2020-2021 Fall semester
Information for
ENS-302 Solid State Physics (Online)

Class hours: Monday, 14:40-16:30
Wednesday, 11:40-12:30
Zoom Link: https://sabanciuniv.zoom.us/j/92419541594

Instructor: İsmet İ. Kaya, Office: FENS-1024, Phone: 9591
Office hour: Friday, 12:40 by appointment in Zoom
TA: There will be no TA's for this course

Textbook:

Solid State Physics by Ashcroft and Mermin, 1976
The Oxford Solid State Basics, Steven H. Simon, 2013

Other Supplementary Books:
Introduction to Solid State Physics by Charles Kittel

Reading assignments and quizzes:

Before every lecture, students will be assigned to read the lecture topic from the textbook to gain a general understanding of the subject as they enter the lecture. The lecture will be as interactive as possible and will be developed on your preliminary study. There will be quiz questions and problem solving throughout the lectures done either individually or in groups.

Exams and grading:

Preliminary Reading/Summary Assignments: 30%
Problem Solving Assignments: 20%
2 Mid Term Exams: 2 x 15%
Final Exam: 20 %

Course content:

An introductory level quantum mechanics course is a pre-requisite, though it can be waived if the student can build their background via other courses and/or by self-study.

Topics to be covered:

The Drude Theory of Metals
The Sommerfield Theory of Metals
Crystal Lattices
Reciprocal Lattice
X-Ray Diffraction
Bloch's Theorem
Nearly Free Electrons
Semiclassical Model of Electron Dynamics
Measuring the Fermi Surface
Cohesive Energy
Classical Harmonic Crystal
Quantum Harmonic Crystal
Phonons in Metals
Homogeneous Semiconductors
Inhomogeneous Semiconductors

Optional topics:
Diamagnetism, Paramagnetism
Magnetic Interactions