

Course description (syllabus) form for higher education, doctoral, postgraduate and skills development programs

A. General course description

FIELD NAME	COMMENTS
Course title (in Polish and English)	Fizjologia <i>(Physiology)</i>
Unit organising the course	Department of Human Physiology Faculty of Medicine Collegium Medicum in Bydgoszcz Nicolaus Copernicus University in Torun
Unit for which the course is organised	Faculty of Pharmacy, Collegium Medicum, Nicolaus Copernicus University Field of study: Pharmacy Long-cycle master's studies
Course ID	1755-F2-FIZJ-J
ERASMUS code	0916
ECTS credit allocation	5
Method of passing	Exam
Language of instruction	English
Indication whether attempts at obtaining course credit can be repeated	No
Affiliation of the course to a course group	Science basics of medicine (Group B)
Total student workload	<p>1. Workload associated with demanding activities direct participation of academic teachers is:</p> <ul style="list-style-type: none"> - participation in lectures: 30 hours - participation in exercises: 35 hours - conducting colloquiums: 4 hours - conducting the exam: 1 hour <p>The workload related to classes requiring the direct participation of academic teachers is 70 hours, which corresponds to 2.8 ECTS points</p> <p>2. Balance of student workload:</p> <ul style="list-style-type: none"> - participation in lectures: 30 hours - participation in exercises: 35 hours - preparation for exercises (including reading the indicated literature): 10 hours - preparing reports on exercises: 2 hours - preparation for and participation in colloquiums: 20+4=24 hours - preparation for the exam and participation in the exam: 25+1=26 hours <p>The total student workload related to the course is 127 hours, which corresponds to 5. ECTS points</p>

	<p>3. Workload related to scientific research:</p> <ul style="list-style-type: none"> - Participation in lectures (including research methodology, research results, and studies) – 2 hours, <p>The total student workload related to research is 2 hours, which corresponds to 0.08 ECTS credits.</p> <p>4. Time required to prepare for and participate in the assessment process:</p> <ul style="list-style-type: none"> - preparation for exercises (including reading the indicated literature): 10 hours - preparation for and participation in colloquiums: 20+4=24 hours - preparation for the exam and participation in the exam: 25+1=26 hours <p>The total student workload related to preparation and participation in the assessment process is 60 hours, which corresponds to 2.4 ECTS points.</p> <p>5. Breakdown of student workload (practical component):</p> <ul style="list-style-type: none"> - participation in laboratory sessions: 30 hours - preparation for tests (practical aspect): 10 hours - preparation for practical classes: 10 hours. <p>The total practical workload for the student amounts to 50 hours, corresponding to 2.0 ECTS credits.</p> <p>6. The student workload dedicated to acquiring social competencies through exercises amounts to:</p> <ul style="list-style-type: none"> - preparation for laboratories: 5 hours <p>The total student workload dedicated to acquiring social competencies through laboratories amounts to 5 hours, which corresponds to 0.2 ECTS credits.</p>
Learning outcomes: knowledge	<p>W1: Knows the normal structure of the human circulatory, respiratory, digestive, urinary, nervous, and endocrine systems, as well as the fundamental relationships between the body's structure and function under physiological conditions – K_A.W4.</p> <p>W2: Possesses knowledge of the physiology of the nervous, endocrine, circulatory, lymphatic, reproductive, digestive, urinary, and respiratory systems, as well as adaptive mechanisms and the processes of neural and hormonal regulation and thermoregulation – K_A.W5.</p> <p>W3: Knows and understands the mechanisms by which selected pharmacological agents modify physiological processes within the nervous, endocrine, circulatory, reproductive, digestive, urinary, and respiratory systems – K_A.W6.</p> <p>W4: Demonstrates knowledge of the structure and functions of biological membranes, mechanisms of membrane transport, and their role in the generation of resting and action potentials in excitable cells, as well as their involvement in processes modifying urine composition and the absorption of substances in the digestive tract – K.A.W10.</p>

	<p>W5: Possesses knowledge of the molecular aspects of signal transduction within the nervous, endocrine, circulatory, respiratory, and digestive systems – K_A.W11</p> <p>W6: Understands the mechanisms regulating metabolism and the impact of selected drugs on these processes – K_A.W12</p> <p>W7: Understands the mechanisms of humoral and cell-mediated immune responses – K_A.W13.</p> <p>W8: Understands the physical principles underlying physiological processes: circulation, nerve conduction, gas exchange, and the exchange of substances – K_B.W1.</p>
Learning outcomes: practical skills	<p>U1: Describes human adaptation mechanisms to various environmental conditions (high and low temperatures, diving, high altitudes) - K_A.U1</p> <p>U2: Describes physiological mechanisms and relationships between individual elements of the human body - K_A.U5</p> <p>U3: Uses the acquired knowledge to analyze the functional state of the body - K_A.U6</p>
Learning outcomes: social competence	<p>K1: Draws and formulates conclusions based on their own measurements and observations – K_B.K2</p> <p>K2: Possesses teamwork skills – K_B.K3</p>
Teaching methods	<p>Lectures:</p> <ul style="list-style-type: none"> • problem lecture with multimedia presentation • informative lecture (conventional) <p>Laboratory exercises:</p> <ul style="list-style-type: none"> • laboratory • observations • classical problem-based exercise method • discussion • show
Prerequisites	<p>A student starting education in the subject of Physiology should have basic knowledge of the anatomy and physiology of the circulatory system, respiratory system, nervous system, digestive system, internal secretion, reproductive system and the physiology of the kidney and blood at an advanced level and chemistry at an advanced level.</p>
Brief course description	<p>The "Physiology" course enables the student to learn basic concepts and understand the processes that regulate the functioning of individual organs and systems. It also allows you to understand the relationships between individual elements of the human body.</p>
Full course description	<p>The aim of the Physiology course is to familiarize students with the physiological processes and mechanisms responsible for the homeostasis of the human body. Lectures on Physiology are intended to present and consolidate knowledge of the basics of physiology: the circulatory system, respiratory system, endocrine system and nervous system. The student will become acquainted with the basic mechanisms of nerve cell functioning, will learn about the properties of the nerve cell's cell membrane and its role in the genesis of the resting potential and action potential as well as synaptic transmission. Then, he will become acquainted with the neurobiological basis of reflexes and the functioning of the movement control system. Additionally, you will gain knowledge</p>

	<p>about the functioning of the circulatory and respiratory systems and the mechanisms that regulate their work. The student will also learn about water and electrolyte management, kidney physiology and intrarenal regulation mechanisms. He will also learn about the physiology and regulation of digestive function. The exercises are laboratory in nature and are partially related to the issues discussed during lectures. The student will learn about the importance of the appropriate composition of extracellular fluid in the formation and transmission of information in the nervous system and the operation of chemical and electrical synapses. Then the student will learn the mechanism of skeletal muscle contraction, types of contraction and mechanisms regulating the force of contraction of these muscles. Additionally, during the exercises, the student will gain knowledge of the physiology of the hematopoietic system and basic blood laboratory parameters. The aim of the exercises is also to become familiar with ECG and blood pressure measurement, as well as functional changes occurring in the circulatory system as a result of changes in body position and under the influence of physical exercise. The student will also gain knowledge about the impact of environmental factors on the functioning of the respiratory system and the importance of spirometry in assessing the functioning of the respiratory system. You will also learn about body composition as well as neurohormonal weight control. Laboratory exercises in physiology allow you to develop individual and team work skills.</p>
Literature	<p>Basic literature:</p> <ol style="list-style-type: none"> 1. Brzozowski T. (ed.): Human Physiology. Konturek. Elsevier, Urban & Partner, Wrocław 2021. 2. Traczyk W.Z., Trzebski A.: Human Physiology with Elements of Applied and Clinical Physiology, PZWŁ, Warsaw 2015
Assessment methods and criteria	<p>The basis for passing the Physiology subject is compliance with the principles set out in the Annex to the Teaching Regulations of the Department of Physiology.</p> <p>Laboratories:</p> <ol style="list-style-type: none"> 1) The condition for obtaining a pass in Physiology is passing all laboratories (passing reports/worksheets) and colloquiums. 2) In the winter semester, 4 colloquia will be held for the field of Pharmacy: <ul style="list-style-type: none"> Colloquium No. 1, covering the thematic block: neurophysiology Colloquium No. 2, covering thematic blocks: physiology of the circulatory system Colloquium No. 3, covering thematic blocks: physiology of internal secretion Colloquium No. 4, covering thematic blocks: Physiology of the respiratory system and kidney physiology. 4) Each colloquium consists of 30 questions, with 4 answer options, only one of which is correct. Each of them contains four possible answers - with 1 distractor and 3 distractors (no negative points for an incorrect answer). For each correct answer, the

	<p>student receives 1 point. The condition for passing the test is to answer 18 questions correctly</p> <p>5) Grades are determined in accordance with paragraph 17, section 2 of the study regulations of April 30, 2019.</p> <p>1) Students who have passed the winter semester take the exam</p> <p>2) The final theoretical examination takes the form of a single-choice test consisting of 50 closed questions based on the knowledge acquired during lectures and laboratory exercises. Each of them contains four possible answers - with 1 distractor and 3 distractors (no negative points for an incorrect answer). The student receives 1 point for each correct answer. To pass the exam, you must answer 30 questions correctly.</p> <p>3) Grades are determined in accordance with the resolution of the Dean's Council No. 33/21 and in accordance with par. 17 section 2 of the study regulations of April 30, 2019.</p> <p>Final theoretical exam: W1-W7, U1-U3, K1. Written test: W1-W7, U1-U2, K1. Written entry: W1-W7, U1-U2, K1. Reports/worksheets: W1- W5, U1, K1. Prolonged observation: K2.</p>
Work placement	Not applicable

B1. Description of the subject of the series

FIELD NAME	COMMENTS
Period of instruction	2026/2027 - winter semester/ III semester
Form of assessment of course completion in the period of instruction	Exam
Form(s) of classes, number of hours and completion assessment methods	Lectures – 30 h: exam Tutorials – 35 h: ungraded credit
Name of course coordinator in the period of instruction	Prof. dr hab. Wojciech Kaźmierczak
Names of persons managing student groups for the course	prof. dr hab. n. med. Wojciech Kaźmierczak dr Wieńczysława Adamczyk mgr Monika Bejtka dr Mirosława Cieślicka dr Blanka Dwojaczny dr n. med. Jerzy Kochan mgr Katarzyna Stranz-Kaja dr Monika Zawadka - Kunikowska dr Piotr Złomańczuk
Course attributes	Obligatory
Course groups including description and limit to the number of students within the groups	Lectures: all year round Exercises: groups of up to 12 people
Time and place of classes	The dates and places of classes are in accordance with the schedule published by the Dean's Office of the Faculty of Pharmacy

<p>Learning outcomes defined for a given form of classes within the course</p>	<p>Lectures: W1, W2, W3, W4, W5, W6, W7, W8, U1, U2, U3 Tutorials: W1, W3, W4, W5, W6, W7, U1, U2, U3, K1, K2</p> <p>Lectures:</p> <p>W1. Describes the physiology of the nervous system and explains the mechanisms of transmission within the nervous system (K_A.W5)</p> <p>W2. Describes thermoregulatory mechanisms (K_A.W5)</p> <p>W3. Explains the physiology of the endocrine and reproductive systems and the mechanisms of hormonal regulation (K_A.W5)</p> <p>W4. Explains the physiological mechanisms of the circulatory, lymphatic, and respiratory systems, as well as the mechanisms of circulatory-respiratory integration (K_A.W5).</p> <p>W5. Describes the physiology of the digestive system and explains the mechanisms regulating food intake (K_A.W5).</p> <p>W6. Describes the physiology of the urinary system (K_A.W5)</p> <p>W7. Characterizes the mechanisms by which selected pharmacological agents modify physiological processes within the nervous, endocrine, circulatory, reproductive, digestive, urinary, and respiratory systems (K_A.W6)</p> <p>W8. Describes the process of hemostasis and explains the effect of selected pharmacological agents on this process (K_A.W6)</p> <p>U1. Describes human adaptive mechanisms to various environmental conditions (high and low temperatures, diving, high altitudes) (K_A.U5)</p> <p>U2. Describes physiological mechanisms and the interrelationships between the various components of the human body (K_A.U5)</p> <p>U3. Uses acquired knowledge to analyze a person's functional status (K_A.U6)</p> <p>Tutorials:</p> <p>W1. Describes the physiology of the nervous system and explains the mechanisms of transmission within the nervous system (K_A.W5)</p> <p>W3. Explains the physiology of the endocrine and reproductive systems and the mechanisms of hormonal regulation (K_A.W5)</p> <p>W4. Explains the physiological mechanisms of the circulatory, lymphatic, and respiratory systems, as well as the mechanisms of cardiorespiratory integration (K_A.W5)</p> <p>W5. Describes the physiology of the digestive system and explains the mechanisms regulating food intake (K_A.W5)</p> <p>W6. Describes the physiology of the urinary system (K_A.W5)</p> <p>W7. Characterizes the mechanisms by which selected pharmacological agents modify physiological processes within the nervous, endocrine, circulatory, reproductive, digestive, urinary, and respiratory systems (K_A.W6)</p>
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Methods and criteria for assessing a given form of classes within a subject	<p>The basis for passing the Physiology subject is compliance with the principles set out in the Annex to the Teaching Regulations of the Department of Physiology.</p> <p>Laboratories:</p> <p>1) The condition for obtaining a pass in Physiology is passing all laboratories (passing reports/worksheets) and colloquiums.</p> <p>2) In the winter semester, 4 colloquia will be held for the field of Pharmacy:</p> <p>Colloquium No. 1, covering the thematic block: neurophysiology</p> <p>Colloquium No. 2, covering thematic blocks: physiology of the circulatory system</p> <p>Colloquium No. 3, covering thematic blocks: physiology of internal secretion</p> <p>Colloquium No. 4, covering thematic blocks: Physiology of the respiratory system and kidney physiology.</p> <p>4) Each colloquium consists of 30 questions, with 4 answer options, only one of which is correct. Each of them contains four possible answers - with 1 distractor and 3 distractors (no negative points for an incorrect answer). For each correct answer, the student receives 1 point. The condition for passing the test is to answer 18 questions correctly</p> <p>5) Grades are determined in accordance with the resolution of the Dean's Council No. 33/21 and in accordance with par. 17 section 2 of the study regulations of April 30, 2019.</p> <p>- Reports/worksheets: a condition for passing the report (no grade) is to obtain 60% of the maximum number of points.</p> <p>- Colloquia, entry tickets: entry tickets are required and colloquiums is to obtain 60% of the maximum number of points.</p> <p>Lectures:</p> <p>1) Students who have passed the winter semester take the exam</p> <p>2) The final theoretical examination takes the form of a single-choice test consisting of 50 closed questions based on the knowledge acquired during lectures and laboratory exercises. Each of them contains four possible answers - with 1 distractor and 3 distractors (no negative points for an incorrect answer). The student receives 1 point for each correct answer. To pass the exam, you must answer 30 questions correctly.</p>

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Course content	<p style="text-align: center;">Lectures:</p> <ol style="list-style-type: none"> 1. Introduction to the subject of human physiology. 2. Physiology of the organ of vision. 3. Physiology of the urinary system. 4. Physiology of kidney function. 5. Physiology of the endocrine system 6. Physiology of the hearing organ. 7. Physiology of the balance system. 8. Central nervous system 9. Physiology of the urogenital system 10. Physiology of the digestive tract 11. Skin and appendages 12. Basics of respiratory system physiology 13. Physiology of the circulatory system. 14. Summary – resume of lectures 15. How to pass a test exam in human physiology. <p style="text-align: center;">Tutorials:</p> <ol style="list-style-type: none"> 1. Basics of cell electrophysiology - neuron structure, cell membrane structure, types of ion channels, ion pumps. Origin and features of the resting potential 2. Origin and features of the action potential - excitability of the nerve cell, the role of ion channels, the phenomenon of refraction in the neuron (PhysioEx) 3. Physiology of skeletal and smooth muscles - contraction mechanism and regulation of its force 4. Electrical activity of the heart. The structure and role of the cardiac stimulus system. The influence of the autonomic system on the electrical activity of the heart. 5. The effect of selected drugs on heart function. Case study 6. Hemodynamic cycle, left ventricular volume-pressure curve. Systolic and diastolic blood pressure. Average arterial pressure. Orthostatic test. The role of baroreceptors in the regulation of blood pressure 7. Regulation of internal secretion - hypothalamic-pituitary-thyroid axis. Thyroid hormones - receptors, mechanism of action at the cellular level, systemic effects 8. Hormonal regulation of blood glucose concentration 9. Blood composition, the role of morphotic elements, basic laboratory parameters 10. Chemical and physical digestion process. Metabolism 11. Respiratory system 12. Respiratory system 13. Glomerular filtration. Autoregulatory mechanisms in the kidney

