

GOVERNMENT POLYTECHNIC JAIPUR		
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DEPARTMENT OF METALLURGY		
Discipline: Metallurgy	Semester: 5th	Name of the Teaching faculty: P ARADHANA
Subject: Heat treatment technology	No of Days/Week class allotted: 4	Semester from Date: 14/07/25 To Date: 15/11/25 No of weeks: 18
Week	Class Day	Topics
1st	1 st	Introduction to heat treatment process, Solid State Phase Transformation, introduction to diffusion,
	2 nd	fick's law of diffusion
	3 rd	fick's law of diffusion
	4 th	Discussion on the formation & mechanism of austenite, austenitic grain size
2nd	1 st	determination of austenitic grain size & importance of grain size
	2 nd	method of measurement of grain size
	3 rd	methods of control austenitic grain size
	4 th	methods of control austenitic grain size
3rd	1 st	decomposition of austenite and pearlitic transformation
	2 nd	decomposition of austenite and pearlitic transformation
	3 rd	process of construction of T-T-T diagram and CCT diagram.
	4 th	process of construction of T-T-T diagram and CCT diagram.
4th	1 st	TTT Diagram for hypo eutectoid, eutectoid and hyper eutectoid steel
	2 nd	TTT Diagram for hypo eutectoid, eutectoid and hyper eutectoid steel
	3 rd	bainitic transformation & martensitic transformation
	4 th	bainitic transformation & martensitic transformation
5th	1 st	Defination of annealing & stress relieving annealing.
	2 nd	different types of annealing
	3 rd	Discussion on normalizing
	4 th	Hardening & factors affecting hardening process
6th	1 st	different methods of hardening
	2 nd	different methods of hardening
	3 rd	quenching media and different types of quenchants
	4 th	quenching media and different types of quenchants
7th	1 st	tempering process for steel
	2 nd	tempering process for steel
	3 rd	thermo-mechanical treatment of steel
	4 th	thermo-mechanical treatment of steel
8th	1 st	martempering
	2 nd	martempering
	3 rd	austempering and subzero treatment
	4 th	austempering and subzero treatment
9th	1 st	Revision
	2 nd	Hardenability, difference between hardening & hardenability
	3 rd	Jominey end quench method

	4 th	Jominey end quench method
10th	1 st	Gross Man"s critical diameter method
	2 nd	Gross Man"s critical diameter method
	3 rd	estimation of hardenability from chemical composition and fracture test
	4 th	estimation of hardenability from chemical composition and fracture test
11th	1 st	Revision
	2 nd	factors affecting hardenability: effect of austenitic grain size, carbon content, and alloying elements
	3 rd	factors affecting hardenability: effect of austenitic grain size, carbon content, and alloying elements
	4 th	high frequency induction hardening -flame hardening
12th	1 st	high frequency induction hardening -flame hardening
	2 nd	electron beam hardening
	3 rd	laser hardening
	4 th	laser hardening
13th	1 st	methods of case depth measurement of steel
	2 nd	pack carburizing,
	3 rd	liquid carburizing,
	4 th	gas carburizing
14th	1 st	vacuum carburizing
	2 nd	post carburizing heat treatment
	3 rd	process of nitriding of steel
15th	1 st	cyaniding, carbo-nitriding of steel
	2 nd	cyaniding, carbo-nitriding of steel
	3 rd	plasma nitriding
	4 th	plasma nitriding
16th	1 st	salt bath nitro carburizing
	2 nd	salt bath nitro carburizing
	3 rd	boronising, chromizing & Toyato diffusion process
	4 th	boronising, chromizing & Toyato diffusion process
17th	1 st	Age Hardening of Al-CU alloys
	2 nd	Age Hardening of Al-CU alloys
	3 rd	revision
	4 th	different alloy steels- low alloy and high alloy steels
18th	1 st	different alloy steels- low alloy and high alloy steels
	2 nd	die steel, high speed steel, high strength, low alloy steels, stainless steels
	3 rd	heat treatment of tool steel
	4 th	heat treatment of stainless steel

F. Meadham
14/7/25
lect 11/12/13/14