

## **AMMR-08: MECHANICAL BEHAVIOUR OF MATERIALS**

### **Course Details:**

Stress tensor & stress transformation. equations, Principle stresses, Strain tensor & strain transformation equations, Isotropic & anisotropic elasticity, elastic strain energy, Yield criteria & constitutive relationships, work hardening, plastic instability & its significance, Crystallographic aspects of deformation, dislocation theory edge, screw & mixed dislocations, resistance to dislocation motion & elastic properties of dislocations, dislocation interactions, multiplication of dislocations, Strengthening mechanisms, Creep characteristics of creep curve & steady state creep. mechanisms & creep mechanism maps, creep under complex stress-states, prediction of long time properties, Fracture toughness & fatigue— Griffith's crack theory energy release rate analysis, modes of loading stress analysis of cracks fracture toughness, Low & high cycle fatigue, Fatigue crack initiation & propagation, Structural aspects of fatigue, fatigue under complex stress-states, environmental assisted cracking & fatigue, some case studies related to design, effect of stricture on strength, ductility & toughness, mechanical behaviour of metals, ceramics, polymers & composites.

### **Text Books and Reference:**

1. Mechanical Metallurgy, G. E. Dieter (McGraw-Hill)
2. Mechanical Behavior of Materials, Meyers & Chawala (Prentice Hall)