REQUIREMENTS (Faculty of Medicine)

Semmelweis University

Faculty of Medicine **Department of Physiology**

Name of subject: Medical Physiology I.

Type of subject: Compulsory subject

Subject code: AOKELT466_1A

Credit Points: 10

Head of the Department: Dr. László Hunyady, Full Professor

Course Director: Dr. Péter Várnai, Full Professor

Tutor: Dr. András Balla

Year: 2019/2020

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:

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. Autonomic neurotransmitters and physiology of smooth muscle. Neuromuscular junction and physiology of skeletal muscle. Physiology of the heart I.: origin and spread of cardiac excitation.
5. Cardiac cycle. Regulation of cardiac output. Electrocardiography (ECG).
6. Physiology of blood circulation: introduction. Hemodynamics, systemic circulation. Microcirculation.
7. Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.
8. Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.
9. Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.
10. Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.
11. Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.
12. Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.

13. General principles of regulation in the gastrointestinal tract. Motor functions of the gastrointestinal tract.
14. Secretory functions of the gastrointestinal tract. Digestion and absorption of food. Energy balance, quality and quantity requirement of food.

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 6; the practice hours per week are 5. The attendance of a minimum of 75% of practices (including seminars) 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. Missed sessions must be reported to the teacher the week after. There are no extra practices. Absence from the exam must be certified at the Head of the Department or Course Director within 3 working days.

Obtaining signatures:
The attendance of a minimum of 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.

Semi-final exam:
In the examination period the students have to give semi-final exam in the first semester.

Type and grading of exams:
The semi-final exam is oral 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 but a failed (1) theoretical question results in an overall failed (1) semi-final exam.
Lists of the theoretical questions are listed in the webpage in the Department of Physiology. The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and overcoats should be placed next to the wall of the lecture halls; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Requirements of the exams:

Semi-final exam: material of the Medical Physiology I.
Registration for the exam: Registration for the exam must be recorded through the NEPTUN system.
Modification of the registration for the exam: Modification in the registration must be recorded through the NEPTUN system not later than 48 hours before the start of the exam.
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.