2 | **Chapter-02: Heat treatment process for steel** | Discuss annealing. |
| Day-3 | Explain stress relieving annealing. |
| Day-4  | Explain different types of annealing-01 |
| **Week -6** | Day-1 | Explain different types of annealing-02 |
| Day-2 | Discuss the process of hardening, normalising |
| Day-3 | Describe the factors affecting hardening process. |
| **Week -7** | Day-1 | Explain different methods of hardening. |
| Day-2 | Discuss quenching media and different types of quenchants. |
| Day-3 | Explain the tempering process for steel. |
| Day-4 | Discuss thermo-mechanical treatment of steel. |
| **Week -8** | Day-1 | **Chapter-03:Hardenability** | Class test and revision class |
| Day-2 | Define hardenability |
| Day-3 | Hardenability , method of determination of hardenability Gross Man‟s critical diameter method &Jominey end quench method. |
| **Week -9** | Day-1 | Discuss the method of estimation of hardenability from chemical composition and fracture test. |
| Day-2 | Discuss the factors affecting hardenability: effect of austenitic grain size, carbon content, and alloying elements. |
| Day-3 | **Chapter-04 : Surface Hardening Methods** | Discuss high frequency induction hardening -flame hardening,  |
| Day-4 | Discuss the methods of case depth measurement of steel. |
| **Week -10** | Day-1 | Explain different carburizing-processes of steel: pack carburizing, liquid carburizing,  |
| Day-2 | Discuss the post carburizing heat treatment. gas carburizing and vacuum carburizing. |
| Day-3 | Explain process of nitriding of steel. |
| Day-4 | Explain the process of cyaniding, carbo-nitriding of steel. |
| **Week -11** | Day-1 | Explain the plasma nitriding.salt bath nitro carburizing |
| Day-2 | Discussion on electron beam hardening, laser hardening. |
| Day-3 | Explain boronising, chromizing & Toyato diffusion process. |
| Day-4 | **Chapter-05: Discuss the Heat Treatment of Non Ferrous Alloy** | Discuss Age Hardening of Al-CU alloys. |
| **Week -12** | Day-1 | Discuss different alloy steels- low alloy and high alloy steels. |
| Day-2 |  | Class test and revision class |
| Day-3 |  | Discussion on martempering, austempering  |
| Day-4 |  | Discussion on subzero treatment |
| **Week -13** | Day-1 | **Chapter-06: Alloy steels** | Discuss die steel, high speed steel, high strength steel |
| Day-2 | Discussion on low alloy steels, stainless steels.  |
| Day-3 | Discuss the effect of alloying elements. |
| Day-4 | Discus the heat treatment of tool steel and stainless steel. |
| **Week-14** | Day-1 |  | Important question discussion  |
| Day-2 |  | Important question discussion  |
| Day-3 |  | Doubt clearing class |
| Day-4 |  | Class test covering entire syllabus |