

Technical Physics II

Winter semester 2024/25

Week	Lecture	Lecturer
1.	Thermodynamics and molecular physics. Kinetic origin of the gas pressure. Kinetic theory of matter. Equation of state. Equipartition theorem.	RNDr. Leja
2.	First law of thermodynamic. Fundamental processes in gases.	RNDr. Leja
3.	Heat work transformation, cyclic process, Carnot cycle. Second law of thermodynamics and third law of thermodynamics.	RNDr. Leja
4.	Electricity and magnetism. Coulomb's law. Electric field and electric potential. Gauss's law in vacuum. I. Maxwell equation in vacuum.	Doc. Sivý
5.	Polarization of dielectric. I. Maxwell equation in dielectric. Capacitance of conductor and capacitor. Energy of electric field.	Doc. Sivý
6.	Electric current. Electric conduction in metals. Ohm's law in differential and integral form. Kirchhoff's laws. Work and power of electric current.	Doc. Sivý
7.	Magnetic field of a point charge, the magnetic field vector. Magnetic field of an elementary conductor. Biot-Savart-Laplace's law. Ampère's law. The law of total current in vacuum. II. Maxwell equation in vacuum. Magnetic flux.	Doc. Sivý
8.	Current loop in the magnetic field. Interaction of magnetic field and matter. Diamagnetic, paramagnetic and ferromagnetic materials.	Doc. Sivý
9.	Electromagnetic induction. Self inductance and mutual inductance. Faraday's law of induction. III. Maxwell equation. Energy of magnetic field. IV. Maxwell equation.	Doc. Sivý
10.	Oscillations. Linear harmonic oscillator. Dynamic description of linear oscillator, its energy. Damped harmonic motion. Forced oscillations. Adding oscillations. Fourier analysis.	Doc. Sivý
11.	Waves. Physical description. Standing waves. Wave equation. Sound waves. Electromagnetic waves.	Doc. Sivý
12.	Optics. Light propagation, reflection, refraction and dispersion. Optical imaging, optical system, plane mirror, spherical mirror, convex and concave lens.	RNDr. Leja
13.	Interferencion, diffraction and polarization of light. Photometry.	RNDr. Leja