

GOVT. POLYTECHNIC, NAYAGARH

3rd SEMESTER MECHANICAL ENGINEERING (2022-23)

SUBJECT- ENGINEERING MATERIALS

**TOTAL PERIODS-60
THEORY-4P/WEEK**

**NAME OF FACULTY :Prafulla Kumar Mallick,PTGF(Mech)&
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Sl No.	week	Day	Topics to be covered
1	1 st	1 st day	Material classification into ferrous and non ferrous category and alloys
		2 nd day	Properties of Materials: Physical and Chemical Mechanical
		3 rd day	Properties of Materials: Mechanical and Thermal properties
		4 th day	Material reliability and safety
Sl No.	week	Day	Topics to be covered
2	2 nd	1 st day	Characteristics and application of ferrous materials
		2 nd day	Classification, composition and application of low carbon steel,
		3 rd day	Classification, composition and application of medium carbon steel and High carbon steel
		4 th day	Alloy steel: Low alloy steel and high alloy steel
Sl No.	week	Day	Topics to be covered
3	3 rd	1 st day	Types of tool steel and stainless steel:Classification,Properties and uses
		2 nd day	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,
		3 rd day	Introduction to Iron – Carbon system
		4 th day	Concept of phase diagram
Sl No.	week	Day	Topics to be covered
4	4 th	1 st day	Concept of Cooling curves
		2 nd day	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
		3 rd day	Iron-Carbon diagram
		4 th day	Crystal defines and classification of crystals
Sl No.	week	Day	Topics to be covered
5	5 th	1 st day	Ideal crystal definition
		2 nd day	Classification of imperfection: Point defects and Line defects
		3 rd day	Types of surface defects and volume defects
		4 th day	Types and causes of point defects: Vacancies, Interstitials and impurities
Sl No.	week	Day	Topics to be covered
6	6 th	1 st day	Types and causes of line defects: Edge dislocation and screw dislocation
		2 nd day	Effect of imperfection on material properties

		3 rd day	Deformation by slip and twinning
		4 th day	Effect of deformation on material properties
Sl No.	week	Day	Topics to be covered
7	7 th	1 st day	Introduction to Heat Treatment
		2 nd day	Purpose of Heat treatment
		3 rd day	Process of heat treatment: Annealing, Normalizing and Hardening
		4 th day	Tempering and stress relieving measures
Sl No.	week	Day	Topics to be covered
8	8 th	1 st day	Surface hardening: Carburizing and Nitriding process
		2 nd day	Effect of heat treatment on properties of steel
		3 rd day	Hardenability of steel
		4 th day	Revision and Discussions with doubt clearance
Sl No.	week	Day	Topics to be covered
9	9 th	1 st day	Introduction to Non-ferrous alloys
		2 nd day	Aluminum alloys: Composition, property and usage of Duralmin, γ - alloy
		3 rd day	Copper alloys: Composition, property and usage of CopperAluminum, Copper-Tin, Babbit alloys
		4 th day	Copper alloys: Composition, property and usage of Phosperous bronze, brass, Copper- Nickel alloys
Sl No.	week	Day	Topics to be covered
10	10 th	1 st day	Predominating elements of lead alloys, Zinc alloys and Nickel alloys
		2 nd day	Low alloy materials like P-91, P-22 for power plants
		3 rd day	High alloy materials like stainless steel grades of duplex, super duplex materials
		4 th day	Introduction to Bearing Material
Sl No.	week	Day	Topics to be covered
11	11 th	1 st day	Classification, composition, properties and uses of Copper base bearing materials
		2 nd day	Classification, composition, properties and uses of Tin Base and Lead base, bearing materials

		3 rd day	Classification, composition, properties and uses of Cadmium base bearing materials
		4 th day	Doubt clearance
Sl No.	week	Day	Topics to be covered
12	12 th	1 st day	Introduction to Spring materials
		2 nd day	Classification, composition, properties and uses of Ironbase Spring materials
		3 rd day	Classification, composition, properties and uses of copperbase Spring materials
		4 th day	Doubt clearance
Sl No.	week	Day	Topics to be covered
13	13 th	1 st day	Introduction to Polymers
		2 nd day	Classification of Polymers and types
		3 rd day	Polymer reaction
		4 th day	Properties and uses of Plastics
Sl No.	week	Day	Topics to be covered
14	14 th	1 st day	Properties and application of Thermosetting and Thermoplastic polymers
		2 nd day	Properties of Elastomers and types
		3 rd day	Uses of Elastomers
		4 th day	Introduction to composites and Ceramics
Sl No.	week	Day	Topics to be covered
15	15 th	1 st day	Classification, composition and properties of Composites
		2 nd day	Uses of particulate based and fibre reinforced composites
		3 rd day	Classification and uses of ceramics
		4 th day	Doubt clearance and Revision