

Discipline: Mechanical Engineering	Semester : 3 <sup>rd</sup> Semester-2020-21	Name of the Teaching Faculty: Shri Arun kumar Sahu, Ptgf mechanical engineering
Subject: ENGINEERING MATERIALS	No. of Days/week Class Allotted: 60	Semester from date: 01/09/ 2020 to date: 19/03 /2021 No of weeks: 18
week	Class Day	Theory Topics
1 <sup>st</sup>	1 <sup>st</sup>	Material Classification into ferrous and nonferrous ferrous category and alloys
	2 <sup>nd</sup>	Physical Properties of Materials
	3 <sup>rd</sup>	Chemical Properties of Materials
	4 <sup>th</sup>	Mechanical Properties of materials
2 <sup>nd</sup>	1 <sup>st</sup>	Performance requirements
	2 <sup>nd</sup>	Material reliability and safety
	3 <sup>rd</sup>	Characteristics and application of ferrous materials
	4 <sup>th</sup>	Classification, composition and application of Low carbon steel
3 <sup>rd</sup>	1 <sup>st</sup>	Classification, composition and application of medium carbon steel
	2 <sup>nd</sup>	Classification, composition and application of High carbon steel
	3 <sup>rd</sup>	Low alloy steel
	4 <sup>th</sup>	High alloy steel
4 <sup>th</sup>	1 <sup>st</sup>	Tool steel and Stain less steel
	2 <sup>nd</sup>	Toolsteel:Effect ofvariousalloyingelementssuchasCr,Mn,Ni,V suchasCr,Mn,Ni,V, Mo
	3 <sup>rd</sup>	Concept of phase diagram and cooling curves
	4 <sup>th</sup>	Feature esofIron-Carbondiagramwithsalientmicro-constituentsof Iron and Steel
5 <sup>th</sup>	1 <sup>st</sup>	Crystaldefines,classificationofcrystals,idealcrystalandcrystalimperfections
	2 <sup>nd</sup>	Classificationofimperfection
	3 <sup>rd</sup>	Pointdefects,linedefects,surfacedefectsand volumedefects
	4 <sup>th</sup>	Typesandcausesofpointdefects:Vacancies,Interstitialsandimpurities
6 <sup>th</sup>	1 <sup>st</sup>	Typesandcausesoflinedefects:Edgedislocation
	2 <sup>nd</sup>	screwdislocation
	3 <sup>rd</sup>	Effectofimperfectiononmaterialproperties
	4 <sup>th</sup>	Deformationbyslipandtwinning
7 <sup>th</sup>	1 <sup>st</sup>	Effectofdeformationonmaterialproperties
	2 <sup>nd</sup>	PurposeofHeattreatment
	3 <sup>rd</sup>	Processofheattreatment

	4 <sup>th</sup>	Annealing, normalizing
8 <sup>th</sup>	1 <sup>st</sup>	hardening, tempering, stress relieving measures
	2 <sup>nd</sup>	Surface hardening
	3 <sup>rd</sup>	Carburizing and Nitriding
	4 <sup>th</sup>	Effect of heat treatment on properties of steel
9 <sup>th</sup>	1 <sup>st</sup>	Hardenability of steel
	2 <sup>nd</sup>	Aluminum alloys: Composition, property and usage of Duralmin, $\gamma$ -alloy.
	3 <sup>rd</sup>	Copper alloys: Composition, property and usage of Copper-Aluminum
	4 <sup>th</sup>	Copper-Tin, Babbitt, Phosphorous bronze, brass, Copper-Nickel
10 <sup>th</sup>	1 <sup>st</sup>	Predominant elements of lead alloys, Zinc alloys and Nickel alloys
	2 <sup>nd</sup>	Low alloy materials like P-91, P-22 for power plants
	3 <sup>rd</sup>	high temperature services. High alloy materials like stainless steel grades of duplex, super duplex material etc.
	4 <sup>th</sup>	Classification, composition, properties and uses of copper base bearing Material
11 <sup>th</sup>	1 <sup>st</sup>	Classification, composition, properties and uses of Tin base bearing Material
	2 <sup>nd</sup>	Classification, composition, properties and uses of Lead base bearing Material Cadmium base bearing Material
	3 <sup>rd</sup>	Classification, composition, properties and uses of Iron-base spring materials
	4 <sup>th</sup>	Classification, composition, properties and uses of Copper base spring material
12 <sup>th</sup>	1 <sup>st</sup>	Properties and application of thermosetting and thermoplastic polymers
	2 <sup>nd</sup>	Properties of elastomers
	3 <sup>rd</sup>	Classification, composition, properties and uses of particulate based and fiber reinforced composites
	4 <sup>th</sup>	Classification and uses of ceramics
13 <sup>th</sup>	1 <sup>st</sup>	Revision of Chapter – 1.1, 1.2
	2 <sup>nd</sup>	Revision of Chapter – 1.3, 1.4
	3 <sup>rd</sup>	Revision of Chapter – 2.1, 2.2, 2.3
	4 <sup>th</sup>	Revision of Chapter – 2.4
14 <sup>th</sup>	1 <sup>st</sup>	Revision of Chapter – 3.1
	2 <sup>nd</sup>	Revision of Chapter – 3.2
	3 <sup>rd</sup>	Revision of Chapter – 4.1, 4.2
	4 <sup>th</sup>	Revision of Chapter – 4.3, 4.4
15 <sup>th</sup>	1 <sup>st</sup>	Revision of Chapter – 4.5, 4.6, 4.7
	2 <sup>nd</sup>	Revision of Chapter – 5.1, 5.2
	3 <sup>rd</sup>	Revision of Chapter – 5.3, 5.4, 5.5
	4 <sup>th</sup>	Revision of Chapter – 6.1, 6.2
16 <sup>th</sup>	1 <sup>st</sup>	Revision of Chapter – 6.3, 6.4
	2 <sup>nd</sup>	Revision of Chapter – 7
	3 <sup>rd</sup>	Revision of Chapter – 8

	4 <sup>th</sup>	Revision of Chapter – 9	
17 <sup>th</sup>	1 <sup>st</sup>	Revision of Chapter – 10.1	
	2 <sup>nd</sup>	Revision of Chapter – 10.2	
	3 <sup>rd</sup>	Discussion of Probable Questions and Answers (1)	
	4 <sup>th</sup>	Discussion of Probable Questions and Answers(2)	
18 <sup>th</sup>	1 <sup>st</sup>	Discussion of Probable Questions and Answers (3)	
	2 <sup>nd</sup>	Discussion of Probable Questions and Answers(4)	
	3 <sup>rd</sup>	Discussion of Probable Questions and Answers (5)	
	4 <sup>th</sup>	Discussion of Probable Questions and Answers (6)	