

KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN Session (2023-2024)

Discipline : Mechanical Engineering	Semester: 3 rd (Winter2023)	Name of the Teaching Faculty: Tushar Kanta Mahapatra, Lecturer. Email: tushar.mahapatrafme@kp.kiit.ac.in
Subject: Engineering Material (Th.3)	No. Of Days/Week: 4	Start Date: 01/ 08/2023 End Date: 30/ 11/ 2023
Week	Class Day	Theory Topics
1 st	1st	Material classification into ferrous and non-ferrous category and alloys
	2nd	Properties of Materials: Physical , Chemical and Mechanical
	3rd	Performance requirements
	4th	Material reliability and safety
2 nd	1st	Characteristics and application of ferrous materials
	2nd	Classification, composition and application of low carbon steel, medium carbon steel and 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,
3 rd	1st	Concept of phase diagram
	2nd	Concept of cooling curves
	3rd	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	4th	Class Test/Assignment
4 th	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	Crystal imperfections: Crystal defines, classification of crystals, ideal crystal and

		crystal imperfections
	4th	Classification of imperfection
5 th	1st	Point defects, line defects
	2nd	surface defects and volume defects
	3rd	Types and causes of point defects: Vacancies, Interstitials and impurities
	4 th	Class Test/Assignment
6 th	1st	Recap/Summarize
	2nd	Types and causes of line defects
	3rd	Edge dislocation and screw dislocation
	4 th	Effect of imperfection on material properties
7 th	1st	Deformation by slip and twinning
	2nd	Effect of deformation on material properties
	3 rd	Heat Treatment, Purpose of Heat treatment
	4 th	Recap/Summarize
8 th	1st	Process of heat treatment: Annealing
	2nd	Process of heat treatment: normalizing
	3rd	Process of hardening
	4 th	Process of tempering
9 th	1st	Stress relieving measures
	2nd	Surface hardening: Carburizing
	3rd	Surface hardening: Nitriding
	4 th	Class Test/Assignment
10 th	1st	Effect of heat treatment on properties of steel
	2nd	Hardenability of steel
	3rd	Non-ferrous alloys: Aluminum alloys: Composition, property and usage of Duralumin
	4 th	Aluminum alloys: Composition, property and usage of y-alloy.
11 th	1st	Recap/Summarize
	2nd	Copper alloys: Composition, property and usage of Copper-Aluminum

	3rd	Composition, property and usage of Copper-Tin
	4 th	Babbitt metal , Phosphorous bronze, brass,Copper- Nickel
12 th	1st	Class Test/Assignment
	2nd	Recap/Summarize
	3rd	Properties and usage of lead alloys, Zinc alloys and Nickel alloys
	4 th	High alloy materials like stainless steel grades of duplex, super duplex materials
13 th	1st	Bearing Material: Classification, composition, properties and uses of Copper base, Tin Base
	2nd	Composition, properties and uses of Lead base, Cadmium Base bearing material.
	3rd	Spring materials: Classification, composition, properties and uses of Iron-base spring materials.
	4 th	Composition, properties and uses of Copper base spring material
14 th	1st	Polymers: Properties and application of thermosetting and thermoplastic polymers
	2nd	Properties of elastomers
	3rd	Classification, composition, properties and uses of particulate based and fiber reinforced composites
	4 th	Classification and uses of ceramics
15 th	1st	Revision and Question discussion
	2nd	Revision and Question discussion.
	3rd	Revision and Question discussion.
	4 th	Revision and Question discussion.