

## REQUIREMENTS

<b>Semmelweis University, Faculty of Medicine</b> <b>Name(s) of the Institute(s) teaching the subject:</b> Department of Biophysics and Radiation Biology
<b>Name of the subject:</b> Medical biophysics II. <b>Credits:</b> 4 <b>Total number of hours:</b> 56 <b>lectures:</b> 21 <b>practices:</b> 35 <b>seminars:</b> - <b>Type of the course (mandatory/elective):</b> mandatory
<b>Academic year:</b> 2022-2023
<b>Code of the course<sup>1</sup>:</b> AOKFIZ668_2A
<b>Course director (tutor):</b> Prof. Dr. Miklós Kellermayer <b>Contact details:</b> Department of Biophysics and Radiation Biology phone: +36-1-459-1500/60200 <b>Position:</b> professor, head of the department <b>Date of habilitation and reference number:</b> 2004 PTE ÁOK 7/2004/habil
<b>Aim of the subject and its place in the curriculum:</b> Aim is to give the knowledge and way of thinking necessary for exact and quantitative understanding of working mechanism of biological systems and the human organism.
<b>Location of the course (lecture hall, practice room, etc.):</b> EOK Szent-Györgyi Albert lecture hall and student laboratories of the department.
<b>Competencies gained upon the successful completion of the subject:</b> Understanding the physical background of life processes and the environmental factors influencing the organism (radiations). Doing and evaluation of measurements individually, production of laboratory reports.
<b>Prerequisite(s) for admission to the subject:</b> Medical biophysics I.
<b>Minimum and maximum number of students registering for the course:</b> Maximum: the number of students in the 1 <sup>st</sup> year. <b>Student selection method in case of oversubscription:</b> -
<b>How to register for the course:</b> Registration in the Neptun system

**Detailed thematic of the course<sup>2</sup>:***Lectures*

1. Generation and properties of X-ray (Dr. Kellermayer)
2. Fundamentals of X-ray diagnostics (Dr. Kellermayer)
3. Thermodynamics: equilibrium, change, laws (Dr. Zrínyi)
4. Transport processes I: Diffusion, Brownian motion. Osmosis (Dr. Veres)
5. Transport processes II: Flow of fluids and gases. Blood as fluid (Dr. Kellermayer)
6. Bioelectric phenomena (Dr. Csik)
7. Sound, ultrasound (Dr. Kellermayer)
8. Biophysics of sensory organs. Vision, hearing. (Dr. Kellermayer)
9. Building blocks of life: water, macromolecules, supramolecular systems (Dr. Kellermayer)
10. Biological motion. Biomechanics, molecular and tissue mechanics (Dr. Mártonfalvi)
11. Methods of investigating biomolecular structure and dynamics. X-ray diffraction, mass spectrometry, infrared spectroscopy (Dr. Kellermayer)
12. Methods of investigating biomolecular structure and dynamics. Radiospectroscopic methods, fundamentals of MRI. (Dr. Kellermayer)
13. Blood circulation and cardiac function (Dr. Kellermayer)
14. Biophysics of pulmonary function. Physical examination (Dr. Kellermayer)

*Practices*

- 1 Blood pressure measurement, dataprocessing.
- 2 Coulter counter
- 3 X-ray measurement
- 4 Microscopy II.
- 5 Gamma energy
- 6 Electrocardiography
- 7 Pulse generator
- 8 Sensory function
- 9 Isotope diagnostics
- 10 Diffusion
- 11 Audiometry
- 12 Fluid flow
- 13 CAT scan
14. Repetition


Teachers: Dr. Gergely Agócs, Dr. Erika Balog, Csilla Csányi, Dr. István Derka, Dr. Rita Galántai, Dr. Judit Gál-Somkuti, Dr. Dóra Haluszka, Dr. Levente Herényi, Dr. Dávid Juriga, Dr. Katalin Kis-Petik, Dr. Károly Liliom, Dr. Zsolt Mártonfalvi, Dr. Gusztáv Schay, Sr. Dániel Veres, Dr. István Voszka

**Potential overlap(s) with other subjects:** Medical physiology, Medical imaging methods, Ophthalmology, Medical statistics, informatics and telemedicine, Mathematical and physical basis of medical biophysics

**Special training activities required<sup>3</sup>:** -

<p><b>Policy regarding the attendance and making up absences:</b> Participation in the practical lessons is compulsory. No more than three absences from practices are allowed for any reason, otherwise the semester will not be credited. <b>The missed measurements should be done with another group during the 4 weeks cycle of laboratory practices if possible. (One should ask for the agreement of the teacher of own group and the other group.)</b></p>
<p><b>Means of assessing the students' progress during the semester<sup>4</sup>:</b> It will be announced on the homepage of the department during the first week of the semester.</p>
<p><b>Requirement for acknowledging the semester (signature):</b> 1. Participation on at least 75 % of the practices, (in case of more than 3 absences the signature for the semester is denied.) 2. Acceptance of the lab. reports. If one has more than 3 „not accepted” lab. reports, the signature is denied. The lab reports must be uploaded to the website at the end of the practice.</p>
<p><b>Type of the examination:</b> Final exam.</p>
<p><b>Exam requirements<sup>5</sup>:</b> See on the homepage of the department</p>
<p><b>Type and method of grading<sup>6</sup>:</b> The final grade is the average of the 3 parts if all are better than 1. The grade is rounded up or down according to the decision of the second examiner. if for one part the student gets 1,5 we do not calculate the average, but the final grade can be max. 2. If any of the grades is 1, the final grade will be 1.</p>
<p><b>How to register for the exam:</b> Through Neptun system</p>
<p><b>Opportunities to retake the exam:</b> According to the educational rules of the university</p>
<p><b>Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):</b> Lecture notes, homework problems on the homepage of the department. Damjanovich-Fidy-Szöllősi (eds): Medical Biophysics (2009) Medical biophysics practices (Semmelweis Publisher, 2015)</p>
<p><b>Signature of the tutor:</b></p>
<p><b>Signature(s) of the head(s) of the Institute(s):</b></p>
<p><b>Date:</b> 2019. 09. 16.</p>

<p><b>Credit Transfer Committee's opinion:</b></p>
<p><b>Comment of the Dean's Office:</b></p>
<p><b>Signature of the Dean:</b></p>

  
<sup>1</sup> Dékáni Hivatal tölti ki, jóváhagyást követően.

<sup>2</sup> Az elméleti és gyakorlati oktatást órákra (hetekre) lebontva, sorszámozva külön-külön kell megadni, az előadók és a gyakorlati oktatók nevének feltüntetésével. Mellékletben nem csatolható!

<sup>3</sup> Pl. terepgyakorlat, kórlapelemzés, felmérés készítése stb.

<sup>4</sup> Pl. házi feladat, beszámoló, zárthelyi stb. témaköre és időpontja, pótlásuk és javításuk lehetősége.

<sup>5</sup> Elméleti vizsga esetén kérjük a tételsor megadását, gyakorlati vizsga esetén a vizsgáztatás témakörét és módját.

<sup>6</sup> Az elméleti és gyakorlati vizsga beszámításának módja. Az évközi számonkérések eredményeink beszámítási módja.