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DEPARTMENT OF MECHANICAL ENGINEERING(2022-2023)

LESSON PLAN (2022-2023)

Discipline: Mechanical	**Semester: 3RD**	**Name of the Teaching faculty: KEDARNATH JENA**
Subject: Engineering Material (Th-3)	**No of Days/ Week class alloted: 4**	**Semester from Date: 15. 19 . 2022 To Date: 22.12.2022** **No of weeks: 15**
Week	**Class Day**	**Topics**
1st	1st	**CH.1 Engineering materials and their properties.** Material classification into ferrous and non ferrous category and alloys
	2nd	Properties of Materials: Physical properties
	3rd	Properties of Materials: Chemical properties.
	4th	Properties of Materials: Mechanical properties.
2nd	1st	Properties of Materials: Mechanical properties.
	2nd	Performance requirements and Material reliability and safety
	3rd	**CH.2 Ferrous materials and alloys.** Characteristics and application of ferrous materials and classification of low carbon steel.
	4th	Composition and application of low carbon steel.
3rd	1st	Classification, composition and application of medium carbon steel.
	2nd	Classification, composition and application of high carbon steel.
	3rd	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel
	4th	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo.
4th	1st	**CH. 3 Iron- Carbon System.** Concept of phase diagram
	2nd	Concept of phase diagram
	3rd	Concept of cooling curves
	4th	Concept of cooling curves
5th	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	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
6th	1st	**CH. 4. Cyrstal Imperfections.** Crystal defines, classification of crystals, ideal crystal and crystal imperfections

	2nd	Classification of imperfection: Point defects,line defects
	3rd	surface defects and volume defects
	4th	Types and causes of point defects: Vacancies, Interstitials and impurities
7th	1st	Interstitials and impurities
	2nd	Types and causes of line defects: Edge dislocation and screw dislocation.
	3rd	Effect of imperfection on material properties
	4th	Deformation by slip and twinning
8th	1st	Effect of deformation on material properties
	2nd	CLASS TEST 1
	3rd	**CH. 5. Heat treatment.** Purpose of Heat treatment
	4th	Process of heat treatment: Annealing, normalizing, hardening
9th	1st	Process of heat treatment: Annealing, normalizing, hardening
	2nd	Tampering, stress relieving measures
	3rd	Tampering, stress relieving measures
	4th	Surface hardening: Carburizing and Nitriding
10th	1st	Surface hardening: Carburizing and Nitriding
	2nd	Effect of heat treatment on properties of steel
	3rd	Effect of heat treatment on properties of steel
	4th	Hardenability of steel
11th	1st	**CH. 6. Non-ferrous alloys.** Aluminum alloys: Composition, property and usage of Duralmin, y- alloy
	2nd	Copper alloys: Composition, property and usage of CopperAluminum, Copper-Tin alloy.
	3rd	Copper alloys: Babbit , Phosperous bronze, brass, Copper- Nickel alloy.
	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 high temperature services.
	2nd	High alloy materials like stainless steel grades of duplex, super duplex materials etc.
	3rd	**CH. 7. Bearing Material.** Classification, composition, properties and uses of Copper base, Tin Base bearing material.
	4th	Classification, composition, properties and uses of Lead base, Cadmium base bearing materials.
13th	1st	**CH. 8. Spring materials**: Classification, composition, properties and uses of Iron base spring material.
	2nd	Classification, composition, properties and uses of Copper base spring material
	3rd	**CH. 9. Polymers** : Properties and application of thermosetting polymers.

	4th	Polymers :Properties and application thermoplastic polymers and properies of elastomers.
14th	1st	**CH. 10. Composites and Ceramics.** Classification, composition, properties and uses of particulate based composites.
	2nd	Classification, composition, properties and uses of fiber reinforced composites.
	3rd	Classification and uses of ceramics.
	4th	Classification and uses of ceramics.
15th	1st	previous year question discussion.
	2nd	previous year question discussion.
	3rd	previous year question discussion.
	4th	CLASS TEST 2

Signature of Faculty