



W07	BW25	knows functions and regulatory mechanisms of organs and systems in human body including: circulation, respiratory system, alimentary system, urinary system and skin, and understands interactions between them	written/oral test, presentation,	L; MC
W08	BW26	knows effects and control of secretion of hormones – physiological controlling mechanisms, clinical consequences of hormonal dysfunction;	written/oral test, presentation,	L; MC
W09	BW27	knows functions and control of reproductive system in male and female	written/oral test, presentation,	L; MC
W10	BW28	knows mechanisms of human ageing	written/oral test, presentation,	L; MC
W11	BW29	knows basic quantitative parameters that describe functions of particular organs and systems including: limit of normal parameters and demographic factors affecting them	written/oral test, presentation,	L; MC
U1	BU7	describes changes in functioning of human body when homeostasis is disturbed, evaluates particularly integrated response of human body to physical exercise, to exposure to low and high temperature, to sudden tilting, to sleep and awakening, to blood or water loss	written/oral test, presentation,	L; MC
U2	BU8	is able to perform simple functional tests that evaluate human body as a system of stable regulation (exercise tests, loading test) and to interpret figures concerning basic physiologic variables;	written/oral test, presentation,	L; MC

** L - lecture; SE - seminar; AC – auditorium classes; MC – major classes (non-clinical); CC – clinical classes; LC – laboratory classes; SCM – specialist classes (magister studies); CSC – classes in simulated conditions; FLC – foreign language course; PCP



practical classes with patient; PE – physical education (obligatory); VP – vocational practice; SS – self-study, EL – E-learning .

Please mark on scale 1-5 how the above effects place your classes in the following categories:
communication of knowledge, skills or forming attitudes:
Knowledge: 5
Skills: 5

Student's amount of work (balance of ECTS points)	
Student's workload (class participation, activity, preparation, etc.)	Student Workload (h)
1. Contact hours:	150
2. Student's own work (self-study):	161
Total student's workload	311
ECTS points for module/course	12.0
Comments	

Content of classes (please enter topic words of specific classes divided into their didactic form and remember how it is translated to intended educational effects)

Lectures

Winter semester

Introduction to physiology. Homeostasis.
Nervous system – introduction
Nervous system – sensory system
Nervous system - motor system
Nervous system - senses
Nervous system - brain
Nervous system – autonomic nervous system
Hormones – hypothalamus, pituitary gland
Hormones – growth control
Reproduction and development
Metabolism (insulin/glucagon). Body temperature regulation

Summer semester

Cardiovascular system – cardiac muscle
Cardiovascular system – hemodynamic of circulation
Cardiovascular system – regulatory mechanisms vascular system
Cardiovascular system – blood flow in specific regions
Respiratory system – mechanics of respiration
Respiratory system – gas exchange, regulation of respiration
Exercise
Blood – red blood cells, hemostasis
Immune system
Physiology of kidneys
Acid-base balance
Physiology of digestive system

Seminars

Classes

Homeostasis. Membrane dynamics. Cell-to-cell communication.
- definition of homeostasis, local and long-term mechanisms
- internal environment of human body; water areas, ion composition
- contribution of individual system in maintaining homeostasis
- dynamics of biological membrane, membrane transport

Nervous system: Excitability



- Nervous system; function, organizing, pathways of signal conduction
- Neuron: structure, types
- resting and action membrane potential
- conduction in neuron
- synapse: structure, types, conduction in the synapse

Nervous system: sensory system. Senses.

- properties of sensory systems
- Receptors: general properties and types of receptors
- somatic senses: touch, temperature, proprioception, pain
- Cerebral cortex – sensory, motor and associated areas
- Special senses: vision, hearing, smell, taste

Nervous system: motor control system

- Spinal cord: organization, properties of conduction, spinal reflexes
- muscle spindle
- Pyramidal and extrapyramidal system – functions
- Cerebellum: functional arrangement, role
- Equilibrium

Nervous system: functions of the brain

- Function of cerebral cortex: sleep/awakeness, language
- limbic system: emotions, memory, learning
- circadian rhythms

Autonomic nervous system (ANS)

- Division of the ANS,
- Neurotransmitters and receptors
- Effectors, neuromodulators
- Control of ANS by CNS
- Autonomic reflexes
- The ways of evaluation of ANS activity

Muscle physiology

- Skeletal muscles: structure of sarcomere, neuromuscular junction, types of skeletal muscles, excitation-contraction coupling, types of skeletal muscle contraction, sources of energy in muscle, factors affecting the strength of contraction, mechanics of contraction
- Smooth muscles: structure, bioelectric activity, types of smooth muscles, mechanics of contraction and relaxation, types of contractions

Hormones

- Hypothalamic and pituitary gland hormones, thyroid gland hormones, parathyroid gland, adrenal gland hormones
- Sex hormones

Metabolism. Body temperature regulation

- Metabolism: definition, variety, determinants, control, methods of measurement
- Endocrine function of the pancreas: insulin, glucagon
- Mechanisms of body Temperature regulation

Summer semester

Physiology of cardiovascular system – cardiac muscle

- Physiological properties of cardiac muscle, regulation of heart activity
- Basics of ECG
- Cardiac cycle

Physiology of cardiovascular system - vascular system

- functional differentiation cardiovascular system
- Hemodynamic principles
- Blood pressure, heart rate, venous pressure

Physiology of cardiovascular system – regulation. Venous blood flow. Capillary blood flow.



- Regulation of circulation: local, nervous, reflex, hormonal
- Venous circulation
- Capillary circulation

Physiology of cardiovascular system – blood flow in specific regions. Exercise.

- Properties of circulation and control mechanisms in specific regions: coronary circulation, cerebral circulation, pulmonary circulation, blood flow in the skin, visceral circulation, blood flow in the skeletal muscles.
- Exercise; ventilatory and cardiovascular responses to exercise, metabolism and exercise, temperature regulation during exercise. Exercise tests.

Respiratory system

- Mechanics of respiration: ventilation, respiratory resistance, function of respiratory pathways
- Spirometry
- Exchange of gases in the lungs, , gasometry
- Nervous and chemical control of respiration

Blood: Erythrocytes (RBCs)

- Composition and functions of blood; erythropoiesis
- Properties and functions of erythrocytes
- Hemoglobin: structure and properties
- Gas transport in the blood

Blood: Leucocytes (WBCs). Hemostasis and coagulations

- Leucocytes: types, functions
- Immunity: types, mechanisms
- Hemostasis: phases of coagulation and fibrinolysis
- Role of platelets and the wall of blood vessel in clot formation

Fluid-electrolyte balance. Physiology of the kidney

- Kidney's anatomy
- Filtration, reabsorption and secretion in the kidneys
- Role of the kidneys in acid-base balance
- Endocrine activity of the kidneys
- Hormones that affect kidney's function
- Composition and physicochemical properties of the urine

Digestive system. The liver

- Control of food intake
- Function and regulation of motility and secretion in the digestive system
- Digestion and absorption of nutrients
- Function of the liver

Other

Basic literature (list according to importance, no more than 3 items)

1. Silverthorn. Human Physiology. Integrated Approach.

Additional literature and other materials (no more than 3 items)

1. William F. Ganong Review of Medical Physiology 22e
2. Guyton. Textbook of Medical Physiology

Didactic resources requirements (e.g. laboratory, multimedia projector, other...)

Virtual physiology laboratory, computer programs, multimedia projector, scripts, TV and DVD, microscopes, multimedia programs, glucometer, centrifuge, immune serum, disposable needles, microscope slides, test tubes, hematocrit tubes, sofa, spirometer, pickflowmeter, electrocardiographic unit, sphygmomanometer, stethoscope, hemodynamic monitor, equipment for urine analysis, pulseoxymeter, dynamometer, aesthesiometer, TIP THERM equipment, ophthalmoscope, vibrating tuning forks, scale, measuring type, didactic films

Preliminary conditions (minimum requirements to be met by the student before starting the



module/course)	
Student has to know human anatomy, histology and the course of basic chemical reactions and biochemical processes taking place in the human body.	
Conditions to receive credit for the course (specify the form, criteria and conditions of receiving credit for classes included in the module/course, admission terms to final theoretical or practical examination, its form and requirements to be met by the student to pass it and criteria for specific grades).	
Conditions for completing the individual classes: to receive credit student has to:	
- receive credit for all classes	
- get pass grade in all partial tests	
- collect credit points during classes to get at least a satisfactory grade, according to the criteria given below.	
Rules of admission to the final examination: the student has to get at least a satisfactory grade in each semester.	
Form of the final exam: written test; to pass the final exam student must get at least satisfactory grade in the exam, in accordance to the criteria listed below.	
Each absence must be made up, including rector's days or dean's hours.	
Grade:	Criteria for course
Very Good (5.0)	33-35 credit points
Good Plus (4.5)	29-32 credit points
Good (4.0)	25-28 credit points
Satisfactory Plus (3.5)	21-24 credit points
Satisfactory (3.0)	18-20 credit points
Grade:	Criteria for exam (if applicable)
Very Good (5.0)	94% - 100% of credit points for final exam
Good Plus (4.5)	86% - 93% of credit points for final exam
Good (4.0)	78% - 85% of credit points for final exam
Satisfactory Plus (3.5)	70% - 77% of credit points for final exam
Satisfactory (3.0)	61% - 69% of credit points for final exam

Name of unit teaching course:	Department of Physiology
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E-mail	e-mail: wl-9@umed.wroc.pl

Person responsible for course:	The Head of the Department of Physiology: prof. dr hab. Beata Ponikowska
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Phone	71 784 14 22; 71 784 14 23
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<i>List of persons conducting specific classes:</i>	<i>degree/scientific or professional title</i>	<i>Discipline</i>	<i>Performer profession</i>	<i>Form of classes</i>
Agnieszka Buldańczyk	dr n. med.	medicine	academic	lectures, classes
Anna Janocha	dr hab. n. med.	medicine	doctor, academic	lectures, classes
Bartłomiej Paleczny	dr n. med.	medicine	academic	lectures, classes
Anna Tumińska	dr n. med.	medicine	doctor, academic	lectures, classes
Rafał Seredyński	mgr biol.	biology	academic	lectures, classes
Agnieszka Siennicka	dr n. o zdrowiu	health science	academic	lectures, classes
Magdalena Krawczyk	lek. med.	medicine	doctor, academic	classes
Robert Skalik	dr n. med.	medicine	doctor, academic	lectures, classes

Date of Syllabus development

Syllabus developed by

.....12.07.2018.....

dr n. med. Agnieszka Buldańczyk

Signature of Head of teaching unit

prof. dr hab. Beata Ponikowska

.....
 Uniwersytet Medyczny we Wrocławiu...
 KATEDRA I ZAKŁAD FIZJOLOGII
 kierownik

 prof. dr hab. Beata Ponikowska

Signature of Faculty Dean

.....

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 prof. dr hab. Andrzej Hendrich