

Dicipline: <u>Mechanical Engineering</u>	Semester: <u>3rd sem</u>	Name of the Teaching Faculty: <u>Tapan Kumar Jena</u>	
Subject: <u>Engineering Material</u>	No of Days/Week Class Allotted: <u>04</u>	Semester From date: <u>01.10.21</u> To date: <u>18.01.22</u>	No. of Weeks: <u>15</u>

WEEK	Class Day	Theory Topics
1st week	1st	Material classification in to ferrous and non ferrous category and alloys.
	2nd	properties of material - physical properties
	3rd	properties of material - chemical properties
	4th	
	5th	
2nd week	1st	properties of material :- mechanical properties
	2nd	Performance requirement
	3rd	Material reliability and safety.
	4th	characteristics and application of ferrous on at part.
	5th	
3rd week	1st	classification, composition and application of low carbon steel, medium carbon steel and high carbon steel.
	2nd	Alloy steel - Low alloy steel, High alloy steel
	3rd	Alloy steel - Tool steel and stainless steel
	4th	Tool steel :- effect of various alloying elements Cr, Mn, Ni.
	5th	

WEEK	Class Day	Theory Topics
4th week	1st	Tool steel - effect of various alloying elements as V, Mo
	2nd	concept of phase diagram
	3rd	various types of phase diagram and concept of eutectic reaction.
	4th	concept of cooling curves
	5th	
5th week	1st	concept of Iron - carbon phase diagram
	2nd	features of Iron - carbon phase diagram
	3rd	Iron - carbon phase diagram with relevant microconstituents at Iron and steel.
	4th	crystals (definition classification) Ideal crystal and crystal imperfection.
	5th	
	1st	Classification of imperfection: Point defects, line defects, surface defects and volume defects
	2nd	type and cause of point defects: vacancies, interstitials and impurities.
	3rd	types and causes of line defects: edge dislocation and screw dislocation.
	4th	effect of imperfection on material properties.
	5th	

Dicipline: <u>Mechanical Engg</u>	Semester: <u>8^oo</u>	Name of the Teaching Faculty: <u>Tapan Kumar Jena</u>	
Subject: <u>Engg Material</u>	No of Days/Week Class Allotted: <u>4</u>	Semester From date: <u>01-10-21</u> To date: <u>18-01-22</u>	No. of Weeks: <u>15</u>

WEEK	Class Day	Theory Topics
7 th week	1st	Deformation by slip and twinning effect of deformation on material properties.
	2nd	process of heat treatment - Annealing
	3rd	process of heat treatment - Normalizing hardening
	4th	Tempering, stress relieving measures.
	5th	
8 th week	1st	Surface hardening carburizing and nitriding.
	2nd	Effect of heat treatment on properties of steel
	3rd	Hardenability of steel
	4th	Aluminium alloys: composition, property and cause of ductility - alloy.
	5th	
9 th week	1st	Copper alloys: composition property and usage of copper aluminium, copper-Ten.
	2nd	Babbitt phosphorous Bronze (composition property uses)
	3rd	Brass, Copper-Nickel (composition property and usage)
	4th	Predominating elements of lead alloys zinc alloys and Nickel alloys.
	5th	

WEEK	Class Day	Theory Topics
10th week	1st	predominating elements of lead alloys Zinc alloy and Nickel alloys
	2nd	Low alloy material like P, Al, P-22 for power plants and other high entropy service
	3rd	High alloy materials like stainless steel grades of duplex, super duplex, materials.
	4th	Bearing materials: classification, composition.
	5th	
11th week	1st	properties and uses of copper based bearing materials.
	2nd	Tin base bearing materials (classification composition properties and uses)
	3rd	Lead based bearing material (composition properties and uses).
	4th	cadmium based bearing materials (composition properties and uses)
	5th	
12th week	1st	spring materials - Iron base (classification properties)
	2nd	uses of iron based spring material
	3rd	copper based spring material (composition properties)
	4th	uses of copper based spring materials.
	5th	

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WEEK	Class Day	Theory Topics
13 th week	1st	Thermosetting polymers and their properties
	2nd	Application of thermosetting polymers.
	3rd	Thermoplastic polymers and their properties.
	4th	Application of thermoplastic polymers.
	5th	
14 th week	1st	properties of elastomers
	2nd	Composites. Particulate based classification, composition.
	3rd	properties and uses of particulate based composites.
	4th	Composites; fiber reinforced composites classification, composition.
	5th	
15 th week	1st	properties of fiber reinforced composites and their uses
	2nd	classification of ceramics.
	3rd	versatile uses of ceramics.
	4th	
	5th	