

Course Outline

Mechanical concepts

Vector description of motion in 2D and 3D.
Circular motion. Angular velocity and acceleration.
Periodic motion. Harmonic oscillator.
Complex exponentials.

Oscillations

Superposition of periodic motions. Beats. Lissajous figures.
Free oscillations.
Forced oscillations. Damping. Resonance.
Normal modes
Fourier analysis

Waves

Mechanical waves. Mathematical description of a wave.
Amplitude, frequency, phase. Wave equation.
Interference and superposition.
Standing waves.
Doppler effect.

Light waves

Wave nature of light
Interference. Diffraction.

Electrical oscillations

Alternating current.
L-C-R circuit.
Electrical resonance.