

Subject card

Subject name and code	Medical applications of population genetics, PG_00147013						
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 Naczka				
	Teachers		dr Aleksandra Naczka				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	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_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.	- is familiar with the principles of population genetics research planning and the possibilities of use their results in practice	[SW4] test/exam - oral or written
	[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 transmission and the genetic basis of variation in allele frequency in populations	[SW4] test/exam - oral or written
	[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 disciplines; points out their relationship with other disciplines in the natural or medical sciences and their possible use in practice	[SW4] test/exam - oral or written
Subject contents	Lecture topics: Genetic polymorphism, association and heritability - medical aspects. Molecular markers and techniques used in population genetics research. Molecular studies in the aspect of determining population history and function. Population genetic structure in the context of quantitative traits. Population genetics and the future of man. Contemporary genetic problems. Inheritance and founder mutations. Behavioural genetics. Medical and forensic genetics. Concepts of the human race. Nutrigenomics. Genetic polymorphism in medical terms.		
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
	written test	51.0%	100.0%

Recommended reading	Basic literature	1. Jorde LB, Carey JC, Bamshad MJ, Genetyka medyczna, red. wyd. polskiego Maciej Borowiec, wydanie 6, Edra Urban&Partner, 2021. 2. Lucchesi JC. Epigenetyka. PWN, Warszawa, 2022. 3. Fletcher H, Hickey I, Krótkie wykłady: Genetyka, PZWL 2021. 4. Węgleński P. Genetyka molekularna, wydanie VI, PWN, 2020. 5. Bał J., Genetyka medyczna i molekularna, PWN, 2024
	Supplementary literature	- subject matter literature; current scientific journals from around the world
	eResources addresses	
Example issues/ example questions/ tasks being completed	1) Heritability (h^2) is a statistical measure that denotes the proportion of: - the phenotypic variance explained by genetic variation - the genotypic variance explained by genetic variation - the genotypic variance explained by phenotypic variance 2) What can be inferred from founder mutations: - the time at which the mutation arose - the geographical location of its occurrence - the migration pattern of individuals in a particular population - all of the above 3) Founder mutations are a particular type of genetic mutation that: - the longer the sequence in which a given mutation is found, the longer the time elapsed since its origin - spread with the descendants of the individual in whom they first appeared - occur in DNA fragments that are more susceptible to random variation 4) The components of phenotypic variation are: - additive variance - non-additive variance - selective selection of parents - all of the above 5) The product of the frequencies of the individual genotypes is: - profile frequency - discrimination power - strength of exclusion - chance of paternity	
Work placement	Not applicable	

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