

Syllabus

ME 150 Materials Science and Engineering I

Credits (3-0)3, Spring Semester 2010

<http://www.iyte.edu.tr/~sedatakkurt/me150/me150ana.html>

Instructor: Dr.Sedat AKKURT, Professor, Room:118 ME
Office Hours: 10:30-12:00 Mon, Phone: 750-6705
sedatakkurt@iyte.edu.tr

Course Description :

Atomic structure and bonding in solids. Crystal structures. Imperfections in solids. Diffusion. Mechanical Properties of Metals. Dislocations and strengthening mechanisms.

Course Objectives :

The aim of the course is to introduce basic concepts of materials, mechanical behaviour and testing of metals to the mechanical engineering students.

Grading: 2 Midterm Exams (MT1 Mar 19, MT2 Apr 27) 60%
Final Exam (May 28th, 2010 2:00pm) 30%
Homeworks, pop-quizzes, labs and attendance 10%

Meeting times for class: 1:30 Tuesdays and Fridays, Makina Müh. Binası, Z-55

Required Textbook :

W. D. Callister, "Materials Science and Engineering", Seventh Edition, John Wiley and Sons. Inc., 2007.

Class attendance:

All students are required to attend all classes. A student may be dropped from the course if more than four classes are missed. Students are authorized to leave after a fifteen minute wait if the instructor is not present for the class.

College of engineering honor code :

All students are expected to follow the engineering honor code which means that their work submitted in homeworks, reports and exams are a result of individual effort free from plagiarism and cheating. The course instructor is not meant to be a nanny but is more like a tour guide that shows you where each subject is for you to study. You are the ones that are supposed to be doing the learning, me and the textbook are only tools to help you in the process. Excuse me for even mentioning these but it is important that there is no misunderstanding.

Other References :

1. S.J.P.Schaffer et.al., "The science and design of engineering materials", International Edition, McGraw Hill, New York, 1999.
2. J.F.Schackelford, "Introduction to Materials Science and Engineering", Fourth Edition, MacMillan New York, 1993.
3. L.H. Van Vlack, "Elements of materials Science and Engineering", Sixth Edition, Addison-Wesley, 1989.
4. C.R. Barrett, W.D. Nix, A.S. Tetelman, "The Principles of Engineering Materials", Prentice-Hall, Inc., 1973.

Contents :

1. Atomic structure and Interatomic Bonding (2 weeks)
2. The Structure of Crystalline Solids (2 weeks)
3. Imperfections in Solids (2 week)
 - i) Point Defects
 - ii) Miscellaneous Imperfections
 - iii) Microscopic Examinations
4. Diffusion (2 week)
5. Mechanical Properties of Metals (3 weeks)
 - i) Elastic deformation
 - ii) Plastic Deformation
6. Dislocations and Strengthening Mechanisms (3 weeks)
 - i) Dislocations and Plastic Deformation
 - ii) Mechanism of Strengthening in Metals
 - iii) Recovery, Recrystallization, Grain Growth

Computer Usage:

Basic office software. The course web page will serve as the main medium of communication for this semester for our class. Please check for updates at our web site.

<http://www.iyte.edu.tr/~sedatakkurt/me150/me150ana.html>

Laboratory Work:

Lab: (1) Crystal structure, (2) Use of Optical Microscope, (3) Mechanical testing