**NS 214 - Oscillations, Waves and Optics**

Oscillations, Waves and Optics – Titreşimler, Dalgalar ve Optik – 3 credits. Instructor: Ali Alpar

This is a course primarily for second year FENS students.

Students from other faculties and 3rd and 4th year FENS students can also take it.

The course will serve the needs of the general 2nd year and later FENS student, and will be an important addition for elective courses for the Physics Minor program.

This course will provide the basic physics of linear oscillations and waves, and serve as a common interdisciplinary introduction to applications in different areas of science and engineering. It will also be a basic optics course.

The mathematical content will supply examples for our Mathematics Faculty Courses, Linear Algebra and Differential Equations, on a unified physics basis as well as the use of complex numbers and Fourier analysis with examples from the science of linear systems, waves and optics.

The course will start from the linear response of systems close to stable equilibrium. The physics and mathematics of linear systems will be studied with examples from different kinds of systems, their oscillations and wave modes.

Textbook: G.C. King, “Vibrations & Waves”

Course Contents:

Linear oscillators. Coupled oscillators and normal modes with mechanical and electromagnetic analogues. Inertia, restoring force and damping. Driven systems and resonance. The continuum limit. Waves and wave equations. Wave propagation. Dispersion relations. Phase. Interference and diffraction. Wave packets. Impedance, reflection, absorption and transmission. Polarization.

Ders İçeriği:

Çizgisel osilatörler. Birbirine bağlı osilatör sistemleri, mekanik ve elektromanyetik örnekleri ile normal titreşim kipleri. Eylemsizlik, geri getirme kuvveti ve sönüm. Uyarılan sistemler ve rezonans. Sürekli ortam. Dalgalar ve dalga denklemi. Dalga yayılımı. Faz. Girişim ve kırınım. Dalga paketleri. Empedans, yansıma, soğurma ve geçirme. Polarizasyon.