

SYLLABUS :-

Prerequisite Nil Introduction, history of materials technology and classification of materials; Atomic Structure and Interatomic Bonding; Crystallography: crystal systems, notations for lattice directions and planes, symmetry elements, common crystal structures, interstitial sites; Defects in Materials: point, line and surface defects, strengthening mechanisms; Mechanical Properties: tensile, hardness, impact, fatigue, creep, fracture; Annealing: cold worked structure, recovery, recrystallization and grain growth; Solidification: nucleation and growth, structure of cast metals, rapid solidification processing; Phase Diagrams: various binary phase diagrams, Fe-Fe₃C diagram, introduction to ternary phase diagrams; Introduction to Solid-State Phase Transformations: diffusion, classification of phase transformations, martensitic and bainitic transformations, precipitation; Introduction to Heat Treatment of Steels: TTT and CCT diagrams, basic heat treatments; Properties of Materials: electrical, thermal, magnetic, and optical; Introduction to Common Engineering Materials: metals, ceramics, electronic materials, polymers and composites. Text Books: 1. William D. Callister, Jr.: Materials Science and Engineering-An Introduction, John Wiley and Sons, U.S.A., 1985. 2. V. Raghavan: Materials Science and Engineering, 4th Edition, Prentice-Hall India, 1998.