GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MODEL ORGANISMS, PG_00063459						
Field of study	Biotechnology						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		blended-learning		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Biotechnology and Microbiology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Martyna Mroczyńska-Szeląg				
	Teachers						

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 15.0						

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	2.0	18.0	50

Subject objectives	
	The aim of the course is to equip students with comprehensive knowledge of model organisms, their significance in scientific research, and the principles of their rational selection for various types of experiments. Students will learn the criteria for choosing model organisms, their limitations, and the ethical aspects related to their use in science. As part of the course, students will solve a research problem by selecting an appropriate model organism for a specific experiment, providing a justified rationale for their choice.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W03] selects methods using living organisms and biomolecules to produce and process consumer goods	The student knows the criteria for selecting model organisms depending on the experiment	[SW3] Assessment of knowledge contained in written work and projects
[K7_U06] plans research and designs biotechnological products and processes taking into account legal regulations and bioethical principles	The student is able to distinguish organisms that require ethical committee approval and, based on this, select an appropriate model organism for the research hypothesis. They can design an experiment using suitable model organisms, considering ethical principles and legal requirements.	[SU4] Assessment of ability to use methods and tools
[K7_W01] defines the phenomena, processes and laws of living nature applied to the production of useful goods and the carrying out of services	The student has the necessary knowledge to characterize basic model organisms from the groups: bacteria, fungi, invertebrates, and vertebrates, describing their applications in scientific research and explaining the biological processes studied using them. They are familiar with the criteria for selecting model organisms for various types of research and understand their limitations. The student is aware of the ethical aspects associated with the use of model organisms in scientific research.	[SW2] Assessment of knowledge contained in presentation
[K7_U03] designs technological solutions for obtaining useful goods using biomolecules and living organisms based on the state of the art in accordance with the latest scientific literature	The student is able to identify the advantages and disadvantages of individual model organisms. They can select an appropriate model organism for research to obtain reliable results. They are capable of planning specific tasks and selecting control groups. The student is aware of the ethical aspects associated with the use of model organisms.	[SU2] Assessment of ability to analyse information

Subject contents

Course content – lecture

The course covers issues related to the role of model organisms in the development of biological sciences and their importance in contemporary basic and applied research. It discusses the advantages, limitations, and challenges associated with the use of biological models, including the problem of extrapolating results to higher organisms, as well as the criteria for the appropriate selection of a model organism for a specific research objective.

Course content – laboratory

As part of the laboratory classes, students perform practical exercises using selected model organisms, gaining knowledge of experimental design, culture maintenance, data analysis, and interpretation of experimental results.

Prerequisites and co-requisites

The student must have knowledge about the hazards while working in a microbiological laboratory, and be able to use basic microbiological techniques. Therefore, it is advisable for the student to pass the subject of general microbiology.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture: test	60.0%	40.0%
Lecture: project during the lecture	60.0%	10.0%
Laboratory: reports	60.0%	50.0%

Recommended reading

Basic literature	Brylińska J., Kwiatkowska J. Laboratory animals. Methods of breeding and experiments. UNIVERSITAS, Krakow, 1996 Ankeny, Rachel A., and Sabina Leonelli. *Model organisms*. Cambridge University Press, 2020. Scientific articles indicated by the instructor during the semester.
Supplementary literature	Greczek-Stachura, Magdalena. Paramecium as a model organism in pharmacological research. Scientific Publishing House of the Pedagogical University, Kraków, 2013.
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Experiments with which model organisms require approval from the ethics committee? 2. List the advantages of G. mellonella as a model organism. 3. Describe one experiment you know of using an invertebrate model organism.

Practical activites within the subject	Not applicable

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