Student Name :KRISHNARAJ PRASHANT THADESAR (1032210888)
Academic Session:2021-2022 Semester Name:TRIMESTER-I Course Year Name:FY - IX

Subject Name : Material Science

Sr No	Unit	Topic Details
1	UNIT-I	Chemical and Physical properties of metals & non-metals,Classification of materials
		Historical perspective of Materials Science, Resent development in Material Science,Selection process of engineering materials (general aspects)
		Structures of metals (BCC, FCC & HCP systems), Miller indices, Numerical based on miller indices
		Definition & classification of imperfection in crystal structure,Importance of characterizations
		Different methods of characterization,Optical microscope, Classification & applications of Electron Microscope,
		Spectrophotometer, X-ray Diffraction (XRD),Scanning Electron Microscope (SEM), Transmission Electron Microscopy (TEM).
2	UNIT-II	Study of different properties of metals and non-metals (Hardness, Strength, Toughness)
		Study of different properties of metals and non-metals (Stiffness, Ductility, Brittleness, Malleability, Bending strength)
		Stress- Strain curve of Ductile and Brittle Materials
		Types of deformation: - Plastic and Elastic, Ductile and Brittle fracture
		Thermal, Magnetic and Optical properties of Materials
		Influence of temperature on magnetic behaviour.
3	UNIT-III	Special purpose plastics. Introduction to composite, Classification and application of composite materials
		Polymers, Types of polymers, Polymerization techniques, Applications of polymers
		Manufacturing process of composite, Iso-stress-iso-strain condition of composite,Numerical on iso-stress iso-strain conditions
		Recent developments in non-ferrous alloys, Lever Rule, Numerical on lever rule.
		Copper & its alloys like Brass, Bronze, Babbitt, Soldering & Brazing materials
		Common non-ferrous metals - Aluminium & its alloys like Hindalium, LM-6, LM-12
		Introduction to ceramics, Types and applications. Introduction to nonferrous metals
4	UNIT-IV	Smart materials, Shape Memory Alloys
		Chromic materials (Thermo, Photo & Electro),Rheological fluids

Sr No	Unit	Topic Details
		Classification of bio-materials. Comparison of properties of some common biomaterials, Metallic implant materials (Stainless steel and Titanium-based alloys)
		Polymeric implant materials (Polyamides, Polypropylene, Acrylic resins & Hydrogels), Tissue replacement implants, Biosensors
		Dielectric materials, Piezoelectric, Pyro electric and Ferroelectric materials and their applications.
		Materials used for electrical and electronics devices, Materials for sports
		Meta materials- introduction, classification, types, applications, introduction to super alloys.
5	UNIT-V	Green design, Environmental and Societal considerations of materials
		Introduction, Economic considerations
		Recycling of metals and non-metals, Recycling issues, Limits of recycling
		Life cycle analysis and its use in design.