University of Gdańsk

Subject card

Subject name and code	Systems approach to microbiology and bacterial gene expression, PG_00147843		
Field of study	Genetics and Experimental Biology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	undergraduate studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish English
Semester of study	6	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Katedra Genetyki Molekularnej Bakterii -> Faculty of Biology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Katarzyna Potrykus	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	15.0	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	12.0	23.0	50

Subject objectives
-to introduce students to the many systems governing bacterial cells at the molecular level, including global regulatory systems, pathogenesis and host-cell interactions -to introduce students to the latest concepts in bacterial molecular genetics -to introduce students to research methods used in microbial systems studies -to introduce students to microbial communities and ecosystem

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GBEL3_W05] the principles of research planning based on achievements in biological sciences and related fields, the potential application of their results in practice, the principles of operation of equipment and apparatus used in molecular genetics research, and the principle of interpreting biological phenomena and processes based on empirical data in research and practical activities, with consideration for sustainable use of biological diversity.	Student recognizes principles of planning research based on the achievements of biological sciences and related fields, and possibilities of using their results in practice	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GBEL3_W01] Understanding the structure and properties of basic types of biological macromolecules, molecular mechanisms of metabolic pathways and genetic information flow, as well as sources of genetic variability in organisms and mechanisms of evolution; explaining the rules of inheritance, elucidating differences in the structure and functioning of prokaryotic and eukaryotic cells, and understanding the structure and functional relationships at the cellular and tissue levels.	Student understands the structure and properties of basic types of biological macromolecules, molecular mechanisms of basic metabolic pathways and genetic information flow, and sources of genetic variation in organisms	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GBEL3_W03] The molecular mechanisms of genetic information transmission and gene expression, as well as the molecular and genetic basis of human physiology and diseases, including infectious diseases.	Student understands molecular mechanisms of genetic information transmission and gene expression	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GBEL3_K07] Lifelong learning and updating knowledge in the field of molecular genetics and other disciplines.	Student understands the need for lifelong learning and updating of knowledge in the field of molecular genetics and other fields	[SK1] oral statement/conversation/ discussion
	[GBEL3_W06] the development and current state of knowledge, as well as the latest trends in molecular genetics and related fields; indicating their relationship with other disciplines in the natural or medical sciences and the possibilities of their practical application.	Student recognizes the development and current state of knowledge, as well as the latest trends in molecular genetics and related fields; indicates their relationship with other disciplines of natural or medical sciences	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[GBEL3_U08] Independently study literature and plan one's own career path.	Student can independently study literature and plan their own career path	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[GBEL3_K02] Critical assessment of one's own knowledge and methods in the field of molecular biology and related disciplines, as well as the commercialization of research.	Student is able to critically evaluate their own knowledge and methods in the field of molecular biology and related fields	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
	[GBEL3_U05] Capable of communicating in English at a B2 level, familiar with and utilizing specialized English vocabulary in the fields of biological and medical sciences, as well as legal and economic aspects of research commercialization in daily professional/scientific activities.	Student is able to communicate in English at the B2 level, knows and uses specialist English vocabulary in the field of biological sciences	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[GBEL3_U04] Capable of reading scientific texts in English and Polish with comprehension, synthesizing the knowledge contained within them, preparing well-documented studies on biological issues, as well as those related to research commercialization.	Student reads and understands scientific texts in English and can synthesize the knowledge contained therein	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written

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<tr><td>Subject contents</td><td>• high-throughput approaches to study microbes, their communities and combating antibiotic resistance
• biology of bacterial toxin-antitoxin systems
• second messengers and the stringent response
• bacterial pathogenesis and establishing novel antibacterial compounds
• regulatory networks of gene expression
• environmental microbiology</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of biochemistry, microbiology and molecular genetics. In order to enroll in this course, the students must have passed a University level class on the subject of microbiolgy, and at least one of the other subjects (biochemistry or molecular genetics).</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>exam/test</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>The list of publications for each lecture will be given to the students by the lecturers.</td></tr><tr><td>Supplementary literature</td><td>Madigan MT, Bender KS, Buckley DH, Sattley WM, Stahl DA Brock Biology of Microorganisms, 15th edition
TA Brown "Genomes"
Alberts B, at al. "Molecular Biology of the cell"
Harvey Lodish et al. Molecular cell biology
Bertrand JC, Environmental Microbiology: Fundamentals and applications, Springer, 2015
Barton LL, McLean RJC Environmental Microbiology and Microbial Ecology, John Wiley & Sons, 2019
Mohseni M, Omar Y, Engel GS, Plenio MB, Quantum Effects in biology, Cambridge University, 2014</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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