

Faculty of Medicine / MEDICINE / MEDICAL PHYSIOLOGY(Biophysics 18)

Course:	MEDICAL PHYSIOLOGY(Biophysics 18)			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
2929	Mandatory	4	22	5.93+3+0
Programs	MEDICINE			
Prerequisites	Anatomy and Histology			
Aims	Students will learn functional relationship among organ systems, regulatory and control mechanisms that govern adaptation of human body to changes in the internal and external environment.			
Learning outcomes	After finishing two semester course and passing exam in Medical physiology, student of medicine should achieve the following learning outcomes and should: MEDICAL PHYSIOLOGY: 1. know the functions of organ systems, and how they interact in the organism as a whole. 2. be able to explain how physiological responses of organ systems relate to their anatomical and histological characteristics, and their biochemical status. 3. know regulatory and compensatory mechanisms that control the function of organ systems. 4. understand the logic and interpret cause and effect relationships in interactions between systems of organs. 5. know general mechanisms in the human body essential adaptation and survival. BIOPHYSICS: 1. know methods which are used in studying of physical phenomena. 2. are able to explain physical basics of functioning particular organs in the human body. 3. know the functional connections between the organ systems and physical conditions of inner and outer environment. 4. understand the logic of cause and effect relationships in biophysical interactions. 5. be able to apply the adopted knowledge in the area of mechanics, thermodynamics, hydrodynamics and optics.			
Lecturer / Teaching assistant	Prof. dr Nataša Popović			
Methodology	This course uses Moodle as a web-based course management system. Teaching is conducted in the form of blended learning. We have face-to-face lectures, lab, seminar presentations, and consultations. They are combined with on-line and computer-mediated delivery of educational material, videos, lab simulations, and tests. Final evaluation is conducted as an oral exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction to physiology. Homeostasis. Cell membrane. Transport of substances through the cell membrane. (Guyton, unit I and II)			
I week exercises	Orientation.			
II week lectures	Membrane potential. Action potential. Contraction of skeletal muscle. Excitation of the skeletal muscle. Excitation and contraction of the smooth muscle. (Guyton, unit II)			
II week exercises	Red blood cells (RBC) in hypo-, iso-, and hypertonic solution. Osmotic resistance of RBC. Physiology of excitable tissues. Demonstration: making neuromuscular preparation (M. Drecun et al.)			
III week lectures	Organization of the nervous system. CNS synapses and synaptic transmission. (Guyton, unit IX)			
III week exercises	Differentiation of intensity of electrical stimulation in neuromuscular preparation. Effect of the increased concentration of K ⁺ on excitability of neuromuscular preparation. (M. Drecun et al.)			
IV week lectures	Sensory receptors. Neuronal circuits for processing information. Somatic sensations: General organization. Pain. (Guyton, unit IX)			
IV week exercises	Effect of local anesthetic on excitability of neuromuscular preparation. Effect of increased concentration of Ca ²⁺ on excitability. (M. Drecun et al.)			
V week lectures	The eye - optics of vision. Receptor and neural function of retina. Central neurophysiology of vision. The sense of taste and smell. (Guyton, unit XI) Test 1.			
V week exercises	Simple muscle contraction. Effect of the myorelaxing compounds on neuromuscular junction. Neuromuscular pharmacology. (M. Drecun et al.)			
VI week lectures	The sense of hearing and balance. Central motor and integrative neurophysiology. Motor functions of the spinal cord, the spinal cord reflexes. (Guyton, unit XI)			
VI week exercises	Effect of fatigue in simple muscle contraction. Effect of temperature in simple muscle contraction. (M. Drecun et al.)			
VII week lectures	The autonomic nervous system and adrenal medulla. (Guyton, unit XI) Cortical and brain stem control of motor function. (Guyton, unit XI)			
VII week exercises	Summation of stimuli in muscle contraction. Complex muscle contraction- tetanus. (Đ. Sterio et al.)			

VIII week lectures	Contributions of the basal ganglia and cerebellum to overall motor control (Guyton, unit XI)
VIII week exercises	Visual acuity. Determination of punctum proximum and punctum remotum. Color vision. Mariotte's experiment. Lenses. (M. Drecun et al.)
IX week lectures	Cerebral cortex, intellectual functions of the brain, learning and memory (Guyton, unit XI)
IX week exercises	Basic clinical tests for examination of hearing (Đ. Sterio et al.)
X week lectures	Behavioral and motivational mechanisms of the brain- the limbic system and the hypothalamus. States of brain activity and sleep. (Guyton, unit XI)
X week exercises	Analysis of the reflex arc. Spinal reflexes of a frog. (Đ. Sterio et al.)
XI week lectures	Red blood cells (RBC). Blood types. Hemostasis. (Guyton, unit VI) Test 2.
XI week exercises	Important human reflexes used in clinical practice. (M. Drecun et al.)
XII week lectures	Resistance of the body to infection: innate immunity. (Guyton, unit VI) Seminar.
XII week exercises	RBC count. RBC sedimentation. Hematological indexes. Hematocrit. (M. Drecun et al.)
XIII week lectures	Resistance of the body to infection: specific immunity. (Guyton, unit VI) Seminar.
XIII week exercises	White blood cell count. White blood cell differential count. Bleeding time. Clotting time. Blood types. (Đ. Sterio et al.)
XIV week lectures	Make up tests 1 and 2.
XIV week exercises	Make up lab.
XV week lectures	Review.
XV week exercises	Review.
XVI week lectures	
XVI week exercises	
XVII week lectures	
XVII week exercises	
XVIII week lectures	
XVIII week exercises	
XIX week lectures	
XIX week exercises	
XX week lectures	
XX week exercises	
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XXVII week exercises	
XXVIII week lectures	
XXVIII week exercises	
XXIX week lectures	

XXIX week exercises						
XXX week lectures						
XXX week exercises						
Student workload						
Per week		Per semester				
22 credits x 40/30=29 hours and 20 minuts 5 sat(a) theoretical classes 0 sat(a) practical classes 3 excercises 20 hour(s) i 24.2 minuts of independent work, including consultations		Classes and final exam: 29 hour(s) i 20 minuts x 16 =469 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 29 hour(s) i 20 minuts x 2 =58 hour(s) i 40 minuts Total workload for the subject: 22 x 30=660 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 132 hour(s) i 0 minuts Workload structure: 469 hour(s) i 20 minuts (courses), 58 hour(s) i 40 minuts (preparation), 132 hour(s) i 0 minuts (additional work)				
Student obligations		Regular attendance of face-to-face lectures, seminars and labs. Showing adequate knowledge improvement after each lab. Taking 2 tests during the winter semester and 3 tests during the summer semester.				
Consultations		As arranged with the instructor.				
Literature		1) Medicinska fiziologija. Guyton & Hall. Publisher : Savremena administracija, Beograd, 12th edition 2) Praktikum iz fiziologije. M. Drecun et al. Publisher: Papirus Zvornik, 2003. 3) Praktikum iz fiziologije. Đ. Sterio et al. Publisher: Medicinski fa				
Examination methods		Attendance of lectures- 7 points. Attendance of lab with verification of knowledge improvement after each lab -11points. Five tests during the course of 2 semesters -30 points. Seminar presentation -1 point. Registration on Moodle -1 point. Final				
Special remarks		None.				
Comment		Lectures and seminars will be held for all registered students at the same time. The lab will be organized for groups of 10-15 people at one time.				
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points