Załącznik nr 5 do zarządzenia nr 189/2025

COURSE SPECIFICATION

Course code: 0912.4.LEK.B.PCP

Course title in Polish: Fizjologia z elementami fizjologii klinicznej
Course title in English: Physiology with elements of clinical physiology

1. Placement of the course within the study programme

1.1. Field of study	Medicine
1.2. Mode of study	Full-time
1.3. Level of study	Uniform Master's study
1.4. Profile of study	General academic
1.5. Course specification author	Prof. dr hab. n. med. Anna Polewczyk
1.6. Contact	Anna.polewczyk@ujk.edu.pl

2. Generał characteristics of the course

2.1. Language of instruction	English
2.2. Entry requirements	Anatomy, Histology

3. Detailed characteristics of the course

3.1. Type of classes	Lectures : 50h (including 10 hours of e-learning),Classes: 50h (including 10 hours of e-learning), Laboratories: 40h
3.2. Place of course delivery	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.a. Basic reading list	Medical Physiology Principles for Clinical Medicine. Wolters Kluwer Health, lipiec 2022
3.5.b. Supplementary reading list	2.Guyton A.C.: Textbook of Medical Physiology, Saunders, 14th ed., 2020 ISBN 9780323597128

4. Objectives, content and learning outcomes

4.1. Course objectives (taking into account the form of classes)

Lectures

- **CO1.** Acquaintance with the basics of circulatory system physiology: discussion of the resting and functional potentials of cardiomyocytes and the concept of the cardiac cycle.
- **CO2.** Acquiring theoretical knowledge of electrocardiography. Instruction in describing ECG recordings.
- **CO3.** Discussion of the functioning of the vascular system.
- **CO4.** Understanding the physiology of nerve cells, synapses, sensation and reflexes, and sense organs.
- **CO5.** Understanding muscle physiology, the regulation of motor functions, and the autonomic nervous system.

- **CO6.** Explanation of the functions of the respiratory system. Discussion of the mechanics of breathing.
- **CO7.** Brainstorming discussion on the origins of respiratory rhythm and regulation.
- **CO8.** Explanation of kidney function and the principles of water and electrolyte management. Case studies.
- **CO9.** Informative lecture on the physiology of the digestive system: gastrointestinal motility.
- **CO10.** Group discussion on the secretory functions of the digestive glands and liver function.
- **CO11.** Understanding the mechanisms of endocrine function. Hormones of the hypothalamic-pituitary axis.
- **CO13.** Presentation on adrenal and thyroid hormones. Discussion of the function of the pancreas as an endocrine organ and a panel discussion on the hormonal function of the gonads.
- **CO14.** Group discussion on exercise physiology and adaptive physiology.
- **CO15.** Overview of the Functions of the Vascular System
- **CO16.** Overview of the Physiology of the Hematopoietic System

Classes

- **CO1.** Demonstration with explanation: analysis of myocardial contractile function and the hemodynamic cycle
- **CO2.** Demonstration with explanation: cardiac electrophysiology and practical aspects of electrocardiography
- **CO3.** Guided text method: analysis of regulatory mechanisms of blood and systemic fluid circulation
- **CO4.** Demonstration with explanation: assessment of sensory organ function
- **CO5.** Demonstration with explanation: analysis of hematopoietic system parameters
- **CO6.** Demonstration with explanation: analysis of respiratory system function parameters
- **CO7.** Demonstration with explanation: analysis of renal function, water-electrolyte balance, and acid-base balance
- **CO8.** Demonstration with explanation: analysis of the secretory function of the digestive glands
- **CO9.** Demonstration with explanation: analysis of the function of the endocrine glands
- **CO10.** Demonstration with explanation: assessment of the body's adaptive mechanisms and adaptation to physical exertion
- **CO11.** Discussion of circulatory regulation in various organs and functional states of the body
- **CO12.** Discussion of hormonal regulation of the body

Laboratories

- **CO1.** Practical: ECG recordings - technique and interpretation
- **CO2.** Practical: assessment of synaptic conduction and the neuromuscular junction
- **CO3.** Practical: examination of the muscular system - sensation and reflexes. Regulation of motor functions
- **CO4.** Practical: assessment of autonomic nervous system function - principles of visual and auditory function
- **CO5.** Practical: assessment of blood count parameters
- **CO6.** Practical: technique and analysis of spirometric parameters
- **CO7.** Practical: analysis of water, electrolyte, and acid-base parameters
- **CO8.** Practical: assessment of gastrointestinal function in terms of endocrine function
- **CO9.** Practical: analysis of the body's adaptive mechanisms

4.2. Course content (taking into count the form of classes)

Lectures

Winter semester

1. Cardiovascular system: 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. 5 h
2. Physiological basis of electrocardiography 5 h
3. Normal electrocardiogram 5 h
4. The Nervous System: General Principles and Sensory Physiology. Organization of the Nervous System, Basic Functions of Synapses, and Neurotransmitters Sensory Receptors. 5 h
5. The Nervous System: Muscle. Regulation of motor functions. 5 h

(including classes conducted with the use of distance learning methods and techniques)

1. Myocardial contraction. Cardiac cycle. Regulation of heart activity 3 h
2. Overview of the Circulation; Biophysics of Pressure, Flow, and Resistance. Functions of the Arterial and Venous Systems. The Microcirculation and Lymphatic System. 2h

Summer semester

1. The Body Fluids and Kidneys. Water-mineral balance 5h
2. Sports Physiology. Adaptive physiology. 2h
3. Respiratory system. Mechanism of breathing. 3h
4. Gastrointestinal Physiology. General Principles of Gastrointestinal Function: gastrointestinal motility. 3 h
5. Secretory functions of the digestive glands. Liver function 4 h
6. Endocrinology and Reproduction. Introduction to Endocrinology. Pituitary Hormones and Their Control by the Hypothalamus. 4 h
7. Thyroid Metabolic Hormones. Adrenocortical Hormones (pancreatic hormones) 4h

(including classes conducted with the use of distance learning methods and techniques)

1. Hematology. Physiology of hematopoietic system. Red blood cells. White blood cells. 3h
2. Hematopoietic system. Platelets. Haemostasis 2h

Classes

Winter semester

1. Systolic myocardial function. 3 h
2. Blood and body fluids circulation. Cardiovascular control Blood and body fluids circulation. Cardiovascular control. 3h
3. Regulation of the circulation in the different organs and functional status of the organism 3 h
4. Nervous system. Physiology of the nerve cell. Functional potential of the nerve cell. Conductivity in synapses and neuromuscular junction. 3 h
5. Muscles. 3h
6. Reflexes. The somatosensory feeling. The regulation of motor functions. 2 h
7. The autonomic nervous system. The organ of sight, hearing, balance, taste, smell. 3h

(including classes conducted with the use of distance learning methods and techniques)

1. Cardiovascular system Cardiac electrophysiology. Electrocardiography. 5h

Summer semester

1. Nephrology. The physiology of the kidney 3 h

2. The acid-base and water-electrolyte balance 3 h
3. Hematology. Blood components and the functions of the cellular elements. Blood groups. Haemostasis 3h
4. Genesis of the respiratory rhythm and regulation of breathing 4h
5. The digestive system. Motor action, digestion, absorption. The energy balance of the body 3h
6. The hormonal system: Hypothalamus. Hypophysis. Pancreas. Thyroid. Adrenal cortex. The adrenal medulla. Calcium homeostasis. Sex hormons. 4h

(including classes conducted with the use of distance learning methods and techniques)

1. Physical exertion 2 h
2. Respiration. Function of respiratory system. 3 h

Laboratories

Winter semester

1. Electrophysiology of the heart. ECG- practical aspects 3 h
2. Practical assessment of systolic function of the heart and hemodynamic cycle 3h
3. Circulation of the blood and organ's fluid 5h
4. Practical aspect of physiology of the nerve cells. The assessment of the conductivity in the neuromuscular junctions. 3 h
5. Muscles- examinations of sensation and reflexions- 3 h
6. The autonomic nervous system- examination of vision and hearing 3 h

Summer semester

1. Kidney. The acid-base and water-electrolyte balance- practical assessment 4h
2. Blood components. Main functions of morphotic elements 3h
3. Respiratory system- genesis of the rhythm of respiration 5h
4. Respiratory system- spirometry 2h
5. Digestive system. Practical knowledge of the digestion mechanisms and gastrointestinal hormones 3h
6. Hormonal system- diagnostic aspect. Reproductive system. 3h

4.3. Course learning outcomes

Course learning outcomes (code)	Upon completion of the course, the student	Alignment with programme learning outcomes
	in the area of knowledge knows and understands:	
W01	The physical, chemical and molecular basis of how the organs of the senses function;	B.W6.
W02	The functions and mechanisms of regulation of all organs and systems of the human body as well as the dependence between them;	B.W20.
W03	Processes occurring during the aging of the body and changes in the functioning of organs related to aging;	B.W21.
W04	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.W22.
W05	The principles of conducting scientific research aimed at the development of medicine;	B.W26.
W06	The genetics of blood groups and serological conflict in Rh system;	C.W4.
W07	The influence of the oxidative stress on cells and its importance in the pathogenesis of diseases and in aging processes;	C.W38.

W08	The consequences of vitamins or minerals deficiency and their excess in the body;	C.W39.
W09	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.W40.

in the area of skills knows how to:

U01	Operate the optical microscope, also making use of immersion;	A.U1.
U02	Perform simple function tests evaluating the functioning of the human body as a stable regulation system (stress and exercise tests) and interpret the figures on the basic physiological variables;	B.U7.
U03	Use medical databases and properly interpret the information contained therein necessary to solve problems in the field of basic and clinical sciences;	B.U8.
U04	Use basic laboratory and molecular techniques;	B.U12.

in the area of social competences is able to:

K01	Recognize his/her own limitations and self-evaluate educational deficiencies and needs;	K.S5.
K02	Use reliable information sources;	K.S7.
K03	Conclude on the basis of own surveys and observations;	K.S8.
K04	Introduce rules of social conduct and teamwork to the group of specialists, including specialists form other medical professions also in the multicultural and multinational environment;	K.S9.
K05	Give opinions concerning various aspects of professional activity;	K.S10.
K06	Take responsibility for own decisions made during professional activities including own safety and safety of other people.	K.S11.

4.4. Assessment methods for learning outcomes

Assessment method (+/-)

Course learning outcomes (code)	Oral/written/ practical examinaion /other (specify)*	Test*	Project*	In-class activity*	Independent study*	Group work*	Other standardized test used in e-learning

Type of classes

1: / 2:	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab
W01-W09	+																				
U01-U04		+									+	+		+	+		+	+		+	
K01-K06											+	+		+	+		+	+		+	

Annotation. 1: form of classes; 2: learning outcomes

4.5. Assessment criteria for learning outcomes

Type of classes:

LECTURE (L) (including classes conducted with the use of distance learning methods and techniques)

Grade	Assessment criteria
3,0	From 61%-68% correct test answers

3,5	From 69%-76% correct test answers
4,0	From 77%-84% correct test answers
4,5	From 85%-92% correct test answers
5,0	From 93% -100% correct test answers

Type of classes:

CLASSES (C) (including classes conducted with the use of distance learning methods and techniques)

Grade	Assessment criteria
3,0	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.
4,0	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.
5,0	From 93% -100% the scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.

Type of classes:

LABORATORIES (Lab) (including classes conducted with the use of distance learning methods and techniques)

Grade	Assessment criteria
3,0	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.
4,0	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.
5,0	From 93% -100% the scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.

5. ECTS credit allocation – student workload

Category	Student workload (full-time mode)	Student workload (part-time mode)
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER (CONTACT HOURS)	**140**	
Participation in lectures*	40	
Participation in seminars/laboratories*	80	
Other (specify) - classes conducted with the use of distance learning methods and techniques*	20	
INDEPENDENT STUDY (NON-CONTACT HOURS)	**80**	
Preparation for lectures*	30	
Preparation for seminars/laboratories*	50	
Preparation for examination/test*		
Gathering materials for project, online research*		
Preparation of a multimedia presentation*		

Other (specify)*		
TOTAL HOURS	**220**	
ECTS CREDITS for the course	**9**	

*** delete as appropriate**

Approved for implementation (date and legible signatures of course instructors in the given academic year):

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