

Discipline : Mechanical Engg	Semester :3 rd	Name of the Teaching Faculty:- ANANDITA NANDA
Subject: Engineering Material (Th-3)	No. of Days/per week class allotted:04	Semester From Date :01.07.2024 To Date:8.11.2024 No. of Weeks: 15
Week	Class Day	Theory Topics
1 ST	1 st	1.Engg Materials and their Properties Material classification into ferrous and non ferrous category and alloys
	2 nd	Material classification into ferrous and non ferrous category and alloys
	3 rd	Properties of Materials: Physical , Chemical and Mechanical Performance requirements
	4 th	Properties of Materials: Physical , Chemical and Mechanical Performance requirements
2 ND	1 st	Material reliability and safety
	2 nd	2. Ferrous Materials and alloys Characteristics and application of ferrous materials
	3 rd	Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel
	4 th	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel
3 RD	1 st	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,
	2 nd	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,
	3 rd	3. Iron-Carbon System Concept of phase diagram and cooling curves
	4 th	Concept of phase diagram and cooling curves
4 TH	1 st	Concept of phase diagram and cooling curves
	2 nd	Features of Iron-Carbon diagram with salient micro- constituents of Iron and Steel
	3 rd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	4 th	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
5 TH	1 st	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	2 nd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	3 rd	4. Crystal Imperfections Crystal defines, classification of crystals, ideal crystal and crystal imperfections
	4 th	Crystal defines, classification of crystals, ideal crystal and crystal imperfections
6 TH	1 st	Classification of imperfection: Point defects, line defects, surface defects and volume defects
	2 nd	Classification of imperfection: Point defects, line defects, surface defects and volume defects
	3 rd	Types and causes of point defects: Vacancies, Interstitials and



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		impurities
	4 th	Types and causes of line defects: Edge dislocation and screw dislocation
7 TH	1 st	Effect of imperfection on material properties
	2 nd	Deformation by slip and twinning
	3 rd	Effect of deformation on material properties
	4 th	Effect of deformation on material properties
8 TH	1 st	5. Heat Treatment Purpose of Heat treatment
	2 nd	Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
	3 rd	Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
	4 th	Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
9 TH	1 st	Surface hardening: Carburizing and Nitriding
	2 nd	Surface hardening: Carburizing and Nitriding
	3 rd	Effect of heat treatment on properties of steel
	4 th	Effect of heat treatment on properties of steel
10 TH	1 st	Hardenability of steel
	2 nd	Hardenability of steel
	3 rd	6. Non Ferrous Alloys Aluminum alloys: Composition, property and usage of Duralumin, Y- alloy.
	4 th	Aluminum alloys: Composition, property and usage of Duralumin, Y- alloy
11 TH	1 st	Aluminum alloys: Composition, property and usage of Duralumin, Y- alloy
	2 nd	Copper alloys: Composition, property and usage of Copper-Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
	3 rd	Copper alloys: Composition, property and usage of Copper-Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
	4 th	Predominating elements of lead alloys, Zinc alloys and Nickel alloys
12 TH	1 st	Predominating elements of lead alloys, Zinc alloys and Nickel alloys
	2 nd	Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.
	3 rd	Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.
	4 th	Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.
13 TH	1 st	7. Bearing Material Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
	2 nd	Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
	3 rd	Classification, composition, properties and uses of Copper



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		base, Tin Base, Lead base, Cadmium base bearing materials
	4 th	8. Spring Materials Classification, composition, properties and uses of Iron-base and Copper base spring material
14 TH	1 st	Classification, composition, properties and uses of Iron-base and Copper base spring material
	2 nd	Classification, composition, properties and uses of Iron-base and Copper base spring material
	3 rd	9. Polymers Properties and application of thermosetting and thermoplastic polymers
	4 th	Properties and application of thermosetting and thermoplastic polymers
15 TH	1 st	Properties of Elastomers
	2 nd	10. Composites & Ceramics Classification, composition, properties and uses of particulate based and fiber reinforced composites
	3 rd	Classification, Composition, Properties and uses of particulate based and fiber reinforced composites
	4 th	Classification and uses of Ceramics

Learning Resources:

- A Textbook of Material Science and Metallurgy, by O. P. Khanna, Dhanpat Rai
- Engineering materials and Metallurgy by R.K. Rajput, S. Chand
- Material Science & Process by S. K. Hazra choudhry, Indian Book Distributing



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