

LESSON PLAN FOR ENGINEERING MATERIALS, 3RD SEM. MECHANICAL ENGG. (2022-2023)

Discipline: Mechanical Engg	Semester: 3rd	Name of the Teaching Faculty: P.R SAMANTARAY
Subject: ENGINEERING MATERIALS	No. of Days/ week class allotted=4	Semester From date: 15.09.2022 To Date: 22.12.2022 No. of Weeks:
Week	Class Day	Theory / Practical Topics
1st	1st	INTRODUCTION TO ALL TOPICS
	2nd	Engineering materials and their properties Material classification into ferrous and non ferrous category and alloys
	3rd	Properties of Materials: Physical, Chemical and Mechanical
	4th	Performance requirements
2nd	1st	Material reliability and safety
	2nd	Ferrous Materials and alloys Characteristics and application of ferrous materials
	3rd	Classification, composition and application of low carbon steel,
	4th	Classification, composition and application of medium carbon steel and High carbon steel
3rd	1st	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel
	2nd	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo
	3rd	Iron – Carbon system Concept of phase diagram
	4th	Concept of phase diagram
4th	1st	Concept of cooling curves

	2nd	Concept of cooling curves
	3rd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	4th	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
5th	1st	Doubt clearing
	2nd	Class Test
	3rd	Crystal imperfections Crystal defines
	4th	Classification of crystals, ideal crystal and crystal imperfections
6TH	1st	Classification of imperfection: Point defects
	2nd	line defects, surface defects and volume defects
	3rd	Types and causes of point defects: Vacancies, Interstitials and impurities
	4th	Types and causes of line defects: Edge dislocation
7th	1st	Types and causes of line defects: screw dislocation
	2nd	Effect of imperfection on material properties
	3rd	Deformation by slip and twinning
	4th	Effect of deformation on material properties
8th	1st	Heat Treatment Introduction
	2nd	Purpose of Heat treatment
	3rd	Process of heat treatment: Annealing, normalizing
	4th	Hardening, tempering, stress relieving measures
9th	1st	Surface hardening: Carburizing
	2nd	Surface hardening: Nitriding

	3rd	Effect of heat treatment on properties of steel
	4th	Effect of heat treatment on properties of steel
10th	1st	Hardenability of steel
	2nd	Revision Class
	3rd	Non-ferrous alloys Aluminum alloys: Composition
	4th	property and usage of Duralmin, γ - alloy.
11th	1st	Copper alloys: Composition
	2nd	Property and usage of CopperAluminum, Copper-Tin, Babbitt
	3rd	Property and usage of Phosperous bronze, brass, Copper- Nickel
	4th	Predominating elements of lead alloys
12th	1st	Predominating elements of Zinc alloys and Nickel alloys
	2nd	Low alloy materials like P-91, P-22 for power plants
	3rd	high temperature services. High alloy materials etc.
	4th	Stainless steel grades of duplex, super duplex materials etc.
13th	1st	Bearing Material Classification, composition
	2nd	, properties and uses of Copper base, Tin Base
	3rd	Lead base, Cadmium base bearing materials
	4th	Spring materials Classification, composition
14th	1st	properties and uses of Ironbase spring material
	2nd	properties and uses of Copper base spring material

	3rd	Polymers Properties and application of thermosetting polymers
	4th	Properties and application of thermoplastic polymers
15th	1st	Properties of elastomers
	2nd	Composites and Ceramics Classification, composition, properties and uses of particulate based composite
	3rd	Classification, composition, properties and uses of fiber reinforced composite
	4th	Classification and uses of ceramics
16th	1st	Overall subject revision
	2nd	Overall subject revision
	3rd	Previous year question answer discussion
	4th	Previous year question answer discussion

P. R. Somentaram
Concerned faculty 20/9/22

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