

Schedule of the lectures on Biophysics – Dentistry branch, 2024/25

Time: Thursday, 8:45 to 10:15

Place: BIOFS2 (ground floor, room 143), U Nemocnice 5

Date	Lecturer, Topic
3.10.2024	RNDr. Zápotocký: Introduction (biophysics in medicine, systems of physical units, dimensional analysis). Structure of matter I (fundamental forces, quantum phenomena)
10.10.2024	MUDr. Štěpánek: Statistical data analysis (probability distributions, error of measurement, data evaluation)
17.10.2024	RNDr. Zápotocký: Structure of matter II (binding energy, stability of atomic nuclei, magnetic properties of nuclei, ionization, quantum numbers and electronic structure, spectrum of hydrogen atom)
24.10.2024	RNDr. Zápotocký: Bioelectric phenomena (Electric circuits, impedance, ion transport at cell membrane, Nernst potential, action potential and its propagation, electrodiagnostic methods, effects of electric current on organism)
31.10.2024	Prof. Jiráček: Magnetic Resonance (magnetic properties of nuclei, principles of nuclear magnetic resonance and MRI)
7.11.2024	RNDr. Zápotocký: Bioacoustics (basic quantities of physical and physiological acoustics, biophysics of hearing, cochlear implants, medical applications of ultrasound)
14.11.2024	Doc. Stanicová: Optics I (properties of light, interaction of light with matter, lens equation, optical microscope)
21.11.2024	Doc. Stanicová: Optics II (wave optics, interference and diffraction, polarization, laser, biophysics of vision, eye defects)
28.11.2024	RNDr. Zápotocký: Thermodynamics (state quantities, thermodynamic potentials, calorimetry, entropy and 2 nd law of thermodynamics, heat transport, bioenergetics)
5.12.2024	RNDr. Zápotocký: Molecular biophysics I (states of matter, Gibbs rule of phases, Maxwell-Boltzmann distribution, surface tension, viscosity, fluid dynamics)
12.12.2024	RNDr. Zápotocký: Molecular biophysics II (classification of dispersion systems, diffusion, osmotic pressure, dialysis, colloids)
19.12.2024	RNDr. Zápotocký: Radioactivity (physical and effective half-life, spectra of α, β, γ radiation, interaction of radiation with matter, positron emission tomography, radiation detectors and dosimeters)
3.1.2025	Prof. Jiráček: X-ray imaging I (X-ray tube, X-ray production, interaction of X-rays with matter, exposure and dose)
10.1.2025	Prof. Jiráček: X-ray imaging II (principles of X-ray imaging, Computed Tomography, X-ray therapy, dosimetry)
17.1.2025	RNDr. Zápotocký: Review and Special Topics