GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Human Physiology, PG_00064118		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	Piotr Badtke	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	15	1.0	9.0	25

Subject objectives

To familiarize the student with the proper functioning of the human body, from the systemic level to the knowledge of the functions of the most important organs and tissues.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U01] is able to acquire knowledge and self-studying, he/she is able to find needed information in specialist books, databases and other sources, he/she is able to integrate information and draw conclusions, he/she is able to communicate by using different technics in work and outside	The student knows the basic physiological nomenclature and knows the basic functional parameters of individual systems and organs of the human body.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_U04] is able to utilize empirical, analytical, simulation, and computer-based methods to formulate and solve engineering tasks in the field of medical and mechanical engineering	The student interprets the numerical data concerning the basic physiological variables.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W01] has knowledge in the field of natural sciences, including mathematics, contemporary physics, chemistry, and human anatomy with physiology	The student is able to assess the functioning of a healthy organism and understands the basic mechanisms that regulate and protect the organism against changes in the external environment.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – lecture
The concept of homeostasis. Regulating systems and their components. Excitability and agitation. Terms: depolarization, hyperpolarization. Absolute and relative refraction. Transmission of information between cells. Types of nerve fibers. Feeling and perception. Types of contractions: isometric, isotonic, auxotonic and: single, summed, tetanic. Smooth muscle activity. Spinal reflexes. Passive and active muscle tone. Reflex activity. Autonomous nervous system and its regulatory role. Fundamentals of cardiac electrophysiology. Introduction to electrocardiography. Heart cycle. Contractility and contraction force. Blood pressure. Reflex from arterial baroreceptors and chemoreceptors. Heart rate and pulse wave spread factors. Basic elements of blood circulation regulation. Methods of assessing the circulatory system. Blood composition and its basic functions in the body. The transport of oxygen and carbon dioxide through the blood. Components of blood counts. Primary and secondary haemostasis. Respiratory system physiology. Introduction to spirometric measurements. Gas exchange in the alveoli. Hormones - their structure, mechanisms of action and basic effects. Hormone nomenclature of the hypothalamus and pituitary gland. Feedback in the endocrine system. Hormonal regulation of blood glucose levels. Metabolism and its measurement. System energy balance. The motor activity of the digestive tract. Basic digestive functions. The distribution of water in the body. Outline of mechanisms regulating the volume and composition of body fluids. The role of the kidneys. Basic elements of the acid-base balance of the body. Senses: taste and smell. Hearing and balance. Vision and visual perception.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of the subjects: biology, anatomy, chemistry and physics</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Final test</td><td>60.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Fizjologia człowieka pod red. Jana Górskiego, PZWL Warszawa, 2015</td></tr>
<tr><td>Supplementary literature</td><td>T. Brzozowski (red.): Konturek Fizjologia człowieka; Edra, Urban@Partner Wrocław 2019

H..Krauss, M. Gibas-Dorna: Fizjologia człowieka. Podstawy; PZWL, Warszawa, 2021</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Wybrane zagadnienia: 1. Głownie czynniki od których bezpośrednio zależy ciśnienie tętnicze skurczowe i rozkurczowe 2. Górne zakresy NORMY ciśnienia tętniczego. Kryteria ilościowe nadciśnienia tętniczego 3. Wpływ insuliny i glukagonu na osoczowe stężenie glukozy 4. Terminy: potencjał błonowy, depolaryzacja, hiperpolaryzacja, repolaryzacja 5. Terminy: objętość wyrzutowa, pojemność minutowa, frakcja wyrzutowa 6. Terminy: Próg pobudliwości - obniżenie, podwyższenie: Pobudliwość zwiększona i zmniejszona; Wpływ zmian chwilowego potencjału błonowego na pobudliwość komórki. Pytania testowe: 1. Nagły wzrost ciśnienia tętniczego: A) wywołuje odruchowe pobudzenie włókien współczulnych zaopatrujących mięśniówkę naczyń tętniczych. B) pobudza baroreceptory tętnicze C) hamuje chemoreceptory w ścianie aorty D) powoduje przyspieszenie rytmu serca 2. W warunkach prawidłowych pobudzenie dla skurczów serca powstają (są generowane): A) w mięśniu przedsionków B) w węźle zatokowo-przedsionkowym C) w węźle przedsionkowo-komorowym D) w pęczku Hisa 3. Pobudzenie przywspółczulnej części autonomicznego układu nerwowego prowadzi do: A) wzrostu ciśnienie tętniczego krwi B) wzrostu oporu oddechowego wskutek zwężenia oskrzeli C) rozszerzenia źrenic D) przyspieszenia częstości akcji serca 4. W warunkach spoczynkowych u zdrowego człowieka: A) mięśnie wydechowe praktycznie nie uczestniczą w oddychaniu B) częstość akcji serca wynosi ok. 100/ min C) objętość minutowa krwi tłoczonej przez lewa komorę wynosi ok. 25 litrów D) prężność tlenu we krwi tętniczej wynosi ok. 40 mm Hg</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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