Atılım University
Department of Metallurgical and Materials Engineering

# MATE 207/208
# Introduction to Materials Engineering

## Summer 2012 - Course Syllabus

**Schedule:** Mondays & Wednesdays from 15:30 to 18:20 at classroom 1025.

**Instructor:** Assist. Prof. Dr. Erkan KONCA **Email:** ekonca@atilim.edu.tr

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**URL:** http://www.atilim.edu.tr/~ekonca/Courses/MATE207/MATE207.htm

**Course Description:** Historical perspective and classification of materials. Atomic structure and theory. Bonding in solids. The structure of crystalline solids. Fundamental mechanical properties of materials. Phase diagrams. Thermal processing of metal alloys. Properties and use of ceramics, glasses and composites. Material selection. Design and economical considerations.

**Textbook:**
*Materials Science & Engineering, An Introduction*, **8E**, W.D. Callister, John Wiley & Sons, 2010.

**Additional Reading:**
*Foundations of Materials Science and Engineering*, **4E**, W.F. Smith, McGraw-Hill, 2006.
*The Science & Engineering of Materials*, **5E**, D.R. Askeland & P.P. Fulay, Thomson, 2005
*Elements of Materials Science & Engineering*, **6E**, L.V. Vlack, Addison-Wesley, 1989.

**Grading:** Midterm (30%), Final Examination (40%), Homework + Quizzes (20%), Attendance (10%).

## COURSE OUTLINE

**1.** Introduction to Materials Science
**2.** Atomic Structure and Interatomic Bonding
**3.** The Structure of Crystalline Solids
**4.** Imperfections in Solids
**5.** Diffusion
**6.** Mechanical Properties of Metals

**Midterm**

**7.** Dislocations and Strengthening Mechanisms
**8.** Failure
**9.** Phase Diagrams
**10.** Phase Transformations in Metals (Chapter 10 & Sections 11.7-9 in Callister)
**11.** Corrosion and Degradation of Materials

**Final Exam covers ALL chapters**