

Instructor: Berna TOPUZ (E-Block; Room 320)
Office Hours: Tuesday 10:30-12:00

Classroom: KMD1
Schedule: Friday 08:30-12:15

Textbook:

Donald R. Askeland, Pradeep P. Fulay, Wendelin J. Wright, The Science and Engineering of Materials, Sixth Edition

Supplementary References:

- William D. Callister, David G. Rethwisch, Materials Science and Engineering, Eighth Edition, Wiley, 2011.
- Lawrence H. Van Vlack, Elements of Material Science and Engineering, Sixth Edition

Course Outline:

- Structure-property relationships of engineering materials;
- Atomic structure and bonding;
Interactions in materials at the atomic scale
- Crystal structures (3 weeks);
Short/Long-range order
Arrangement of atoms inside crystals
Fundamentals of x-ray diffraction
- Imperfections in solids (2 weeks);
Crystal defects
- Strength of materials (3 weeks);
Mechanical properties of materials
Stress-strain curves
Elastic/plastic deformation
Failure analysis
- Phase equilibria and transformations (2 weeks);
The lever rule
Binary phase diagrams

Homework and Term Project:

Homework assignment will be submitted on the indicated due date in class hour. Late homework will not be accepted. You can work in groups of 2 or 3 people on the term project assignment.

Evaluations:

There will be two midterm exams, final exam and make-up exam
40% mid-exams, 50% final exam, 10% term project and homework.