MECE 3345 Materials Science

Required Textbook: Course materials in ppt format posted in Blackboard Learn

Recommended Textbook: Materials Science and Engineering: An Introduction, 9th edition (or 8th edition), William D. Callister Jr. and David G. Rethwisch, John Wiley and Sons Publishers

Prerequisites: MATH 1431 1432 and 2433 (Calculus); CHEM 1331 and 1332 (Fundamentals of Chemistry); .PHYS 1321 and 1322 (University Physics); MECE 2334 (Thermodynamics); MECE 3336 (Dynamics)

Grading Policy:

Exams	80%
Participation/Attendance	10%
Homework assignments and take-home exam	10%

Course Topics:

Materials introduction (Chapter 1)
Atomic bonding (Chapter 2)
Crystal structures (Chapter 3)
Crystalline defects (Chapter 4)
Diffusion (Chapter 5)
    Exam 1
Mechanical properties of metals (Chapter 6)
Dislocations and strengthening mechanisms (Chapter 7)
Material failure (Chapter 8)
    Exam 2
Phase diagrams (Chapter 9)
Phase transformations (Chapter 10)
Metal applications (Chapter 11)
Corrosion (Chapter 17, option)
    Final exam

Learning Objectives:

The goal of the course is to provide the fundamental concepts in engineering materials, mainly for structural applications.
The objectives are to learn (1) the properties of engineering materials, (2) how microstructures dictate the properties, and (3) how processing conditions control the microstructures.

ABET Student Outcomes:

h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for and an ability to engage in life-long learning
j) knowledge of contemporary issues

Additional Statements:
Syllabus is subject to change.