University of Gdańsk

Subject card

Subject name and code	Exercise physiology, PG_00207339		
Field of study	Biology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group Subject group related to scientific research 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	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Mateusz Karnia	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	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	30	6.0	14.0	50

Subject objectives

1. Familiarizing students with the biological mechanisms accompanying physical exercise and with different types of exercise loads, including adaptive changes in individual body systems resulting from physical efforts of varying intensity (e.g. adaptations induced by sprint, strength, and endurance training).

2. Familiarizing students with the practical implementation of exercise testing using indirect and direct methods for physical efforts of different intensity and characteristics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMU2_W01] has a deep knowledge and understanding of natural phenomena and processes at various levels of complexity	The student has an in-depth understanding of physiological phenomena and processes occurring in the human and animal organism in response to physical exercise, at both the systemic and cellular levels.	[SW4] test/exam - oral or written
[BIOLMU2_U01] is able to select and apply research techniques and tools appropriate to the problems of the studied speciality of biological sciences	The student is able to select and apply basic research techniques and tools in exercise physiology that are appropriate for assessing physical performance, exercise-induced adaptations, and fatigue.	[SU6] demonstration of practical skills
[BIOLMU2_K02] is ready to work effectively as a team member and to comply with the rules of teamwork and take responsibility for the tasks carried out	The student is prepared to work effectively as a member of a team during physiological measurements and testing, to follow team-based work principles, and to take responsibility for assigned tasks.	[SK8] observation of student's independent or team work
[BIOLMU2_U04] is able to plan and carry out complex research tasks or expert opinions in the field of the biological specialty studied, independently or in a team, also in changing and unforeseen conditions	The student is able to plan and perform, individually or as part of a team, basic research tasks in the field of exercise physiology, including method selection, data collection, and preliminary data analysis.	[SU6] demonstration of practical skills

Subject contents

The concept of physical fitness, aerobic and anaerobic capacity, and selected factors determining their level. The concept of exercise tolerance and its physiological determinants. The concept of physical exercise, classification of exercise types, and energy sources.
Practical component: measurement, calculation, and analysis of basic body composition components; orthostatic test.

Changes in oxygen uptake and circulatory parameters in response to exercise of varying intensity.
Practical component: determination of maximal oxygen uptake using the ÅstrandRyhming nomogram; direct measurement of maximal oxygen uptake (exercise-to-exhaustion test / ramp test).

Adaptive changes in the respiratory system in response to exercise of different intensity and duration.
Practical component: determination of PWC 170, 150, and 130 values.

Anaerobic exercise and the concept of power.
Practical component: direct measurement of anaerobic capacity (WAnT), indirect power measurements.

Physiological basis of warm-up.
Practical component: interval exercise, static exercise.

Fatigue and recovery: basic concepts, types, symptoms, and causes of fatigue.
Practical component: Harvard step test, calculation of the recovery efficiency index; prolonged exercise at constant intensity.

Training as a process of adaptation to progressively increasing loads. Adaptive changes in children and adults induced by endurance, strength, and speed training.
Practical component: anaerobic threshold measurement methods and performance of a field test.

Issues related to physical exercise in model organisms.
Practical component: measurement of strength, coordination, and endurance using laboratory rats and mice as examples.

Prerequisites and co-requisites

Completed a course in animal and human physiology / general physiology.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm tests.	51.0%	100.0%

Recommended reading	Basic literature	Górski J. *Physiological Foundations of Physical Exercise*, PZWL, Warsaw, 2008. *Physiological Tests in the Assessment of Physical Fitness*, PWN, Warsaw, 2010.
	Supplementary literature	Materials (review articles in English and Polish) provided by the course instructor or proposed by students.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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