

**Subject card**

<b>Subject name and code</b>	Medical applications of population genetics, PG_00147012						
<b>Field of study</b>	Genetics and Experimental Biology						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2025/2026		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study		
<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>	3	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>					
<b>Conducting unit</b>	Laboratory of Molecular Evolution and Bioinformatics -> Department of Evolutionary Genetics and Biosystematics -> Faculty of Biology -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Aleksandra Naczka				
	<b>Teachers</b>		dr Aleksandra Naczka				
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	15.0	0.0	0.0	15
	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>	15		3.0		7.0	25
<b>Subject objectives</b>	<p>To familiarise students with molecular research methods in population genetics.</p> <p>To learn the basic terminology, tools and steps of molecular data analysis in population genetics.</p> <p>To introduce issues in the applications of population genetics in medicine, forensics and archaeology.</p> <p>To provide an understanding of quantitative traits and their impact on population genetic structure.</p> <p>To familiarise students with the issue of nutrigenomics.</p> <p>To provide a basis for critical reflection on selected problems in contemporary human genetics.</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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.	- is familiar with the development and current state of knowledge and the latest trends in population genetics and related fields; indicates their relationship to other disciplines in the natural or medical sciences and the possibilities of their use in practice	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work [SW5] implementation of a problem task
	[GBEL3_U02] Utilize computer programs for performing analyses and calculations, as well as utilize databases and bioinformatics tools to solve biological problems.	- is able to use computer programs to perform basic statistical and bioinformatics analyses in the field of population genetics	[SU3] text preparation/written work [SU5] implementation of a problem task [SU6] demonstration of practical skills
	[GBEL3_K07] Lifelong learning and updating knowledge in the field of molecular genetics and other disciplines.	- updates knowledge of population genetics and knows its practical applications	[SK3] text preparation/written work
	[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.	- knows the molecular mechanisms of genetic information transfer and the genetic basis of variation in allele frequency in populations	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work [SW5] implementation of a problem task
	[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.	- knows the principles of planning population genetics research and how to use their results in practice	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work [SW5] implementation of a problem task
	[GBEL3_U01] Independently perform practical tasks in the field of biological sciences and related disciplines, formulate research problems, analyze their results, and draw conclusions.	- is able to independently carry out simple practical tasks in the field of genetics populations, analyse their results and draw conclusions	[SU3] text preparation/written work [SU5] implementation of a problem task [SU6] demonstration of practical skills
	[GBEL3_U07] Work in a team and organize work while adhering to occupational health and safety principles and ergonomics.	- can work as part of a team and organise its work	[SU5] implementation of a problem task
	[GBEL3_K01] The utilization of theoretical knowledge in laboratory and production practice.	- is ready to apply theoretical knowledge of population genetics in practice	[SK5] implementation of a problem task [SK6] demonstration of practical skills
Subject contents	<b>Exercise topics:</b>  Statistical methods in genetic data analysis, especially microsatellite SSR. Assessment of the level of variability and genetic structure of human populations. Microevolutionary processes: genetic drift, inbreeding, natural selection, isolation by distance. Population genetics in forensics and archaeology. Phylogeography. Nutrigenomics. Contemporary genetic issues: eugenics and human races.		
Prerequisites and co-requisites	Basics of genetics, 1st year, semester I  Fundamentals of population and conservation genetics, 1 st year, semester II		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	independent work - worksheets	51.0%	50.0%
	short test	51.0%	50.0%

Recommended reading	Basic literature	<p>Avise J.C. 2008. Markery molekularne, historia naturalna i ewolucja. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa.</p> <p>Friedman J.M., Dill F.J., Hayden M.R., McGillivray B.C. 2000. Genetyka (red. wyd. pol. J. Limon), Urban &amp; Partner.</p> <p>Futuyma E.J. 2008. Ewolucja. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa.</p> <p>Hartl D.L., Clark A.G. 2009. Podstawy genetyki populacyjnej. Wydawnictwo. Uniwersytetu Warszawskiego, Warszawa.</p>
	Supplementary literature	- subject matter literature; current scientific journals from around the world
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>Analysis of population genetic variation - basic parameters.</p> <p>Analysis of genetic differences between populations.</p> <p>Recognition of evolutionary processes acting on a population.</p> <p>Familiarisation with the procedures to be followed in the development of analytical results for microsatellite DNA in individual identification.</p>	
Work placement	Not applicable	

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