



ÇANKAYA UNIVERSITY
MSE 235- Materials Science for Electronics Engineers
(Section 01)
(2021-2022 Fall)



Methods of Instruction	Theor.	Appl.	Lab.	Total	Credit	ECTS Credit
	42	-	-	42	(3 0 3)	4
Semester	Fall 2021 – 2022					
Instructor	Assoc.Prof.Dr. Ziya ESEN Materials Science and Engineering Dept. Room: NB-16, e-mail: ziyaesen@cankaya.edu.tr					
Schedule	Lecture Hours: Tuesday 13:20-16:10 Office hours will be announced					

Course Description

Materials have been an integral and important part of electrical and electronic engineering from finding good conductors of electricity that can carry very high current to finding good insulators that can handle very high voltages.

Semiconductors, superconductors, magnetic materials, optical materials have been all making use of different electron behaviors in solids interacting with electrical, optical and magnetic fields. In order to understand and develop such technologies, a deep and thorough understanding of structure and property of materials is necessary.

Therefore, in this course we will study:

- structures in various sizes (atomic structure, crystal structure, defect structure, electronic structure, microstructure, etc.)
- different properties of materials (electrical, optical, magnetic, etc.)

and eventually do the correlation between structure and property, that is, understand how structure dictates properties of materials.

Text book:

William Callister, Materials Science and Engineering – An Introduction John Wiley & Sons 2007

Reference Books:

- Donald A. Neamen, An introduction to Semiconductor Devices
- Ben G. Streetman, Solid State Electronic Devices, Prentice Hall 2000

Grading Scheme:

Midterm 1	25%
Midterm 2	25%
Final	35%
Quiz+HW	15%



ÇANKAYA UNIVERSITY
MSE 235- Materials Science for Electronics Engineers
(Section 01)
(2021-2022 Fall)



Tentative Course Outline

Week	Topics	Reading
1	Introduction, Definition and Classification of Materials	Chapter 1
2	Atomic structure, periodic table, molecular structure, bonding	Chapter 2
3	Structure of Crystalline Solids	Chapter 3
4	Imperfections in Solids	Chapter 4
5	Diffusion in Solids	Chapter 5
6	Mechanical Properties of Metals I (Test methods; Stress-strain curves)	Chapter 6
7	Mechanical Properties of Metals II (Strength, ductility, toughness, resilience; Dislocations and Strengthening Mech.)	Chapter 6,7
8	Failure I (Fracture, types of fracture, fracture mechanisms, impact test)	Chapter 8
9	Failure II (Fatigue and creep)	Chapter 8
10	Electrical Properties I	Chapter 18
11	Electrical Properties II	Chapter 18
12	Optical Properties	Chapter 21
13	Optical Properties	Chapter 21
14	Review	