

REQUIREMENTS

Semmelweis University, Faculty of Medicine Name of the managing institute (and any contributing institutes): Department of Physiology
Name of the subject: Medical Physiology I. Credit value: 10 Number of lessons per week: 10,5 lectures: 5,5 practices: 5 seminars: - Subject type: <u>compulsory course</u> elective course optional course
Academic year: 2022/2023 academic year, I. semester
Code of the course¹: AOKELT792_1A
Name of the course leader: Dr. Péter Várnai Contact details: Semmelweis University, Department of Physiology; phone: +36-1-459-1500/60439 Position: Full Professor Date of habilitation and reference number: 2013; reference number: 347
Objectives of the subject, its place in the medical curriculum: 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.
Place where the subject is taught (address of the auditorium, seminar room, etc.): Semmelweis University; Department of Physiology; H-1094 Budapest, Tűzoltó u. 37-47.
Successful completion of the subject results in the acquisition of the following competencies: Understanding of the human physiology which is foundation of medical practice.
Course prerequisites: (see Curriculum, NEPTUN)
Number of students required for the course (minimum, maximum) and method of selecting students: There is no minimum and maximum number of students. Student selection method in case of oversubscription: -
How to apply for the course: Registration must be recorded through the NEPTUN system.

Detailed curriculum: by week*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

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

Other subjects concerning the border issues of the given subject (both compulsory and optional courses!). Possible overlaps of themes: -

Special study work required to successfully complete the course: -

Requirements for participation in classes and the possibility to make up for absences:

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. There are no extra practices and missed practices cannot be retaken. Absence from the exam must be certified at the Head of the Department or Course Director within 3 working days.

Methods to assess knowledge acquisition during term time:

The knowledge of the students is tested in a written form on a weekly base. The written short tests cover the material of lectures of the previous week. Missed tests cannot be repeated. The evaluation of the weekly written test will be expressed as a percentage. The average of percentages of the nine best written tests results in a five-point scale:

0-50% = 1, 51-60% = 2; 61-70% = 3, 71-80% = 4, 81-100% = 5.

This grade is taken into account in the exams.

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.

Type of the examination:

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

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.

Method and type of evaluation:

The semi-final exam is oral exam. The exam starts at 8:45 by showing up in the selected exam place. The exam place and examiners are announced at 8:40. 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). Grouping of questions, the topics of the semifinal exam can be found in <http://semmelweis.hu/elettan/teaching/first-semester>.

I: 1 and 2 topics of the semifinal exam

II: 3, 4 and 5 topics of the semifinal exam

The overall result of the oral exam is based on the lab grade and two theoretical grades but a failed (1) theoretical question results in an overall failed (1) exam. The mathematical average of three partial grades (lab grade and two oral exam grades) gives the grade of the semi-final exam:

Excellent (5): 4.51 - 5.00

Good (4): 3.51 - 4.50

Satisfactory (3): 2.51 - 3.50

Pass (2): 2.00 - 2.50

Fail (1): below 2.00 or in case of failed (1) theoretical question.

The following rules will be enforced during the exam: electronic devices must be kept in the baggage; baggage and overcoats should be placed next to the wall of the lecture halls or the practice rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Failing to certify absence causes registering "absence" = "nem jelent meg" in the NEPTUN system.

How to register for the examination?:

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

Possibilities for exam retake:

Repetition of the exam is possible at least three days after the unsuccessful trial.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:**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.

Signature of the habilitated instructor (course leader) who announced the subject:**Signature of the Director of the Managing Institute:****Hand-in date:**

2022. 05. 15.

Opinion of the competent committee(s):**Comment of the Dean's Office:****Dean's signature:**