

# MEDICAL BIOPHYSICS I.

Tutor: *Dr. István Voszka*

## First Semester

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### Week Lecture (1.5 hours per week)

- 1 Radiations (basic concepts)
- 2 Properties of electromagnetic radiations; wave and corpuscular nature
- 3 Attenuation of radiation
- 4 Luminescence and its applications
- 5 Lasers and their medical applications
- 6 Thermal radiation, thermography. Biological effects of light
- 7 Production and spectrum of X-radiation  
Cyclotron; Linear accelerator;
- 8 Attenuation of X-radiation, interactions
- 9 Atomic structure; Radioactive decay law  
Gamma-radiation and its detection
- 10 Radiotherapy, radiosurgery;  
Isotope diagnostics
- 11 SPECT, PET  
Beta-radiation, beta-decay
- 12 Alpha-radiation, alpha-decay  
Interaction with matter
- 13 Dosimetry
- 14 Radiation protection; estimation of risk

### Laboratory (2,5 hours per week)

- Telemedicine  
Fundamentals of biomathematics
- Emission spectroscopy. Light sources  
Spectrophotometry  
Optical lenses; light microscope  
Detection of nuclear radiations
- Amplifier
- Special light microscopes  
Resonance  
Optics of the eye
- Polarimeter
- The attenuation of gamma-radiation
- Dosimetry
- Concentration determination with refractometer  
Repetition