

Subject card

Subject name and code	Medical applications of population genetics, PG_00147012						
Field of study	Genetics and Experimental Biology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
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	3		ECTS credits		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Laboratory of Molecular Evolution and Bioinformatics -> Department of Evolutionary Genetics and Biosystematics -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Aleksandra Naczek				
	Teachers		dr Aleksandra Naczek				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	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		3.0		7.0	25
Subject objectives	To familiarise students with molecular research methods in population genetics.						
	To learn the basic terminology, tools and steps of molecular data analysis in population genetics.						
	To introduce issues in the applications of population genetics in medicine, forensics and archaeology.						
	To provide an understanding of quantitative traits and their impact on population genetic structure.						
	To familiarise students with the issue of nutrigenomics.						
	To provide a basis for critical reflection on selected problems in contemporary human genetics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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_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_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
	[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_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_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_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
Subject contents	Exercise topics: Statistical methods in the analysis of genetic data, especially SSR microsatellites. Assessment of the level of variation and genetic structure of human populations. Population genetics in forensics and archaeology. Nutrigenomics. Contemporary genetic problems: issues of eugenics and human races.		
Prerequisites and co-requisites	Basics of genetics, 1st year, semester I		

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

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