University of Gdańsk

Subject card

Subject name and code	Mechanisms of pathogenesis of microorganisms, PG_00198350						
Field of study	Genetics and Experimental Biology						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's 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		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Molecular Genetics of Bacteria -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Agnieszka Szalewska-Pałasz				
	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		3.0		17.0	50
Subject objectives	To familiarize students with the processes involved in the acquisition of pathogenic traits by bacteria. To understand the genetic mechanisms underlying the expression of virulence factors. To understand the risks associated with emerging pathogens and antibiotic resistance. To familiarize students with the hosts defense mechanisms. To provide knowledge of methods for combating pathogens. Ability to work with microorganisms and identify pathogenic factors.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GBEL3_K01] The graduate is prepared to: use of theoretical knowledge in laboratory and production practice	Is ready to apply his theoretical knowledge in laboratory and production settings	[SK1] oral statement/conversation/ discussion [SK5] implementation of a problem task [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[GBEL3_U03] The graduate is able to: use research apparatus and tools and, following the correct sequence of operations, carry out simple physical, biological or chemical observations and measurements in laboratory work in the biological sciences.	Uses basic laboratory equipment and research tools and, following the correct sequence of steps, performs simple physical, biological, or chemical observations and measurements in laboratory work in the field of biological sciences	[SU4] test/exam - oral or written [SU6] demonstration of practical skills
[GBEL3_W05] A graduate has an advanced knowledge and understanding of: principles for planning research based on the achievements of biological sciences and related disciplines and the possibility of putting their results into practice, principles for the 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 work and practical action, taking into account the sustainable use of biodiversity.	Understands the principles of research planning based on advances in the biological sciences and the potential practical applications of their findings, as well as the principles of operation of the equipment and instruments used in genetic research	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work [SW5] implementation of a problem task
[GBEL3_W03] A graduate has an advanced knowledge and understanding of: molecular mechanisms of genetic information transfer and gene expression and the molecular and genetic basis of human physiology and disease, including infectious diseases.	Understands 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	[SW4] test/exam - oral or written [SW5] implementation of a problem task
[GBEL3_K05] The graduate is prepared to: responsibility for their own and others' safety at work	Is responsible for his own safety and that of others	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[GBEL3_U01] The graduate is able to: independently perform practical tasks in the biological and related sciences, formulate research problems, analyse their results and draw conclusions.	Is able to independently perform simple practical tasks in the field of biological sciences and related disciplines	[SU1] oral statement/conversation/ discussion [SU3] text preparation/written work [SU6] demonstration of practical skills [SU8] observation of student's independent or team work

Subject contents

Mechanisms of bacterial genetic variability, the evolution of pathogenic bacteria, and virulence factors. Terminology related to pathogenic microorganisms. Interactions between the pathogen and the host organism, mechanisms of colonization. Fundamentals of the immune system. Mechanisms of expression and action of virulence factors. Intracellular pathogens.
Epidemics, pandemics, chronic infections. Emerging pathogens, methods of infection prevention, the search for new drugs, phage therapy.

Prerequisites and co-requisites

A. Formal Requirements
General microbiology, biochemistry, molecular genetics of bacteria, chemistry
B. Prerequisites
Basic knowledge of biochemistry and microbiology, ability to perform aseptic techniques and maintain bacterial cultures, ability to ensure workplace safety

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Assessment: Report on completed assignments, observation of the student’s work during the practical sessions</td><td>51.0%</td><td>100.0%</td></tr>
<tr><td></td><td>0.0%</td><td>0.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>A. Required reading for final course completion (passing the exam):
A.1. Used during class
Materials specified by the lecturer
Salyers, A. A. and D. D. Whitt. 2002. *Bacterial Pathogenesis: A Molecular Approach*. 2nd ed. ASM Press. Washington, D.C.
Infectious Diseases, Jonathan Cohen, William G Powderly, Steven M. Opal, 4th Edition - June 10, 2016, Elsevier

A.2. To be studied independently by the student
Materials indicated by the lecturer
Medical Microbiology. Short Lectures by Will Irving, Tim Boswell, and Dlawer Aldeen. PWN, 2008
Translated with DeepL.com (free version)</td></tr>
<tr><td>Supplementary literature</td><td>Bacterial biofilms Romeo T. Springer, 2008

Bacterial Pathogenesis: Molecular and Cellular Mechanisms Caister Academic Press 2012</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Molecular mechanisms underlying the pathogenesis of diseases caused by specific groups of bacteria
Common viral diseases
Emerging diseases</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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