

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

**Assistant:** Furkan SOYSAL (E-Block; Room 308)  
**Office Hours:** Wednesday 10:00-11:30 (Office)  
Friday 13:30-18:00 (Unit Operations Lab.)

**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.