

DESCRIPTION OF THE COURSE OF STUDY

Course code	0912-7LEK-B2.5-PzC	
Name of the course in	Polish	Fizjologia z cytofizjologią
	English	Physiology and cytophysiology

1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

1.1. Field of study	medicine
1.2. Mode of study	Full-time
1.3. Level of study	Uniform Master's studies
1.4. Profile of study*	General academic
1.5. Specialization*	lack
1.6. Unit running the course of study	Faculty of Medicine and Health Sciences
1.7. Person/s preparing the course description	dr. hab. n. med., prof. UJK Anna Polewczyk
1.8. Person responsible for the course of study	dr. hab. n. med., prof. UJK Anna Polewczyk
1.9. Contact	apolewczyk@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Affiliation with the module	Scientific basis of medicine
2.2. Language of instruction	mandatory
2.3. Semesters in which the course of study is offered	English
2.4. Prerequisites*	3rd and 4th semester;
	Anatomy, Histology

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	LECTURE : 50 ,CLASSES – 60, LABORATORIES- 40	
3.2. Place of classes	Lecture /Classes/ Laboratories - Courses in the teaching rooms of the UJK	
3.3. Form of assessment	LECTURE –exam, CLASSES – credit with grade, Laboratories - credit with grade	
3.4. Teaching methods	Practical classes, conversational lecture, discussion. Computer programmes provided in the scope of Physiology classes	
3.5. Bibliography	Required reading	1.Ganong W.F.: Review of Medical Physiology, Lange Medical Book, 21st ed., 2003, ISBN 0071402365 10szt
	Further reading	2.Guyton A.C.: Textbook of Medical Physiology, Saunders, 10th ed., 2000, ISBN 072168677

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED TEACHING OUTCOMES

4.1. Course objectives (including all forms of classes)

Physiology- it is the study of phenomena, reactions, actions, mechanisms and laws of life. Not only does it explain individual molecular functions of subcellular structures, cells, tissues, organs and systems but it also explains how they depend on each other throughout the body.

The aim of the course:

- Learn the basics of general human physiology including elementary aspects of cell physiology.
- Enable to understand the principles of functioning of the human organism by developing habit of scientific thinking as well as logical interpretation of the facts.

The aim is accomplished by:

- Assimilation of theoretical information about the functions of individual organs and systems.
- Assessment and interpretation of the outcomes of, conducted by the students, experiments as well as practical classes.

Independent computer work using interactive programs of the physiology of the nervous system, muscular, cardiovascular, respiratory, renal, acid-base balance and water-electrolyte, endocrine and digestive systems as well as multimedia computer simulation, experimental and laboratory programs.

a. Detailed syllabus (including all forms of classes)

Interactive lectures with presentation of the clinical cases: 50 hours

I semester lectures - 25 hours

1. **Cardiac Muscle**; The Heart as a Pump and Function of the Heart Valves. Resting and functional potential of cardiomyocytes. Action potential of complex conducting tissue.
2. Physiological basis of electrocardiography
3. Normal electrocardiogram
4. Myocardial contraction. Cardiac cycle. Regulation of heart activity
5. Overview of the Circulation; Biophysics of Pressure, Flow, and Resistance. Functions of the Arterial and Venous Systems. The Microcirculation and Lymphatic System.
6. **Physiology of hematopoietic system. Physiology of the hematopoietic system.**
7. Hematopoietic system. Haemostasis
8. **The Body Fluids and Kidneys.** Water-mineral balance
9. **Sports Physiology. Adaptive physiology.**
10. Exam –I semester.

II semester lectures - 25 hours

1. The Nervous System: General Principles and Sensory Physiology. Organization of the Nervous System, Basic Functions of Synapses, and Neurotransmitters Sensory Receptors.
2. **The Nervous System:** Muscle. Regulation of motor functions.
3. Respiratory system. Mechanism of breathing.
4. **Gastrointestinal Physiology.** General Principles of Gastrointestinal Function: gastrointestinal motility.
5. Secretory functions of the digestive glands. Liver function
6. Endocrinology and Reproduction. Introduction to Endocrinology. Pituitary Hormones and Their Control by the Hypothalamus.
7. Thyroid Metabolic Hormones. Adrenocortical Hormones (pancreatic hormones)
8. Exam

Classes: 60 hours

I semester 30 hours Classes

9. Cardiac electrophysiology. Electrocardiography.
10. Systolic myocardial function.
11. Blood and body fluids circulation. Cardiovascular control Blood and body fluids circulation.

Cardiovascular control.

12. Regulation of the circulation in the different organs and functional status of the organism
13. Exam including classes material in the field of cardiovascular system.
14. Blood components and the functions of the cellular elements. Blood groups. Haemostasis
15. The physiology of the kidney
16. The acid-base and water-electrolyte balance
17. Physical exertion
18. A written test covering classes material in the field of physiology of blood, respiratory system, kidney

II semester 30 hours Classes

19. Physiology of the nerve cell. Functional potential of the nerve cell. Conductivity in synapses and neuromuscular junction .
20. Muscles.
21. Reflexes. The somatosensory feeling. The regulation of motor functions.
22. The autonomic nervous system.
23. The organ of sight, hearing, balance, taste, smell.
24. Exam including classes material in the field of neurophysiology.
25. Genesis of the respiratory rhythm and regulation of breathing
26. The digestive system. Motor action, digestion, absorption. The energy balance of the body
27. The hormonal system: Hypothalamus. Hypophysis. Pancreas. Thyroid. Adrenal cortex. The adrenal medulla. Calcium homeostasis. Sex hormones.
28. Physical exertion.
29. A written exam including classes material in the field of digestive system, hormonal system and physical exertion

Laboratory : 40 hours**I semester 20 hours Laboratory**

30. Electrophysiology of the heart. ECG- practical aspects
31. Practical assessment of systolic function of the heart and hemodynamic cycle
32. Circulation of the blood and organ's fluid
33. Blood components. Main functions of morphotic elements
34. Kidney. The acid-base and water-electrolyte balance- practical assessment

II semester 20 hours Laboratory

35. Practical aspect of physiology of the nerve cells. The assessment of the conductivity in the neuromuscular junctions.
36. Muscles- examinations of sensation and reflexions
37. The autonomic nervous system- examination of vision and hearing
38. Respiratory system- genesis of the rhythm of respiration
39. Respiratory system- spirometry
40. Digestive system. Practical knowledge of the digestion mechanisms and gastrointestinal hormones
41. Hormonal system- diagnostic aspect. Reproductive system.

4.3 Education outcomes in the discipline

Code	A student, who passed the course	Relation to teaching outcomes
within the scope of KNOWLEDGE the graduate knows and understands :		
W 1	basic cellular structures and their functional specifications;	A.W4.
W 2	the water and electrolyte balance in biological systems;	B. W1
W 3	acid-base homeostasis and mechanisms of buffers and their significance in systemic homeostasis;	B.W2.
W 4	the concepts of solubility, osmotic pressure, isotonia, colloidal solutions and Gibbs-Donnan effect;	B.W3.
W 5	the physical, chemical and molecular basis of how the organs of the senses function;	B.W7.
W 9	basic catabolic and anabolic pathways, methods of their regulation and the influence of genetic and environmental factors	B.W15.
W10.	the metabolic profiles of basic organs and systems;	B.W16.
W12.	the enzymes involved in digestion, the mechanism of production of hydrochloric acid in the stomach, the role of bile, the course of absorption of the products of digestion and disorders associated with them	C.W49
W13	the consequences of inadequate nutrition, including long-term starvation, taking too large meals and the use of unbalanced diet as well as digestive disorders and malabsorption	C.W50
W14.	the consequences of vitamins or minerals deficiency and their excess in the body;	C.W48.
W16.	The processes such as cell cycle, proliferation, differentiation, and cell aging, apoptosis and necrosis, and their importance for the functioning of the body;	B.W18.
W17	basic problems concerning stem cells and their use in medicine;	B.W19.
W18.	basic principles of stimulation and conduction in the nervous system and higher nervous functions, as well as physiology of striated and smooth muscles and functions of blood;	B.W20.
W19.	the functions and mechanisms of regulation of all organs and systems of the human body, including the circulatory, respiratory, digestive, and urinary systems as well as skins and the dependence between them;	B.W21.
W 21.	the reproductive function in women and men;	B.W22.
W22.	the mechanisms of aging;	B.W23.
W23.	the basic quantitative parameters describing the performance of individual systems and organs, including the range of norms and demographic factors affecting the value of these parameters;	B.W24.

W24.	the relationship between the factors that disrupt the equilibrium of biological processes and physiological and pathophysiological changes;	B.W25.
W25.	the genetics of blood groups and serological conflict in Rh system	C.W6.
within the scope of ABILITIES the graduate knows how to:		
U1.	operate the optical microscope, also making use of immersion,	A.U1.
U2.	describe changes in the functioning of the organism in case of disruption of homeostasis, in particular determines its integrated response to exercise, exposure to high and low temperature, loss of blood or water, sudden vertical position, transition from sleep to wakefulness.	C.U20.
U3.	perform a simple function tests evaluating the human body as a system stable regulation (stress tests); interprets the figures on the basic physiological variables;	B.U7.
U4.	apply basic laboratory techniques, such as: qualitative analysis, titration, colorimetry, pehametry, chromatography, electrophoresis of proteins and nucleic acids;	B.U8.
U5.	operate simple measuring instruments and evaluates the accuracy of measurements;	B.U9.

4.4. Methods of assessment of the intended teaching outcomes																					
Teaching outcomes (code)	Method of assessment (+/-)																				
	Written exam - test*			Test*			Project* Presentation			Effort in class*- discussion			Practical test*			Group work*			Others* Attendance		
	<i>Form of classes</i>			<i>Form of classes</i>			<i>Form of classes</i>			<i>Form of classes</i>			<i>Form of classes</i>			<i>Form of classes</i>					
	<i>L</i>	<i>C</i>	<i>...</i>	<i>L</i>	<i>C</i>	<i>L a b</i>	<i>L</i>	<i>C</i>	<i>...</i>	<i>L</i>	<i>C</i>	<i>L a b.</i>	<i>L</i>	<i>C</i>	<i>L a b.</i>	<i>L</i>	<i>C</i>	<i>...</i>	<i>L</i>	<i>C</i>	<i>..</i>
W 1	+	+									+	+							+	+	+
W 2	+	+									+	+							+	+	+
W 3	+	+									+	+							+	+	+
W 4	+	+									+	+							+	+	+
W 5	+	+									+	+							+	+	+
W 9	+	+									+	+							+	+	+
W10.	+	+									+	+							+	+	+
W11	+	+									+	+							+	+	+
W12.	+	+									+	+							+	+	+
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W24.	+	+									+	+							+	+	+
W25.	+	+									+	+							+	+	+
U01	+													+	+				+	+	+
U02	+													+	+				+	+	+
U03	+													+	+				+	+	+
U04	+													+	+				+	+	+
U05	+													+	+				+	+	+

*delete as appropriate

4.5. Criteria of assessment of the intended teaching outcomes		
Form of classes	Grade	Criterion of assessment
lecture (L)	3	From 61%-68% correct test answers
	3,5	From 69%-76% correct test answers
	4	From 77%-84% correct test answers
	4,5	From 85%-92% correct test answers
	5	From 93% -100% correct test answers
classes (C)*	3	From 61%-68% learning programme content on the basic level, replies chaotic, leading questions necessary.
	3,5	From 69%-76% learning programme content on the basic level, answers systematized, requires assistance from the teacher.
	4	From 77%-84% learning programme content on the basic level, answers systematized, independent. Solving of problems in typical situations.
	4,5	From 85%-92% the scope of presented knowledge exceeds the basic level based on the supplementary literature provided. Solving of problems in new complex situations.
	5	From 93% -100% the scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.
laboratories*	3	From 61%-68% learning programme content on the basic level, replies chaotic, leading questions necessary.
	3,5	From 69%-76% learning programme content on the basic level, answers systematized, requires assistance from the teacher.
	4	From 77%-84% learning programme content on the basic level, answers systematized, independent. Solving of problems in typical situations.
	4,5	From 85%-92% the scope of presented knowledge exceeds the basic level based on the supplementary literature provided. Solving of problems in new complex situations.
	5	From 93% -100% the scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.

- **Thresholds are valid from 2018/ 2019 academic year**

5. BALANCE OF ECTS CREDITS – STUDENT’S WORK INPUT

Category	Student's workload
	Full-time studies
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	160
<i>Participation in lectures*</i>	50
<i>Participation in classes, seminars, laboratories*</i>	110
<i>Preparation in the exam/ final test*</i>	
<i>Others*</i>	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	190
<i>Preparation for the lecture*</i>	20
<i>Preparation for the classes, seminars, laboratories*</i>	135
<i>Preparation for the exam/test*</i>	35
<i>Gathering materials for the project/Internet query*</i>	
<i>Preparation of multimedia presentation</i>	
<i>Others*</i>	
TOTAL NUMBER OF HOURS	350
ECTS credits for the course of study	14

Accepted for execution (date and signatures of the teachers running the course in the given academic year)

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