

## LESSON PLAN

<b>DISCIPLINE:</b> Mechanical engineering	<b>Semester:</b> 3RD	<b>Name of the Teaching Faculty:</b> ER.PR.SAHOO
<b>Subject :</b> ENGINEERING MATERIAL	<b>No. of Days / per week class allotted : 4</b>	<b>Semester From date :</b> 01.08.2023 <b>To Date :</b> -23-11-2023 <b>No. of Weeks :</b> 12
<b>Week</b>	<b>Class Day</b>	<b>Topics</b>
1st	1st	<u>ENGINEERING MATERIAL AND THEIR PROPERTIES:</u> Material classification into ferrous and non ferrous category and alloys
	2nd	Properties of Materials: Physical, Chemical
	3rd	and Mechanical
	4th	Performance requirements
2nd	1st	Material reliability and safety
	2nd	<u>FERROUS MATERIAL AND ALLOYS:</u> Characteristics and application of ferrous materials
	3rd	Classification, composition and application of low carbon steel,
	4th	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	<u>IRON-CARBON SYSTEM:-</u> Concept of phase diagram
	4th	cooling curves
4th	1st	cooling curves
	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
	4th	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel

5 <sup>th</sup>	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	<u>CRYSTAL IMPERFECTIONS:</u> Crystal definition, classification of crystals
	4th	ideal crystal and crystal imperfections
6 <sup>th</sup>	1st	Classification of imperfection: Point defects, line defects, surface defects and volume defects
	2nd	Types and causes of point defects: Vacancies, Interstitials and impurities
	3rd	Types and causes of point defects: Vacancies, Interstitials and impurities
	4th	Types and causes of line defects: Edge dislocation and screw dislocation
7 <sup>th</sup>	1st	Types and causes of line defects: Edge dislocation and screw dislocation
	2nd	Effect of imperfection on material properties
	3rd	Deformation by slip and twinning
	4th	Effect of deformation on material properties
8 <sup>th</sup>	1st	<u>HEAT TREATMENTS:</u> Purpose of Heat treatment
	2nd	Process of heat treatment: Annealing,
	3rd	normalizing, stress relieving measures
	4th	hardening, tempering
9 <sup>th</sup>	1st	Surface hardening: Carburizing
	2nd	and 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
	3rd	<u>NONFERROUS ALLOYS</u> : Aluminum alloys: Composition, property
	4th	Usage of Duralumin, $\gamma$ -alloy.
11th	1st	Copper alloys: Composition, property a
	2nd	usage of Copper Aluminum, Copper-Tin
	3rd	Babbitt, Prosperous bronze, brass, Copper-Nickel
	4th	Predominating elements of lead alloys, Zinc alloys and Nickel alloys
12th	1st	Low alloy materials like P-91, P-22 for power plants and other 10 high temperature services
	2nd	High alloy materials like stainless steel grades of duplex, super duplex materials etc.
	3rd	Revision
	4th	Revision
13th	1st	<u>BEARING MATERIAL</u> : Classification, composition, properties
	2nd	uses of Copper base, Tin base, Lead base,
	3rd	Cadmium base bearing materials
	4th	<u>SPRING MATERIAL</u> : Classification, composition, properties
14th	1st	uses of Iron base
	2nd	Copper base spring material
	3rd	<u>POLYMERS</u> : Properties and application of thermosetting
	4th	thermoplastic polymers
15th	1st	Properties of elastomers
	2nd	<u>COMPOSITE AND CERAMICS</u> : Classification, composition, properties
	3rd	uses of particulate based and fiber reinforced composites
	4th	Classification and uses of ceramics