

KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN

Session:-2022-2023

Discipline : Metallurgy	Semester: 5th Sem,w/2022	Name of the Teaching Faculty: Pramod Kumar Sethi Sr.Lecturer Email Id :-pksethifmt@kp.kiit.ac.in
Subject: Heat treatment Technology (Th-3)	No. Of Days/Week:-4	Starting date:-14/09/2022 Ending date:-21/01/2023
Week	Class Day	Theory Topics
1 st	1st	Solid state phase transformation.
	2nd	Give an introduction to diffusion and state ficks law
	3rd	Discuss the formation of austenite.
	4th	Explain the mechanism of formation of austenite.
2 nd	1st	Discuss austenitic grain size.
	2nd	Explain the methods of determination of austenitic grain size.
	3rd	State the importance of grain size.
	4th	Discussion on possible questionnaire
3 rd	1st	Discuss the method of control austenitic grain size.
	2nd	Discuss decomposition of austenite and pearlitic formation.
	3rd	Explain the process of construction of T.T.T diagram and CCT diagram
	4 th	Explain the process of construction of T.T.T diagram and CCT diagram
4 th	1 st	Discussion on possible questionnaire
	2 nd	Explain bainitic transformation.
	3rd	Explain martensitic transformation
	4th	Discuss annealing
5 th	1st	Explain stress relieving annealing.

	2nd	Quiz Test.
	3rd	Explain the process of normalising.
	4th	Discuss the process of hardening
6 th	1st	Describe the factors affecting hardening.
	2nd	Explain the methods hardening
	3rd	Discuss the quenching media and different types quenchant.
	4th	Explain the tempering process of steel.
7 th	1st	Discuss the thermo-mechanical treatment of steel.
	2nd	Discuss martempering, austempering and sub zero treatment.
	3rd	Discussion on possible questionnaire
	4th	Define hardenability.
8 th	1st	Discuss the method of determination of hardenability.(Gross Mans critical diameter method and Jominey End quench method.)
	2nd	Discuss the method of determination of hardenability.(Gross Mans critical diameter method and Jominey End quench method.)
	3rd	Discuss the method of estimation of hardenability from chemical composition and fracture test.
	4th	Discuss the method of estimation of hardenability from chemical composition and fracture test
9 th	1st	Discuss the factor affecting hardenability: effect of grain size, carbon content, and alloying element.
	2nd	Discuss the factor affecting hardenability: effect of grain size, carbon content, and alloying element.
	3rd	Discussion on possible questionnaire
	4th	Discuss high frequency induction hardening, flame hardening, electron beam hardening, and laser hardening.
10 th	1st	Discuss high frequency induction hardening, flame hardening, electron beam hardening, and laser hardening.
	2nd	Discuss the post carburising heat treatment.
	3rd	Discuss the post carburising heat treatment.
	4th	Discussion on possible questionnaire
11 th	1st	Discuss the methods of case depth measurement of steel.
	2nd	Discuss the methods of case depth measurement of steel.
	3rd	Explain different carburising –process: pack carburising, liquid carburising, gas carburising and vacuum carburising.
	4th	Discuss the process of nitriding of steel.
12 th	1st	Explain plasma nitriding
	2nd	Explain salt bath nitro-carburising.
	3rd	Explain boronising, chromizing, and Toyato diffusion process.
	4th	Discussion on possible questionnaire

13 th	1st	Discuss Age Hardening of Al-Cu alloys
	2nd	Discuss Age Hardening of Al-Cu alloys
	3rd	Discuss different alloy steels-Low alloy and high alloy steels.
	4th	Discuss different alloy steels-Low alloy and high alloy steels
14 th	1st	Discussion on possible questionnaire
	2nd	Discuss the effect of alloying elements
	3rd	Discuss the effect of alloying elements
	4th	Discuss die steels, high speed steels, high strength low alloy steels, and stainless steels.
15 th	1st	Discuss die steels, high speed steels, high strength low alloy steels, and stainless steels.
	2nd	Discuss the heat treatment of tool steels and stainless steels.
	3rd	Discuss the heat treatment of tool steels and stainless steels.
	4th	Discussion on possible questionnaire.

Recommended Books:-

1. Physical Metallurgy principles by Reed-Hill
2. Heat Treatment by Rajan and Sharma.