



Academic Lesson Plan 2024-25 (W)

Discipline: Mechanical Engineering	Semester:3rd	Name of the Teaching Faculty: Janmejy Rout
Subject: ENGINEERING MATERIAL	No.of Days/ per week classallotted:4	Semester From date:01.07.24 No. of Weeks: 15
Week	ClassDay	Topics
1 <sup>st</sup>	1st	Material classification
	2nd	Introduction to ferrous and nonferrous category
	3rd	Alloys
	4th	Types of alloys
2 <sup>nd</sup>	1st	Properties of Materials
	2nd	Physical, Chemical and Mechanical
	3rd	Performance requirements
	4th	Material reliability and safety
3 <sup>rd</sup>	1st	Characteristics of ferrous materials
	2nd	Application of ferrous materials
	3rd	Classification of low carbon steel
	4th	Composition of low carbon steel
4 <sup>th</sup>	1st	Application of low carbon steel
	2nd	Classification of Medium carbon steel
	3rd	Composition of Medium carbon steel
	4th	Application of Medium carbon steel
5 <sup>th</sup>	1st	Classification of High carbon steel
	2nd	composition of High carbon steel
	3 <sup>rd</sup>	Application of High carbon steel
	4 <sup>th</sup>	Alloy steel
6 <sup>th</sup>	1 <sup>st</sup>	Low alloy steel
	2 <sup>nd</sup>	High alloy steel
	3 <sup>rd</sup>	Tool steel
	4 <sup>th</sup>	Stainless steel
7 <sup>th</sup>	1 <sup>st</sup>	Tool steel:
	2 <sup>nd</sup>	Effect of various alloying elements such asCr,Mn,Ni,V,Mo
	3 <sup>rd</sup>	Concept of phase diagram
	4 <sup>th</sup>	Cooling curves
8 <sup>th</sup>	1 <sup>st</sup>	Features of Iron-Carbondiagram
	2 <sup>nd</sup>	Withsalientmicro-constituents of IronandSteel
	3 <sup>rd</sup>	Crystal defines
	4 <sup>th</sup>	Classification of crystals
9 <sup>th</sup>	1 <sup>st</sup>	Crystalim perfections
	2 <sup>nd</sup>	Classification of imperfection
	3 <sup>rd</sup>	Point defects
	4 <sup>th</sup>	Line defects
10 <sup>th</sup>	1 <sup>st</sup>	Volume defects
	2 <sup>nd</sup>	Surface defects
	3 <sup>rd</sup>	Types and causes of point defects
	4 <sup>th</sup>	Vacancies

11th	1 <sup>st</sup>	Interstitial and impurities
	2 <sup>nd</sup>	Types and causes of line defects
	3 <sup>rd</sup>	Edge dislocation
	4 <sup>th</sup>	Screw dislocation
12 <sup>th</sup>	1 <sup>st</sup>	Effect of imperfection on material properties
	2 <sup>nd</sup>	Deformation by slip and twinning
	3 <sup>rd</sup>	Deformation by slip and twinning
	4 <sup>th</sup>	Effect of deformation on material properties
13 <sup>th</sup>	1 <sup>st</sup>	Purpose of Heat treatment
	2 <sup>nd</sup>	Process of heat treatment: Annealing, normalizing, hardening, tempering, Stress relieving measures
	3 <sup>rd</sup>	Surface hardening: Carburizing and Nitriding and Effect of heat treatment on properties of steel
	4 <sup>th</sup>	Hardenability of steel
14 <sup>th</sup>	1 <sup>st</sup>	Aluminum alloys: Composition, property and usage of Duralumin, $\gamma$ -alloy. Copper-Aluminum, Copper-Tin, Babbitt
	2 <sup>nd</sup>	Prosperous bronze, brass, Copper-Nickel, Predominating elements of lead alloys, Zinc alloys and Nickel alloys
	3 <sup>rd</sup>	Low alloy materials like P-91, P-22 for power plants and other high temperature services
	4 <sup>th</sup>	High alloy materials like stainless steel grade soft duplex, super duplex material etc
15 <sup>th</sup>	1 <sup>st</sup>	Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
	2 <sup>nd</sup>	Classification, composition, properties and uses of Iron base and Copper base spring material
	3 <sup>rd</sup>	Properties and application of thermosetting and thermoplastic polymers, Properties of elastomers
	4 <sup>th</sup>	Classification, composition, properties and uses of particulate based and fiber reinforced composites 10.2 Classification and uses of ceramics.

Jayraj Raut