

## Cardiorespiratoric and neurophysiological measuring methods

*Elective course for medical (3-6th years), pharmacy and dentistry students (4-5th years) (AOSTLM770\_1A)*

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

*Elective course for PhD students (DI1207\_A and DI1207\_M)*

#### Course Director:

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

#### Deputy Director:

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

#### Invited Lecturers:

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

*The purpose of the course:* To review the theory and practice of modern measuring methods in experimental and clinical medicine, providing practical knowledge to 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 is the completion of the Theoretical module, i.e. having Physiology final exam. Acquisition of the curriculum requires regular attendance (max. 3 absences). Signature in Neptun/Index will be awarded. Sources of the final exam: lecture materials and supplementary literature. PhD students receive more exam questions than graduate students. The final exam can be repeated twice in case of failure or obstruction (medical certificate). After successful exam 2 credit points will be granted.

*Time and location:* 1st semester of the 2021/2022 academic year, Mondays at 5:15-6:45 PM, in EOK Beznák room (1094 Budapest, Tüzoltó u. 37-47). *First lecture:* 6<sup>th</sup> of September, 2021. Applications via the Neptun system. Course announcements and information will be available in Neptun and/or Moodle (itc.moodle.semmelweis). *Contact person:* Dr. László Dézsi (e-mail: [etk.dezsi@gmail.com](mailto:etk.dezsi@gmail.com)). The application of min. 5 students is required in order to start the course.

#### Detailed Program:

**September 6.** Introduction. Biomedical engineering. Measurements of blood gases and the acid-base balance (Dr. Dézsi)

**September 13.** Computerized data acquisition and analysis. Telemetry systems (Dr. Dézsi)

**September 20.** General metrology. Basics of measurement and control theory (Dr. Füzes)

**September 27.** Sampling of continuous signals. Digitizing analogue signals (Dr. Füzes)

**October 4.** Home monitoring of cardiovascular health status (Dr. Jobbágy **5:15-6:00 pm**). Construction consideration of medical instruments (Dr. Füzes **6:00-6:45 pm**)

**October 11.** Experimental study of pulmonary function. Determination of blood glucose and tissue glucose concentrations (Dr. Dézsi)

**October 18.** Measuring blood pressure in the lab and clinics. Investigating the electrical activity of the heart. Design of ECG amplifiers (Dr. Füzes)

**October 25.** Direct and indirect methods to determine cardiac output and peripheral blood flow (Dr. Dézsi)

**November 8.** Neurophysiological measurements (action potentials, brain stem evoked potentials). Objective studies in audiology (Dr. Füzes)

**November 15.** Adaptive processes in the cardiovascular system. Investigative methods in experimental angiology (Dr. Nádasy)

**November 22.** Complement-related immunological and cardiopulmonary responses (CARPA) (Dr. Dézsi)

**November 29.** Studying brain function by functional imaging systems. The linear CT method (Dr. Füzes)

**December 6.** Experimental methods to study pain and nociception (Dr. Dézsi)

Final (written) exam following the lecture (Dr. Dézsi & Dr. Füzes)