

**Subject card**

<b>Subject name and code</b>	Multicellular organisms - Genetics Methodology (M04_B1), PG_00153690						
<b>Field of study</b>	Biotechnology						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2025/2026		
<b>Education level</b>	undergraduate studies	<b>Subject group</b>					
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	2	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	4	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>					
<b>Conducting unit</b>	Zakład Ochrony i Biotechnologii Roślin -> Instytut Biotechnologii UG -> Intercollegiate Faculty of Biotechnology UG-MUG						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Anna Ihnatowicz				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	12.0	0.0	0.0	0.0	12
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	12		6.0		12.0	30
<b>Subject objectives</b>	The student, by completing the program block, will learn the mechanisms of development and symptoms of disorders of the discussed processes, including chromosomal aberrations and human genetic diseases. The aim of the exercises is to use the acquired knowledge during solving tasks and analyzing selected genetic processes, including the use of basic statistical methods used in biotechnology. The student will have the opportunity to develop the ability to speak and lead discussions, using specialist terminology and conceptual apparatus appropriate for biotechnology and will understand the need to provide society with information about the achievements of biotechnology in the diagnosis and treatment of genetic diseases, prenatal diagnosis, personalized medicine and others.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHL3_U03] The graduate is able to use basic mathematical and statistical methods to describe phenomena and analyse data; analyse basic data in professional databases used in biotechnology	The student applies basic mathematical and statistical methods to describe phenomena and analyze data, including the analysis of selected genetic processes; has the ability to perform basic data analysis in professional databases used in biotechnology.	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written
	[BIOTECHL3_K05] The graduate is willing to understand the need to inform the society about the achievements of biotechnology important for the improvement of health and quality of life.	The student understands the need to provide the public with information about biotechnology achievements important for improving health and quality of life, including information about biotechnology achievements in the diagnosis and treatment of genetic diseases, prenatal diagnosis, personalized medicine, and others.	[SK1] oral statement/conversation/discussion [SK8] observation of student's independent or team work
	[BIOTECHL3_U07] The graduate is able to prepare and present a short oral presentation in Polish and/or English, covering detailed issues in the field of biotechnology, using scientific language, including specialist terminology and conceptual apparatus appropriate for biotechnology; conduct discussions	The student will have the opportunity to develop the ability to speak and lead discussions using specialized terminology and conceptual apparatus appropriate to biotechnology and genetics. Will understand the need to provide the public with information about the achievements of biotechnology in the diagnosis and treatment of genetic diseases, prenatal diagnosis, personalized medicine and others.	[SU1] oral statement/conversation/discussion [SU8] observation of student's independent or team work
Subject contents	<b>Genetics of higher organisms:</b>  Solving genetic crosses, probability, statistical tests. Diseases caused by chromosomal aberrations. Karyotypes. Pedigree analysis. Inheritance of blood groups. Examples of the use of genetic and molecular markers in molecular breeding, genetic counseling, forensics, and criminology. Application of genetic techniques to construct maps showing gene positions. Experimental mapping populations - examples in various types of organisms. Application of molecular biology techniques to study DNA molecules (restriction mapping, fluorescence in situ hybridization, mapping of sequence-labeled sites). QTL mapping. Normal distribution. Study of heritability in the broad and narrow sense. GWAS. The impact of progress in sequencing techniques on the development of genetic research. Model organisms in genetic research - databases. Directions of development of gene therapies.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test/exam - written	51.0%	100.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>Genomy, Autor: Terence A. Brown Współtwórca: Piotr Węgleński (redaktor naukowy), Wydanie: 4, 2019</li> <li>Genetyka molekularna, Autor: Piotr Węgleński, Wydawnictwo Wydawnictwo Naukowe PWN, 2021</li> <li>Krótkie wykłady Genetyka. Autorzy: Ivor Hickey, Hugh Fletcher, 2021</li> <li>Krótkie wykłady. Genetyka. Autorzy: Ivor Hickey, Hugh Fletcher (ebook)</li> </ul>	
	Supplementary literature	<ul style="list-style-type: none"> <li>Genetyka medyczna, Podręcznik dla studentów, Redakcja naukowa: Gerard Drewa, Tomasz Ferenc, Wydanie: Wrocław, 2021, Wydawca: Edra Urban &amp; Partner</li> <li>50 idei, które powinieneś znać. GENETYKA (ebook), Autor: Mark Henderson, Wydanie: 1, 2020, Wydawca: Wydawnictwo Naukowe PWN</li> <li>Hartl D.L., Ruvolo M. Genetics: Analysis of Genes and Genomes, wyd. VIII, Jones and Bartlett Publisher 2011</li> <li>Schaum's Outline of Genetics, Fifth Edition (Schaum's Outlines) 5th edition by Elrod, Susan, Stansfield, William (2010)</li> </ul>	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	--
Work placement	Not applicable

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