

Course description form (syllabus) for higher education, doctoral studies, postgraduate studies, and continuing education courses

1. General description of the subject matter

Field name	Comment
Name of the course (in Polish and English)	Fizjologia (Physiology)
Unit offering the course	Department of Human Physiology Faculty of Medicine Ludwik Rydygier Collegium Medicum in Bydgoszcz Nicolaus Copernicus University in Toruń
The entity for which the item is offered	Faculty of Pharmacy Field of Study: Pharmacy (Uniform Master's Degree Programme)
Course code	1700-F2-FIZJ-J
Erasmus code	0916 (Farmacy)
Number of ECTS credits	4
Method of assessment	Exam
Language of instruction	english
Determination of whether a course can be credited multiple times	No
Assignment of the course to a group of courses	Compulsory course Educational module A Biomedical foundations of pharmacy
Total student/postgraduate student/continuing education course participant workload	1. Workload associated with classes requiring the direct participation of academic staff amounts to: - participation in lectures: 25 hours; - participation in laboratory classes: 35 hours; - taking tests: 4 hours; - taking the exam: 1 hour. The workload associated with classes requiring the direct participation of academic staff is 65 hours, which corresponds to 2.6 ECTS credits. 2. Student workload breakdown: - participation in lectures: 25 hours; - participation in laboratory classes: 35 hours; - preparation for laboratory classes: 8 hours; - reading assigned literature: 2 hours; - preparation for and taking tests: 10 + 4 = 14 hours; - preparation for and taking the exam: 15 + 1 = 16 hours.

	<ul style="list-style-type: none"> - problem-based lecture with multimedia presentation; - informative (conventional) lecture. <p>Laboratory:</p> <ul style="list-style-type: none"> - individual work; - teamwork; - classic problem-based exercises; - laboratory sessions/computer simulations; - analysis of results; - discussion.
Prerequisites	A student beginning the course in physiology should possess basic knowledge of the anatomy and physiology of the circulatory, respiratory, nervous, digestive, endocrine, and reproductive systems, as well as renal and blood physiology—at an advanced secondary school level—and chemistry at an advanced level.
Brief description of the item	The "Physiology" course enables students to learn fundamental concepts and understand the processes regulating the functioning of individual organs and systems. It also fosters an understanding of the interrelationships between the various components of the human body.
Full item description	<p>The aim of the Physiology course is to familiarize students with the physiological processes and mechanisms responsible for human body homeostasis. The lectures are designed to present and consolidate knowledge regarding the fundamentals of physiology, specifically concerning the circulatory, respiratory, endocrine, and nervous systems. Students will learn about the basic functional mechanisms of nerve cells, the properties of the nerve cell membrane, and its role in the generation of resting and action potentials as well as in synaptic transmission. Subsequently, they will explore the neurobiological basis of reflexes and the operation of the motor control system. Furthermore, students will gain knowledge regarding the functioning of the circulatory and respiratory systems and the mechanisms regulating their activity. The course also covers water-electrolyte balance, renal physiology, and intra-renal regulatory mechanisms, as well as the physiology and regulation of digestive system functions.</p> <p>The practical classes are laboratory-based and partially linked to topics discussed in the lectures. Students will learn about the importance of the extracellular fluid composition for information generation and transmission within the nervous system, as well as the functioning of chemical and electrical synapses. Next, students will examine the mechanisms of skeletal muscle contraction, contraction types, and the factors regulating contraction force. Additionally, the practical classes will provide knowledge on the physiology of the hematopoietic system and basic laboratory blood parameters. The exercises also aim to familiarize students with ECG examinations and blood pressure measurement, as well as</p>

	<p>the functional changes occurring in the circulatory system due to changes in body position and physical exertion. Students will also gain knowledge regarding the impact of environmental factors on respiratory system function and the importance of spirometry in assessing that function. Furthermore, they will learn about body composition and the neurohormonal control of body weight. These physiology laboratory exercises foster the development of both individual and teamwork skills.</p>
Literature	<p>Required reading:</p> <ol style="list-style-type: none"> 1. Brzozowski T. (ed.): Human Physiology. Konturek. Elsevier, Urban & Partner, Wrocław 2021. 2. Silverthorn Dee Unglaub: Human Physiology: An Integrated Approach. PZWL Medical Publishing, 2018.
Assessment methods and criteria	<p>To receive credit for the Physiology course, students must adhere to the rules set out in the Appendix to the Teaching Regulations of the Department of Physiology.</p> <p>Laboratory classes:</p> <ol style="list-style-type: none"> 1) To receive credit for the Physiology course, students must successfully complete all laboratory classes (including the approval of reports/worksheets) and pass all tests. 2) During the winter semester, four tests will be administered for the Pharmacy program: <ul style="list-style-type: none"> Test No. 1, covering the topic: neurophysiology Test No. 2, covering the topic: cardiovascular physiology Test No. 3, covering the topic: physiology of the endocrine system Test No. 4, covering the topics: respiratory physiology and renal physiology. 4) Each test consists of 30 questions, each with four answer choices, only one of which is correct (comprising one key and three distractors; there is no penalty for incorrect answers). Students receive 1 point for each correct answer. To pass a test, a student must answer 18 questions correctly. 5) Grades are determined in accordance with the Faculty Council Resolution No. 33/21 and in compliance with § 17 para. 2 of the Study Regulations dated April 30, 2019. <ol style="list-style-type: none"> 1) Students who have successfully completed the winter semester are eligible to take the exam. 2) The final theoretical exam takes the form of a single-choice test consisting of 50 closed-ended questions based on knowledge acquired during lectures and laboratory classes. Each question offers four possible answers—one correct answer and three distractors (with no penalty points for incorrect answers). Students earn 1 point for each correct answer. To pass the exam, a student must answer 30 questions correctly. 3) Grades are determined in accordance with the Faculty Council Resolution No. 33/21 and in compliance with §... Article 17, paragraph 2 of the Study Regulations of 30 April 2019.

	Final theoretical exam: W1–W8, U1–U3, K1. Written test: W1–W8, U1–U2, K1. Written entrance quiz: W1–W7, U1–U2, K1. Reports/worksheets: W1–W5, U1, K1. Extended observation: K2.
Professional internships as part of the course	Not applicable

B1) Course unit description

Field name	Comment
Academic cycle in which the course is taught	1st year, 1st semester (winter semester)
Method of course completion within the cycle	Exam
Format and number of class hours, and methods of assessment	Lectures (25 hours): exam Laboratory classes (35 hours): pass/fail (credit without a grade)
Name(s) of the course/cycle coordinator(s)	Prof. dr hab. Wojciech Kaźmierczak
Names of the instructors conducting the course's class groups	prof. dr hab. n. med. Wojciech Kaźmierczak dr Wieńczysława Adamczyk mgr Monika Bejtka dr Mirosława Cieślicka dr Blanka Dwojaczny dr n. med. Jerzy Kochan dr Monika Zawadka - Kunikowska dr Piotr Złomańczuk mgr. Katarzyna Stranz-Kaja
Attribute (character) of an object	Compulsory subject
Activity groups with descriptions and capacity limits	Lectures: all first-year students Laboratory classes: groups of 12 students
Class schedules and locations	Class schedules and locations are announced by the Department of Recruitment and Student Affairs of the CM UMK in Bydgoszcz.
Learning outcomes defined for a specific form of instruction within the course	Lectures: W1–W8, U1–U3 Laboratories: W1, W3–W7, U1–U3, K1–K2
Assessment methods and criteria for a specific form of class within the course	To receive credit for the Physiology course, students must adhere to the rules set out in the Appendix to the Teaching Regulations of the Department of Physiology. Laboratory classes: 1) To receive credit for the Physiology course, students must pass all laboratory classes (including the approval of reports/worksheets) and all tests. 2) During the winter semester, four tests will be administered for the Pharmacy program: Test No. 1, covering the topic: neurophysiology Test No. 2, covering the topic: cardiovascular physiology Test No. 3, covering the topic: physiology of the endocrine system

	<p>Test No. 4, covering the topics: respiratory physiology and renal physiology.</p> <p>4) Each test consists of 30 questions, each with four answer choices, only one of which is correct (one key/correct answer and three distractors; no negative points for incorrect answers). Students receive 1 point for each correct answer. To pass a test, a student must answer 18 questions correctly.</p> <p>5) Grades are determined in accordance with the Faculty Council Resolution No. 33/21 and § 17 para. 2 of the Study Regulations dated April 30, 2019.</p> <p>- Reports/worksheets: the condition for passing a report (without a grade) is obtaining 60% of the maximum possible score. - Midterm tests and entry tests: the requirement for passing these tests is obtaining 60% of the maximum possible score.</p> <p>Lectures:</p> <p>1) Students who have successfully completed the winter semester are eligible to take the exam.</p> <p>2) The final theoretical exam takes the form of a single-choice test consisting of 50 closed-ended questions covering material from lectures and laboratory exercises. Each question offers four possible answers—one correct answer and three distractors (with no penalty points for incorrect answers). Students earn 1 point for each correct answer. To pass the exam, a student must answer 30 questions correctly.</p> <p>3) Grades are determined in accordance with Faculty Council Resolution No. 33/21 and § 17, section 2 of the Study Regulations dated April 30, 2019.</p> <p>Final theoretical exam: W1-W8, U1-U3, K1. Written midterm test: W1-W8, U1-U2, K1. Written entry test: W1-W7, U1-U2, K1. Reports/worksheets: W1-W5, U1, K1. Extended observation: K2.</p>
Scope of topics	<p>Lectures:</p> <ol style="list-style-type: none"> 1. Nervous system and sense organs. 2. Renal physiology. Water and electrolyte balance. 3. Physiology of the digestive system. Physiology of the endocrine system. 4. Respiratory physiology. 5. Cardiovascular physiology. <p>Laboratory sessions:</p> <ol style="list-style-type: none"> 1. Fundamentals of cellular electrophysiology: neuron structure, cell membrane structure, types of ion channels, ion pumps. Genesis and characteristics of the resting membrane potential. 2. Genesis and characteristics of the action potential: neuronal excitability, role of ion channels, refractory period in the neuron (PhysioEx).

	<p>3. Physiology of skeletal and smooth muscle: contraction mechanism and regulation of contraction force.</p> <p>4. Electrical activity of the heart. Structure and function of the cardiac conduction system. Influence of the autonomic nervous system on cardiac electrical activity.</p> <p>5. Effect of selected drugs on cardiac function. Case study.</p> <p>6. Hemodynamic cycle; left ventricular pressure-volume curve. Systolic and diastolic arterial pressure. Mean arterial pressure. Orthostatic test. Role of baroreceptors in arterial pressure regulation.</p> <p>7. Regulation of endocrine secretion: hypothalamus-pituitary-thyroid axis. Thyroid hormones: receptors, mechanism of action at the cellular level, systemic effects</p> <p>8. Hormonal regulation of blood glucose concentration</p> <p>9. Blood composition, role of formed elements, basic laboratory parameters</p> <p>10. Chemical and physical processes of digestion. Metabolism</p> <p>11. Respiratory system</p> <p>12. Respiratory system</p> <p>13. Glomerular filtration. Renal autoregulatory mechanisms</p> <p>14. Mechanisms altering urine composition; mechanism of action of selected diuretics</p> <p>15. Acid-base balance</p>
Teaching methods	Identical to Part A
Literature	Identical to Part A

2602 WTC

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