GOVERNMENT POLYTECHNIC, BALASORE

Government of Odisha

ସରକାରୀ ବହୁବୃତି ଅନୁଷ୍ଠାନ, ବାଲେଶ୍ୱର

Academic Lesson Plan for Winter semester- 2023-24

Name of the teaching faculty: Janmejay Rout **Department: Mechanical Engg.**

Total Periods: 60 **Semester: 3rd** **Subject: ENGG. MATERIAL**

End semester exam: 80 **No. of periods per week: 4**

Class test: 20

Total Marks : 100

Week	Class Day	Topics
1st	1st	Material classification
	2nd	Introduction to ferrous and non-ferrous category
	3rd	Alloys
	4th	Types of alloys
2nd	1st	Physical Properties of Materials
	2nd	Chemical and Mechanical Properties
	3rd	Performance requirements.
	4th	Material reliability and safety
3rd	1st	Characteristics of ferrous materials
	2nd	Application of ferrous materials
	3rd	Classification of low carbon steel
	4th	Composition of low carbon steel
4th	1st	Application of low carbon steel
	2nd	Classification of Medium carbon steel
	3rd	Composition of Medium carbon steel
	4th	Application of Medium carbon steel
5th	1st	Classification of High carbon steel
	2nd	Composition of High carbon steel
	3rd	Application of High carbon steel
	4th	Alloy steel
6th	1st	Low alloy steel
	2nd	High alloy steel
	3rd	Tool steel
	4th	Stainless steel
7th	1st	Tool steel:
	2nd	Effect of various alloying elements such as Cr, Mn, Ni, V, Mo
	3rd	Concept of phase diagram
	4th	Cooling curves
8th	1st	Features of Iron-Carbon diagram
	2nd	With salient micro-constituents of Iron and Steel
	3rd	Crystal defines
	4th	Classification of crystals
9th	1st	Crystal imperfections
	2nd	Classification of imperfection
	3rd	Point defects
	4th	Line defects

10th	1st	Volume defects
	2nd	Surface defects
	3rd	Types and causes of point defects
	4th	Vacancies
11th	1st	Interstitials and impurities
	2nd	Types and causes of line defects
	3rd	Edge dislocation
	4th	Screw dislocation
12th	1st	Effect of imperfection on material properties
	2nd	Deformation by slip.
	3rd	Deformation by twinning.
	4th	Effect of deformation on material properties
13th	1st	Purpose of Heat treatment
	2nd	Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures
	3rd	Surface hardening: Carburizing and Nitriding and Effect of heat treatment on properties of steel
	4th	Hardenability of steel
14th	1st	Aluminum alloys: Composition, property and usage of Duralmin, y- alloy. Copper- Aluminum, Copper-Tin, Babbit
	2nd	Phosperous bronze, brass, Copper-Nicke, Predominating elements of lead alloys, Zinc alloys and Nickel alloys
	3rd	Low alloy materials like P-91, P-22 for power plants and other high temperature services
	4th	High alloy materials like stainless steel grades of duplex, super duplex materials etc
15th	1st	Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
	2nd	Classification, composition, properties and uses of Ironbase and Copper base spring material
	3rd	Properties and application of thermosetting and thermoplastic polymers, Properties of elastomers
	4th	Classification, composition, properties and uses of particulate based and fiber reinforced composites. Classification and uses of ceramics.

11/8/23

Janmejay Rout

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(PTGF MECHANICAL ENGG.)