

Discipline :MECHANICALENGG	Semester :3 rd	Name of the Teaching Faculty: SAMBEED SOURAV MAHAKUL
Subject: ENGINEERING MATERIAL	No. of days/per week class allotted: 04	Semester From July To December No. of Weeks: 15
Week	Class Day	Theory / Practical Topics
1 ST	1 ST	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	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	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	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

		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	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	Aluminum alloys: Composition, property and usage of Duralmin, γ - alloy.
	4 TH	Aluminum alloys: Composition, property and usage of Duralmin, γ - alloy
11 TH	1 ST	Aluminum alloys: Composition, property and usage of Duralmin, γ - 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	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

		base, Tin Base, Lead base, Cadmium base bearing materials
	4 TH	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	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	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:

01. A Textbook of Material Science and Metallurgy, by O P Khanna, Dhanpat Rai
02. Engineering materials and Metallurgy by R K Rajput, S. Chand
03. Material science & process, by S K Hazrath, Indian Book Distributing