TH3

GOVT. POLYTECHNIC, DHENKANAL

LESSON PLAN: ENGG.MATERIAL, 3RD – SEMESTER,(2024-2025)

Discipline: **Mechanical Engineering**	Semester: **3RD**	Name of the teaching faculty: **PRADEEP KUMAR JENA**
Subject: **EM**	No of days/per week class allotted: **04**	Semester From Date:**16/08/2024** To Date: **16/12/2024** No of weeks:**15**
Week:	Class day:	**Theory/practical topics:**
1ST	**1ST**	**CH-1 (Engineering materials and their properties)** Classificatio of ferrous material
	2ND	Classificatio of non ferrous material and alloys
	3RD	Properties of material : Physical and chemical
	4TH	Properties of material : Mechanical
2ND	**1ST**	Performance requirements, material reliability, safety.
	2ND	**CH-2(Ferrous material and alloys)** Characteristics and application of ferrous materials.
	3RD	Classification, composition and application of low carbon steel, medium carbon steel and high carbon steel.
	4TH	Low alloy steel and high alloy steel.
3RD	**1ST**	Tool steel and stainless steel.
	2ND	Effect of various alloying elements such as Cr,Mn,Ni,V,Mo .
	3RD	**Ch-3(Iron carbon system)** Concept of phase diagram
	4TH	Concept of cooling curve
4TH	**1ST**	Relation between phase diagram and cooling curve .
	2ND	Drawing of Iron – carbon system with various point.
	3RD	Features of Iron – carbon system

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	4TH	Features of Iron – carbon system
5TH	1ST	Micro constituents of Iron.
	2ND	Micro constituents of steel.
	3RD	**CH-4(Crystal imperfections)** Definition and classification of crystals .
	4TH	Ideal crystal and crystal imperfection
6TH	1ST	Classification of imperfaction
	2ND	. Types and causes of point defects
	3RD	Types and causes of point defects
	4TH	Types and causes of line defects
7TH	1ST	Types and causes of line defects
	2ND	Effect of imperfection on material properties
	3RD	Deformation by slip and twinning.
	4TH	. Effect of deformation on material properties.
8TH	1ST	**CH-5(Heat treatment)** Purpose of heat treatment
	2ND	Process of heat treatment: Annealing
	3RD	Normalizing
	4TH	Hardening
9TH	1ST	Tampering
	2ND	Stress relieving
	3RD	Surface hardening : carburizing

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	4TH	Nitriding
10TH	1ST	Effect of heat treatment on properties of steel .
	2ND	Hardenability of steel .
	3RD	**CH-6(Non-ferrous alloys)** Aluminium alloys: Composition, property and usage of Duralmin
	4TH	Composition, property and usage of y-alloy
11TH	1ST	Copper alloy: Composition, property and usage of Copper-aluminium,copper-Tin
	2ND	Composition, property and usage of Babbit and phosperous bronze
	3RD	Composition, property and usage of Brass and Copper-Nickel
	4TH	Predominating elements of lead alloys,Zinc alloys and Nickel alloys
12TH	1ST	Low alloy material like p-91,p-22 for power plants and other high temperature services .
	2ND	High alloy materials like stainless steel grades of duplex materials.
	3RD	Super duplex materials .
	4TH	Doubt clearing class
13TH	1ST	**CH-7(Bearing Material)** Classification , Composition, property and uses of Copper base, Tin base bearing material
	2ND	Classification , Composition, property and uses of lead base bearing material
	3RD	Classification , Composition, property and uses of cadmium base bearing material
	4TH	**CH-8(Spring Materials)** Introduction to Spring material
14TH	1ST	Classification , Composition, property and uses of Iron base spring material
	2ND	Classification , Composition, property and uses of copper base spring material.
	3RD	CH-9(Polymers) Properties and application of thermosetting polymer.

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	4TH	Properties and application of thermoplastic polymers.
15TH	1ST	Properties of elastomer .
	2ND	**CH-(Composites and Ceramics)** Classification , Composition, property and uses of particulate based composites .
	3RD	Classification , Composition, property and uses of reinforced composites .
	4TH	Classification and uses of ceramics .

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