Appendix No.3
to Resolution No. 2303
of Senate of Wroclaw Medical University
of 28 April 2021

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Syllabus for academic year: 2021/2022 Training cycle: 2020/2021-2024/2025			
Description of the course			
Course	Human physiology	Group of detailed education results Group code B	Group name Scientific Basics of Medicine
Faculty	Dentistry		
Major	dentistry		
Level of studies	X uniform magister studies		
Form of studies	X full-time		
Year of studies	II	Semester:	X winter X summer
Type of course	X obligatory		
Language of study	X English		

Number of hours	Form of education												
	Lectures (L)	Seminars (SE)	Auditorium classes (AC)	Major Classes – not clinical (MC)	Clinical Classes (CC)	Laboratory Classes (LC)	Classes in Simulated Conditions (CSC)	Practical Classes with Patient (PCP)	Foreign language Course (FLC)	Physical Education (PE)	Vocational Practice (VP)	Directed Self-Study (DSS)	E-learning (EL)
Winter semester: 45													
Department of Physiology and Pathophysiology. Department of Physiology													
Direct (contact) education[1]				35									
Distance learning[2]	10												
Summer semester: 45													
Department of Physiology and Pathophysiology. Department of Physiology													

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Direct (contact) education				35									
Distance learning	10												
TOTAL per year: 90													
Department of Physiology and Pathophysiology. Department of Physiology													
Direct (contact) education				70									
Distance learning	20												

Educational objectives (max. 6 items)

C1. To familiarize the student with functioning of individual organs and systems of the human body and their influence on each other.
C2. Understanding physiological principles and mechanisms that regulate physiological processes.
C3. To familiarize the student with the correct numerical values of the basic physiological parameters.
C4. To familiarize the student with the basic methods of measuring physiological functions.
C5. To familiarize the student with selected functional tests that assess functioning of the human body.
C6. Development social competences needed to practice the medical profession, in accordance with graduate's profile.

Education result for course in relation to verification methods of the intended education result and the type of class:

Number of deteiled education result	Student who completes the course knows/is able to	Methods of verification of intended education results	Form of didactic class **enter the abbreviation*
B.W1	Knows and understands the role of major and trace elements in processes occurring in the body, including supply, absorption and transport;	oral test, written test	L; MC
B.W5	Knows and understands the principles of calcium and phosphate metabolism;	oral test, written test	L; MC
B.W6	Knows and understands the role and significance of body fluids, including saliva;	oral test, written test	L; MC
B.W19	Knows and understands human vital functions;	oral test, written test	L; MC
B.W20	Knows and understands the neurohormonal regulation of physiological processes;	oral test, written test	L; MC
B.W21	Knows and understands the principles of acid-base homeostasis as well as oxygen and carbon dioxide transport within the body;	oral test, written test	L; MC
B.W22	Knows and understands the principles of metabolism and nutrition;	oral test, written test	L; MC
B.W23	Knows and understands the numerical value of basic physiological variables and changes in numerical values.	oral test, written test	L; MC

* L- lecture; SE- seminar; AC- auditorium classes; MC- major classes (non-clinical); CC- clinical classes; LC- laboratory classes; CSC- classes in simulated conditions; PCP- practical classes with patient; FLC- foreign language course; PE- physical education; VP- vocational practice; DSS- directed self-study; EL- E-learning

Student's amount of work (balance of ECTS points):	
Student's workload (class participation, activity, preparation, etc.)	Student Workload
1. Number of hours of direct contact:	70
2. Number of hours of distance learning:	20
3. Number of hours of student's own work:	n/a
4. Number of hours of directed self-study	180
Total student's workload	270
ECTS points for course	9

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 form: online

Winter semester: 5 weeks/2 hours

1. Introduction to physiology. Homeostasis.
2. Nervous system – part 1
3. Nervous system – part 2
4. Nervous system – part 3
5. Hormones

Summer semester: 5weeks/2 hours

1. Cardiovascular system – cardiac muscle
2. Cardiovascular system – vascular system
3. Cardiovascular system - regulation
4. Respiratory system
5. Immunity

Classes 11 weeks/3 hours, 1 week/2 hours; form: direct contact

Winter semester:

Homeostasis 4 hours

- 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 4 hours

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

Nervous system: Sensory systems. Senses 4 hours

- General properties of the sensory systems
- Sensory receptors: features and criteria for division, signal transduction
- Somatic senses: touch, temperature, proprioception, pain
- Special senses: smell, taste

Nervous system: Motor control system and brain functions 4 hours

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

Autonomic nervous system (ANS) 4 hours

- Division of the ANS,
- Neurotransmitters and receptors

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

Muscle physiology 4 hours

- Skeletal muscles: structure of sarcomere, neuromuscular junction, excitation-contraction coupling, types of skeletal muscles, types of contractions, sources of energy in skeletal muscles, factors determining the strength of contractions, mechanics of contractions.
- Smooth muscles: myocyte structure, contraction and relaxation mechanism, types of contractions, types of smooth mucsles

Hormones 4 hours

- Types of hormones, regulating mechanisms of hormones secretion
- Hypothalamic and pituitary gland hormones, hypothalamic-pituitary axis thyroid gland hormones, adrenal gland hormones, sex hormones

Growth of bones and tissues. 4 hours

- Hormonal regulation of growth: adrenal glucocorticoids, thyroid hormones, growth hormone.
- The importance of calcium in the body, hormones that control calcium balance.

Metabolism. Hormones secreted by pancreas. Body Temperature regulation 3 hours

- Energy balance. Metabolism during fed state and fasted state. Measurement of metabolism.
- Function of endocrine pancreas; glucagon, insulin
- Mechanisms of body temperature regulation

<u>Summer semester:</u>

Physiology of cardiovascular system: Cardiac muscle 4 hours

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

Physiology of cardiovascular system: Vascular system 4 hours

- Cardiovascular functional differentiation,
- Principles of hemodynamics
- Blood pressure, heart rate, venous pressure

Physiology of cardiovascular system – regulation. Venous circulation. Capillary circulation 4 hours

- Blood flow regulation : local, nervous, reflex, hormonal
- Venous circulation
- Capillary circulation

Physiology of cardiovascular system: Blood flow in specific regions 4 hours

- Features and control mechanisms of circulation in specific regions: coronary circulation, cerebral circulation, pulmonary circulation, blood flow in the skin, visceral circulation, blood flow in the skeletal muscles

Respiratory system 4 hours

- 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 4 hours

- Composition and functions of blood; Erythropoesis
- Properties and functions of erythrocytes
- Hemoglobin: structure and properties , types of hemoglobin and combinations with gases
- Transport of gases in the blood

Blood: Leucocytes. Hemostasis 4 hours

- Leucocytes: types, functions
- Immunity
- Response to invading bacteria and viruses

- Hemostasis

Water-electrolyte balance. Physiology of the kidney 4 hours

- Kidney's functional anatomy
- Glomerular filtration, reabsorption and secretion in the kidneys. Assessment of renal function - measurement of renal clearance.
- Micturition.
- Water-electrolyte and acid-base balance of the body.
- Vasopressin. Aldosterone. RAS system.

Digestive system. Function of the liver. 3 hours

- Regulation of food intake
- Motility and secretion in the gastrointestinal tract and their regulation
- Digestion and absorption of nutrients
- Principles of nutrition
- Function of the liver

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

1. Dee Unglaub Silverthorn, Human Physiology: An Integrated Approach. Pearson Education 2016

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

1. Wiliam F. Ganong Review of Medical Physiology 22e
2. Guyton and Hall, John E. Hall, Textbook of Medical Physiology

Preliminary conditions: (minimum requirements to be met by the student before starting the course)
Exam in anatomy must be passed.

Conditions to receive credit for the course: (specify the form and conditions of receiving credit for classes included in the course, admission terms to final theoretical or practical examination, its form and requirements to be med by the student to pass it and criteria for specific grades)

Credit for the course takes place in direct contact with the teacher. In justified cases, by the Rector's decision, it may be remote.
Conditions required for getting credit for classes:

- getting credit for each class
- obtaining at least a satisfactory grade for each partial test
- obtaining at least a satisfactory grade for each semester, calculated from the average of all grades in the semester

Every absence from classes must be made up, including rector days and dean's hours.
Criteria for oral/written test
5.0 - the answer is fully adequate* to the content of the question/task; the answer is detailed**; the answer contains no substantive errors; the answer is consistent and contains no factual/terminological mistakes
4.5 - the answer is fully adequate* to the content of the question/task; the answer is detailed**; the answer contains no substantive errors; the answer is mostly consistent and/or contains minor factual/terminological mistakes
4.0 - the answer is mostly adequate* to the content of the question/task; the answer is detailed**; the answer contains a few substantive errors; the answer is mostly consistent and/or contains minor factual/terminological mistakes
3.5 - the answer is mostly adequate* to the content of the question/task; the answer is detailed**; the answer contains a few substantive errors
3.0 - the answer is mostly adequate* to the content of the question/task; the answer is general**; the answer contains a few substantive errors
2.0 - the answer is inadequate to the content of the question/task OR the answer contains numerous substantive errors.

* A fully adequate answer is focused on the content of the question/task (without unnecessary mentions of secondary aspects, and not exceeding the substantive scope of the question/task). A mostly adequate

answer to some extent deviates from the content of the question/task (through unnecessary digressions, recalling content not related to the question/task, etc.) An inadequate answer is off-topic answer (mostly unrelated to the content of the question/task).
** A detailed answer thoroughly explains the majority of substantive aspects of the question/task. In a general answer, the majority of substantive aspects is discussed in a superficial, cursory manner (or they are omitted).

Final exam takes place in direct contact with the teacher. In justified cases, by the Rector's decision, it may be remote.
Conditions required for admitting the student to the final exam:
- in order to take the final exam, it is necessary to obtain a credit for each semester with at least a satisfactory grade.

Form of the final exam: final exam is form of oral or written test.
In order to pass the final exam, the student is obliged to obtain at least a satisfactory grade according to the criteria listed below:

	Criteria for courses ending with a credit[3]
Credit	- getting credit for each class - obtaining at least a satisfactory grade for each partial test - obtaining at least a satisfactory grade for each semester, calculated from the average of all grades in the semester

Grade:	Criteria for oral/written exam[3]
Very Good (5.0)	- the answer is fully adequate* to the content of the question/task - the answer is detailed** - the answer contains no substantive errors - the answer is consistent and contains no factual/terminological mistakes
Good Above (4.5)	- the answer is fully adequate* to the content of the question/task - the answer is detailed** - the answer contains no substantive errors - the answer is mostly consistent and/or contains minor factual/terminological mistakes
Good (4.0)	- the answer is mostly adequate* to the content of the question/task - the answer is detailed** - the answer contains a few substantive errors - the answer is mostly consistent and/or contains minor factual/terminological mistakes
Satisfactory Plus (3.5)	- the answer is mostly adequate* to the content of the question/task - the answer is detailed** - the answer contains a few substantive errors
Satisfactory (3.0)	- the answer is mostly adequate* to the content of the question/task - the answer is general** - the answer contains a few substantive errors

Unit realizing the course:	Department of Physology and Pathophysiology. Department of Physiology
Unit address:	50-368 Wrocław, ul. T. Chałubińskiego 10
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Person responsible for the course:	prof. dr hab. Beata Ponikowska
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List of persons conducting specific classes:

Name and surname	Degree/scientific or professional title	Discipline	Performed profession	Form of classes
Agnieszka Buldańczyk	dr n.med.		academic teacher	lectures, classes
Bartłomiej Paleczny	dr hab.	medical science	academic teacher	lectures, classes
Agnieszka Siennicka	dr n. o zdrowiu	medical science	academic teacher	lectures, classes
Rafał Seredyński	dr n. biol.	medical science	academic teacher	lectures, classes
Tymoteusz Okupnik	mgr biol.		academic teacher	classes

Date of Syllabus development

30.06.2021

Syllabus developed by

dr n. med. Agnieszka Buldańczyk.

Dean's signature

Uniwersytet Medyczny we Wrocławiu
WYDZIAŁ
LEKARSKO-STOMATOLOGICZNY
DZIEKAN
prof. dr hab. Marcin Mikulewicz

Signature of Head(s) of teaching unit(s)

prof. dr hab. Beata Ponikowska

Uniwersytet Medyczny we Wrocławiu
KATEDRA FIZJOLOGII I PATOFIZJOLOGII
kierownik
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