

GOVERNMENT POLYTECHNIC JAIPUR

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DEPARTMENT OF MECHANICAL ENGINEERING (2023-2024)

LESSON PLAN (2023-2024)


Discipline: Mechanical	Semester: 3RD	Name of the Teaching faculty: KEDARNATH JENA
Subject: Engineering Material (Th-3)	No of Days/ Week class alloted: 4	Semester from Date: 01. 08 . 2023 To Date: 31. 11. 2023 No of weeks: 15
Week	Class Day	Topics
1st	1st	CH.1 Engineering materials and their properties.
		Material classification into ferrous and non ferrous category and alloys
	2nd	Properties of Materials: Physical properties
	3rd	Properties of Materials: Chemical properties.
2nd	4th	Properties of Materials: Mechanical properties.
	1st	Properties of Materials: Mechanical properties.
	2nd	Performance requirements and Material reliability and safety
	3rd	CH.2 Ferrous materials and alloys.
3rd	4th	Characteristics and application of ferrous materials and classification of low carbon steel.
	1st	Composition and application of low carbon steel.
	2nd	Classification, composition and application of medium carbon steel.
	3rd	Classification, composition and application of high carbon steel.
4th	4th	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel
	1st	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo.
	2nd	CH. 3 Iron- Carbon System.
	3rd	Concept of phase diagram
5th	4th	Concept of phase diagram
	1st	Concept of cooling curves
	2nd	Concept of cooling curves
	3rd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
5th	4th	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	1st	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	2nd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	3rd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel

6th	1st	CLASS TEST 1
	2nd	CH. 4. Crystal Imperfections.
		Crystal defines, classification of crystals, ideal crystal and crystal imperfections
		Classification of imperfection: Point defects, line defects
4th	surface defects and volume defects	
7th	1st	Types and causes of point defects: Vacancies, Interstitials and impurities
	2nd	Interstitials and impurities
	3rd	Types and causes of line defects: Edge dislocation and screw dislocation.
	4th	Effect of imperfection on material properties
8th	1st	Deformation by slip and twinning
	2nd	Effect of deformation on material properties
	3rd	CH. 5. Heat treatment.
		Purpose of Heat treatment
4th	Process of heat treatment: Annealing, normalizing, hardening	
9th	1st	Process of heat treatment: Annealing, normalizing, hardening
	2nd	Tampering, stress relieving measures
	3rd	Tampering, stress relieving measures
	4th	Surface hardening: Carburizing and Nitriding
10th	1st	Surface hardening: Carburizing and Nitriding
	2nd	Effect of heat treatment on properties of steel
	3rd	Effect of heat treatment on properties of steel
	4th	Hardenability of steel
11th	1st	CLASS TEST 2
	2nd	CH. 6. Non-ferrous alloys.
		Aluminum alloys: Composition, property and usage of Duralmin, γ - alloy
		Copper alloys: Composition, property and usage of CopperAluminum, Copper-Tin alloy.
4th	Copper alloys: Babbit , Phosperous bronze, brass, Copper- Nickel alloy.	
12th	1st	Predominating elements of lead alloys, Zinc alloys and Nickel alloys .
	2nd	Low alloy materials like P-91, P-22 for power plants and other high temperature services.
	3rd	High alloy materials like stainless steel grades of duplex, super duplex materials etc.
	4th	CH. 7. Bearing Material.
Classification, composition, properties and uses of Copper base, Tin Base bearing material.		
	1st	Classification, composition, properties and uses of Lead base, Cadmium base bearing materials.

13th	2nd	CH. 8. Spring materials: Classification, composition, properties and uses of Iron base spring material.
	3rd	Classification, composition, properties and uses of Copper base spring material
	4th	CH. 9. Polymers :
		Properties and application of thermosetting polymers.
14th	1st	Polymers :Properties and application thermoplastic polymers and properties of elastomers.
	2nd	CH. 10. Composites and Ceramics.
		Classification, composition, properties and uses of particulate based composites.
	3rd	Classification, composition, properties and uses of fiber reinforced composites.
4th	Classification and uses of ceramics.	
15th	1st	Classification and uses of ceramics.
	2nd	Previous year question discussion.
	3rd	Previous year question discussion.
	4th	VST

Learning resources:

Sl. No.	Author	Title of the book	Publisher
01	O P Khanna	A Textbook of Material Science and Metallurgy	Dhantpat Rai
02	R K Rajput	Engineering materials and Metallurgy	S.Chand
03	S K Hazra choudhry	Material science & process	Indian Book Distributing


3/10/23
Signature of Faculty