

Cardiorespiratoric and neurophysiological measuring methods

Elective course for medical students in the 3-6th years and pharmacy students in the 4-5th years

Modern research and measuring methods in experimental and clinical medicine (selected chapters)

Elective course for PhD students

Course Director:

- Dr. Habil. László Dézsi, Adjunct Professor of Physiology, Semmelweis University

Deputy Director:

- Dr. Iván Füzes, Dipl. Electrical Engineer, Master Teacher, Semmelweis University

Invited Lecturers:

- Prof. Ákos Jobbágy, Professor of Electrical Engineering, Budapest University of Technology and Economics
- Dr. György L. Nádasy, Associate Professor, Semmelweis University

The purpose of the course: To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical students on cardiorespiratoric and neurophysiological measurements. The course is based on, but further extends the material delivered during the course of Medical physiology. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, discussing how to avoid them.

Acknowledgement of the course: Prerequisite of the course for medical students is the completion of the first 2 years (Theoretical module), for pharmacy students having physiology exam. Regular attendance (maximum 3 absences) is required. Signature in the Index and 2 credit points will be awarded after successful exam. Source: material of the lectures, supplementary literature will be provided by the lecturers. PhD students receive more exam questions compared to graduate students.

Time and location: 1st semester of the 2019/2020 academic year, Mondays at 5:10-6:55 PM, in EOK Beznák room (1094 Budapest, Tüzoltó u. 37-47). *First lecture:* 9th of September, 2019. Applications via the Neptun system. *Contact person:* Dr. László Dézsi (e-mail: dr.dezsi.laszlo@gmail.com). The application of min. 5 students is required.

Detailed Program:

September 9. Introduction. Biomedical engineering (Dr. Dézsi **6:10-6:55 pm**). Design and safety requirements of biomedical equipments (Dr. Füzes **5:10-5:55 pm**)

September 16. General metrology. Basics of measurement and control theory (Dr. Füzes)

September 23. Computerized data acquisition and analysis. Telemetry systems (Dr. Dézsi)

September 30. Sampling of continuous signals. Digitizing analogue signals (Dr. Füzes)

October 7. Home monitoring of cardiovascular health status (Dr. Jobbágy **5:10-5:55 pm**). Determination of blood glucose and tissue glucose concentrations (Dr. Dézsi **6:10-6:55 pm**)

October 14. Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance (Dr. Dézsi **5:10-5:55 pm**). Investigating the electrical activity of the heart. Design of ECG amplifiers (Dr. Füzes **6:10-6:55 pm**)

October 21. Direct and indirect methods to determine cardiac output and peripheral blood flow (Dr. Dézsi)

October 28. Neurophysiological measurements (action potentials, brain stem evoked potentials). Objective studies in audiology (Dr. Füzes)

November 4. Adaptive processes in the cardiovascular system. Investigative methods in experimental angiology (Dr. Nádasy)

November 11. Measuring blood pressure in the lab and clinics (invasive and noninvasive methods) (Dr. Füzes)

November 18. Complement-related immunological and cardiopulmonary responses (CARPA) (Dr. Dézsi)

November 25. Studying brain function by functional imaging systems. The linear CT method (Dr. Füzes)

December 2. Experimental methods to study nociception (Dr. Dézsi)

December 9. Written exam (DL&FI)