



Subject card

Subject name and code	Genetics of Microorganisms, PG_00058250						
Field of study	Biotechnology						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			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	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Microbiology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Rafał Piątek					
	Teachers	dr inż. Paweł Wityk					
Lesson types and methods of instruction	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: 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		5.0		15.0	50
Subject objectives	Knowledge and understanding of processes related to genetic of prokaryotic and eucaryotic microorganisms and expression of their genetic material. Knowledge and practical skills of variety of genetic techniques.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U07] is able to consider bioethical issues and regulations in research planning and design of biotechnological products and processes	The student is able to take into account bioethical problems and regulations in planning research and designing biotechnological products and processes. The student knows the legal requirements for conducting research with the use of GMOs and GMMs in Poland.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K7_U05] is able to apply instrumental methods of quantitative and qualitative analysis and studies on activity of biomolecules, select and apply diagnostic and analytical methods in the field of his/her specialty with particular emphasis on genetic, molecular and microbiological diagnostics and diagnostics based on antigen-antibody reaction	The student knows how to use instrumental methods of quantitative and qualitative analysis and biomolecular activity testing, select and apply diagnostic and analytical methods in the field of his specialty, with particular emphasis on genetic, molecular and microbiological diagnostics and based on the antigen-antibody reaction.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	[K7_W01] has advanced knowledge of methods of genetic engineering and molecular genetics, functioning of the immune system and mechanisms of immune system response, diagnostic methods, and analytical methods in the area of specialty	The student has advanced knowledge of genetic engineering methods and molecular genetics, diagnostic and analytical methods in the field of specialties, e.g. nucleic acid sequencing, CRISPR, siRNA, molecular cloning, molecular diagnostics.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
	[K7_K02] is aware of the limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training	The student is aware of the dynamic development of knowledge in the field of genetics of microorganisms. The student is aware of the limitations resulting from the current state of knowledge and technology.	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work [SK2] Assessment of progress of work [SK1] Assessment of group work skills
Subject contents	<p>Lectures: Bacterial and yeast chromosomes, genetic code, genes, expression of genes, homologous recombination, mutational variability, repair of DNA damage, horizontal gene transfer, bacterial plasmids, elements integrating with DNA, insertional sequences, mobile introns and inteins, genomic islands, molecular basis of pathogenesis of infections.</p> <p>Laboratories: Conjugation in bacteria; Cloning of selected gene into plasmid vector; Mutagenesis of yeasts induced by UV; Identification of genes coding for virulence features of pathogenic bacteria.</p>		
Prerequisites and co-requisites	Basic knowledge of microbiology, molecular biology and genetic engineering.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final exam	60.0%	60.0%
	Laboratory	60.0%	40.0%
Recommended reading	Basic literature	<p>1: Biologia molekularna bakterii. J. Baj, Z. Markiewicz, Wydawnictwo Naukowe PWN, 2012;</p> <p>2: Genetyka. Krótkie wykłady. H. Fletcher, I. Hickey, P. Winter, Wydawnictwo Naukowe PWN, 2013;</p> <p>3: Genomy. T.A. Brown, Wydawnictwo Naukowe PWN, 2013.</p>	
	Supplementary literature	Molecula genetics of bacteria. J. W. Dale, S.F. Park, Willey-Blackwell, 2010.	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	1. Expression of hlyA gene coding for hemplysin of Listeria monocytogenes bacterium is regulated: a) by temperature; b) by osmotic pressure; c) by NaCl concentration; d) by saccharose concentration. 2. Rybosomes in Procaryotic cells are located: a) in the periplasmic space; b) in the cellular membrane; c) in the cytoplasm
Work placement	Not applicable