University of Gdańsk

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 2026	Academic year of realisation of subject	2027/2028
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 Naczk	
	Teachers		

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_W06] A graduate has an advanced knowledge and understanding of: the development and current state of knowledge and the latest trends in molecular genetics and related fields; indicates their relationship to other disciplines in the life sciences or medical sciences and their potential for use in practice	- 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
[GBEL3_W05] A graduate has an advanced knowledge and understanding of: principles for planning research based on the achievements of biological sciences and related disciplines and the possibility of putting their results into practice, principles for the 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 work and practical action, taking into account the sustainable use of biodiversity.	- 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] A graduate has an advanced knowledge and understanding of: molecular mechanisms of genetic information transfer and gene expression and the molecular and genetic basis of human physiology and disease, 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

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%

<table>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>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. Bal J., Genetyka medyczna i molekularna, PWN, 2024</td></tr>
<tr><td>Supplementary literature</td><td>- subject matter literature; current scientific journals from around the world</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1) Heritability (h2) is a statistical measure that denotes the proportion of:

1. the phenotypic variance explained by genetic variation
2. the genotypic variance explained by genetic variation
3. the genotypic variance explained by phenotypic variance

2) What can be inferred from founder mutations:

1. the time at which the mutation arose
2. the geographical location of its occurrence
3. the migration pattern of individuals in a particular population
4. all of the above

3) Founder mutations are a particular type of genetic mutation that:

1. the longer the sequence in which a given mutation is found, the longer the time elapsed since its origin
2. spread with the descendants of the individual in whom they first appeared
3. occur in DNA fragments that are more susceptible to random variation

4) The components of phenotypic variation are:

1. additive variance
2. non-additive variance
3. selective selection of parents
4. all of the above

5) The product of the frequencies of the individual genotypes is:

1. profile frequency
2. discrimination power
3. strength of exclusion
4. chance of paternity</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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