KIIT POLYTECHNIC

Department of Mechanical Engineering

LESSON PLAN

Session :: Winter – 2022

Course Type :: Theory

Semester/Branch :: 3rd Semester, Mechanical Engineering

Subject (with code) :: **Engineering Material (Th.3)**

Contact hours/week :: 4

Name of Faculty :: **Tushar Kanta Mahapatra**

SL. NO.	CLASS ID	COURSE CONTENT	MODE OF DELIVERY	EXHIBIT/ REFERENCE
1	1	Material classification into ferrous and non-ferrous category and alloys	Lecture	1. PPT 2. Study material 3. Engineering Materials and Metallurgy by R Srinivasan 4. https://www.youtube.com/watch?v=uutg8jKrL9w
2	2	Properties of Materials: Physical , Chemical and Mechanical	Lecture	
3	3	Performance requirements, Material reliability and safety	Lecture	
4	4	Characteristics and application of ferrous materials	Lecture (Explanation)	1. PPT 2. Study material 3. From Reference Books 4. https://www.youtube.com/watch?v=8-EGhWmizH0
5	5	Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel.	Lecture (Explanation)	
6	6	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel	Lecture	
7	7	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo.	Lecture	
8	8	Recap/Summarize		
9	9	Concept of phase diagram	Lecture	1. From Reference Books 2. YouTube Link / NPTL https://www.youtube.com/watch?v=OQ3SSnmOieQ 3. PPT 4. Study material
10	10	Concept of cooling curves	Lecture (Explanation)	
11	11	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Hybrid	
12	12		Student Participation	
13	13	***Assignment Evaluation/* Review class**		
14	14	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Lecture	1. Study material 2. From Reference Books 3. PPT
15	15	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Lecture (Explanation)	
16	16	Crystal imperfections: Crystal defines, classification of crystals, ideal crystal and crystal imperfections	Lecture	
17	17	Classification of imperfection, Point defects, line defects, surface defects and volume defects	Lecture	
18	18	Types and causes of point defects: Vacancies, Interstitials and impurities, Types and causes of line defects	Hybrid	

19	19	Effect of imperfection on material properties Edge dislocation and screw dislocation	Lecture	
20	20	Deformation by slip and twinning	Lecture	
21	21	Effect of deformation on material properties	Lecture	
22	22	Recap/Summarize		
23	23	**Class Test**		
24	24	Heat Treatment, Purpose of Heat treatment	Lecture	1. Study material 2. PPT 3. https://www.youtube.com/watch?v=3IQz9LAPuIA 4. https://www.youtube.com/watch?v=3IQz9LAPuIA
25	25	Process of heat treatment: Annealing, normalizing,	Lecture	
26	26	Process of heat treatment: hardening, tempering	Lecture	
27	27	Stress relieving measures, Surface hardening: Carburizing, Nitriding	Lecture	
28	28	Effect of heat treatment on properties of steel Hardenability of steel	Lecture	
29	29	***Assignment Evaluation/* Review class**		
30	30	Non-ferrous alloys: Aluminum alloys: Composition, property and usage ofDuralumin	Lecture	1. PPT 2. From Reference Books 3. Study material / 4. https://www.youtube.com/watch?v=lExZrAcNTyw
32	32	Aluminum alloys: Composition, property and usage of y- alloy.	Lecture	
33	33	Copper alloys: Composition, property and usage of Copper-Aluminum	Lecture	
34	34	Composition, property and usage of Copper-Tin	Lecture	
35	35	Babbit metal , Phosperous bronze, brass,Copper-Nickel	Lecture	
36	36	Properties and usage of lead alloys, Zinc alloys and Nickel alloys	Hybrid	
37	37	High alloy materials like stainless steel grades of duplex, super duplex materials	Hybrid	
38	38	***Assignment Evaluation/* Review class**		
39	39	Bearing Material: Classification, composition, properties and uses of Copper base, Tin Base	Lecture	1. Study material 2. From Reference Book 3. PPT
40	40	Composition, properties and uses of Lead base, Cadmium Base bearing material.	Lecture	
41	41	Spring materials: Classification, composition, properties and uses of Iron-base spring materials.	Lecture	1. Study material 2. From Reference Books 3. PPT
42	42	Composition, properties and uses of Copper base spring material	Lecture	
43	43	Polymers: Properties and application of thermosetting and thermoplastic polymers Properties of elastomers	Lecture	
44	44	Classification, composition, properties and uses of particulate based and fiber reinforced composites,	Lecture	
45	45	Classification and uses of ceramics	Lecture	
46	46	***Assignment Evaluation/* Review class**		
47	47	*Discussion on Previous year question paper*	Group Discussion	
48	48	*Discussion on Previous year question paper*	Group Discussion	

Signature of Concern Teacher