MEDICAL PHYSIOLOGY I.

Department of Physiology

Name of subject: Medical Physiology I.
Type of subject: Compulsory subject
Subject code: AOKELT792_1A
Credit Points: 10
Head of the Department: ***Dr. Attila Mócsai, Full Professor***
Course Director: ***Dr. Péter Várnai, Full Professor***
Tutor: ***Dr. András Balla***

Aim of Medical Physiology course:
The goal of Medical Physiology course is to give the students the understanding of the concepts and principles of medical physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course.

Schedule of the subject:

Lectures:

1. **Introduction, body fluids. Functions of cellular membranes, transport across membranes. Transepithelial transports.**
2. **Signal transduction: receptors, G proteins, second messengers. Cellular calcium metabolism, receptors of growth factors and cytokines. Membrane trafficking and vesicular transport.**
3. **Ion channels and resting membrane potential. Action potential. Physiology of nerve cells, synaptic transmission in the central nervous system.**
4. **Neuromuscular junction and physiology of skeletal muscle. Autonomic neurotransmitters and physiology of smooth muscle.**
5. **Physiology of the blood.**
6. **Physiology of the heart I.: origin and spread of cardiac excitation Cardiac cycle. Regulation of cardiac output.**
7. **Electrocardiography (ECG). Physiology of blood circulation: introduction.**
8. **Hemodynamics, systemic circulation. Microcirculation.**
9. **Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.**
10. **Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.**
11. **Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.**
12. **Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.**
13. **Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.**
14. **Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.**

Practices:

- Blood cell counting, determination of hemoglobin concentration and hematocrit, measurement of erythrocyte sedimentation rate
- Leukocyte differential count on peripheral blood smear
- Typing of Blood Groups, Blood Coagulation Test
- Measurement of transport rate on red blood cells. Hemolysis
- Investigation of cardiac functions *in situ*
- Blood pressure measurement in humans
- Echocardiography
- Computer simulation: Neuromuscular junction
- Electromyography (EMG), nerve conduction velocity
- Recording and analyzing the human ECG
- Computer simulation: Skeletal and smooth muscle
- Effects of vagal nerve stimulation on cardiac functions
- Respiratory physiology calculations
- Evaluation of acid-base parameters with the Siggaard-Andersen nomogram

Attendance at classes: The lecture hours per week are 5.5; the practice hours per week are 5. The attendance of a minimum of 75% of practices is necessary for the end-term signature.

Absences:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices.

Requirements for signature:

The attendance in minimum 75% of practices (including seminars) is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is compulsory. No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited.

Requirements of the examination:

Requirements of the semi-final exam: material of the Medical Physiology I.

The semi-final exam is oral exam. The students need to bring ID card and the laboratory report book to participate in the exam. The oral exam consists of two theoretical questions (I-II). The overall result of the oral exam is based on the two theoretical grades; a failed (1) theoretical question results in an overall failed (1) exam.

Lists of the theoretical questions can be found in the webpage of the Department of Physiology. The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the exam place; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Registration for the exam:

Registration for the exam must be recorded through the NEPTUN system.

Modification in the registration must be recorded through the NEPTUN system.

Absences from the exams:

Failing to certify absence or denying it cause registering “absence” = “nem jelent meg” in the lecture book and/or in the NEPTUN system.

List of textbooks:

Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2017. ISBN: 9789633314159.