

University of California
Department of Mechanical Engineering
Mechanical Behavior of Engineering Materials (ME108)
Spring 2018

Course Content

Introduction (chapter 1)
Microstructure and Deformation of Materials (chapter 2)
Alloying and Hardening (chapter 3)
Heat Treatment (class notes)
Slip Planes, Dislocations, Twinning (class notes)
Introduction to Mechanical Testing (chapter 4)
Stress and Strain (chapter 5)
Complex Stress/Strain States (chapter 6)
Special topics on complex stress states (class notes)
Yielding and Fracture Criteria (chapter 7)
Plastic Deformation (chapter 12)
Ductile and Brittle Fracture (chapter 8)
Fracture Mechanics (chapter 8, class notes)
Fatigue, Stress-based Approach (chapter 9)
Fatigue, Strain-based Approach (chapter 14, class notes)
Cumulative Fatigue Damage (class notes)
Notch Effects in Fatigue (chapter 10)
Crack Growth (chapter 11)
Time-dependent Deformation, Creep (chapter 15)

*Note: The chapters assigned for each topic are from the class-text.

Labs

Lab 1: Heat Treatment, Phase Diagrams, and Indentation Hardness

Lab 2: Deformation due to Monotonic Loading & Fracture Toughness

Lab 3: Time- and Rate-Dependent Deformation

Lab 4: Deformation due to Cyclic Loading

Lab 5: Fatigue

Lab 6: Wear