

## Schedule of the lectures on Biophysics – Dentistry branch, 2023/24

Time: Thursday, 8:45 to 10:15

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

Date	Lecturer, Topic
5.10.2023	RNDr. Zápotocký: <b>Introduction</b> (biophysics in medicine, systems of physical units, dimensional analysis). <b>Structure of matter I</b> (fundamental forces, quantum phenomena)
12.10.2023	MUDr. Štěpánek: <b>Statistical data analysis</b> (probability distributions, error of measurement, data evaluation)
19.10.2023	RNDr. Zápotocký: <b>Structure of matter II</b> (binding energy, stability of atomic nuclei, magnetic properties of nuclei, ionization, quantum numbers and electronic structure, spectrum of hydrogen atom)
2.11.2023	RNDr. Zápotocký: <b>Bioelectric phenomena</b> (Electric circuits, impedance, ion transport at cell membrane, Nernst potential, action potential and its propagation, electrodiagnostic methods, effects of electric current on organism)
9.11.2023	Doc. Jiráček: <b>Magnetic Resonance</b> (magnetic properties of nuclei, principles of nuclear magnetic resonance and MRI)
16.11.2023	RNDr. Zápotocký: <b>Bioacoustics</b> (basic quantities of physical and physiological acoustics, biophysics of hearing, cochlear implants, medical applications of ultrasound)
23.11.2023	Doc. Stanicová: <b>Optics I</b> (properties of light, interaction of light with matter, lens equation, optical microscope)
30.11.2023	RNDr. Zápotocký: <b>Thermodynamics</b> (state quantities, thermodynamic potentials, calorimetry, entropy and 2 <sup>nd</sup> law of thermodynamics, heat transport, bioenergetics)
7.12.2023	Doc. Stanicová: <b>Optics II</b> (wave optics, interference and diffraction, polarization, laser, biophysics of vision, eye defects)
14.12.2023	RNDr. Zápotocký: <b>Molecular biophysics I</b> (states of matter, Gibbs rule of phases, Maxwell-Boltzmann distribution, surface tension, viscosity, fluid dynamics)
21.12.2023	RNDr. Zápotocký: <b>Molecular biophysics II</b> (classification of dispersion systems, diffusion, osmotic pressure, dialysis, colloids)
4.1.2024	Doc. Jiráček: <b>X-ray imaging I</b> (X-ray tube, X-ray production, interaction of X-rays with matter, exposure and dose)
11.1.2024	Doc. Jiráček: <b>X-ray imaging II</b> (principles of X-ray imaging, Computed Tomography, X-ray therapy, dosimetry)
18.1.2024	RNDr. Zápotocký: <b>Radioactivity</b> (physical and effective half-life, spectra of $\alpha, \beta, \gamma$ radiation, interaction of radiation with matter, positron emission tomography, particle accelerators, equivalent and effective dose, radiation detectors and dosimeters)