

2.3 30253 MATERIAL SCIENCE & ENGINEERING

UNIT-1 CLASSIFICATION AND PROPERTIES OF MATERIALS:

- 1.1 Introduction to engineering materials
- 1.2 Classification of materials
- 1.3 Thermal, chemical, electrical, mechanical properties of various materials
- 1.4 Selection criteria for use in industry

UNIT-2 STRUCTURE OF METALS AND THEIR DEFORMATION:

- 2.1 Metal structure & Arrangement of atoms in metals
- 2.2 Crystalline structure of metals
- 2.3 Crystal imperfections
- 2.4 Deformation of metal
- 2.5 Impact of cold and hot working on metal structure.

UNIT-3. FERROUS MATERIALS:

- 3.1 Classification of iron and steel
- 3.2 Sources of Iron ore and its availability
- 3.3 Manufacture of pig iron, wrought iron, cast iron and steel
- 3.4 Types of cast iron: white, malleable grey, mottled, nodular and alloy and their usage.
- 3.5 Classification of steels
- 3.6 Different manufacturing method of steel open hearth, Bessemer, electric arc.
- 3.7 Specification as per BIS and equivalent standards
- 3.8 Effect of various alloying elements on steel
- 3.9 Use of alloy steel (high-speed steel, stainless steel, spring steel, silicon steel)

UNIT-4. NON FERROUS MATERIALS:

- 4.1 Important ores and properties of aluminum, copper, zinc, tin, lead
- 4.2 Properties and uses of nonferrous alloys

UNIT-5. ENGINEERING PLASTICS AND FIBERS:

- 5.1 Introduction of plastics
- 5.2 Classification - Thermoplastic and thermosetting
- 5.3 Various trade names of engineering plastics
- 5.4 Fibers and their classification: Inorganic and organic fibers
- 5.5 Uses of fiber

UNIT-6. INSULATING MATERIALS:

- 6.1 Various heat insulating material and their usage like asbestos, glass, wool Thermocol, cork, puff, china clay.
- 6.2 Various electrical insulating materials and their use.

Reference Book: Material Science for Polytechnics by R.K.Rajput