



## Subject card

Subject name and code	Human Genetics, PG_00058249						
Field of study	Biotechnology						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group 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	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Microbiology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Paweł Sachadyn				
	Teachers		prof. dr hab. inż. Paweł Sachadyn				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	30
	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	30		5.0		15.0	50
Subject objectives	The objective of the lecture is to present the fundamental knowledge on human genome, the methods of human genome analysis, mutations and genetic polymorphism and the translational implications of human genome research.						
	The objective of the seminars is to broaden students knowledge in the field of human genetics through focusing on selected topics, acquainting students with the principles of searching, selecting, validating and presenting scientific information and the rules of scientific discussion.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W01] has advanced knowledge of methods of genetic engineering and molecular genetics, functioning of the immune system and mechanisms of immune system response, diagnostic methods, and analytical methods in the area of specialty	The student has knowledge about the human genome, methods of its study, in particular mutations and genetic polymorphism, and the possibility of practical use of knowledge about the human genome.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
	[K7_U05] is able to apply instrumental methods of quantitative and qualitative analysis and studies on activity of biomolecules, select and apply diagnostic and analytical methods in the field of his/her specialty with particular emphasis on genetic, molecular and microbiological diagnostics and diagnostics based on antigen-antibody reaction	The student is able to use the knowledge of the human genome in the use and design of methods of genetic molecular diagnostics	[SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task
	[K7_W05] knows the basis of civilization diseases, including cancer, and chemical structures and properties of various groups of active substances, including anticancer drugs	The student has knowledge about the origin and consequences of mutations in DNA	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
	[K7_K02] is aware of the limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training	The student knows the prospects opened by the study of the human genome but is aware of the risks associated with new technologies of DNA analysis and modification.	[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness

## Subject contents

### LECTURE

Human genome structure and organizations.

Mitochondrial DNA.

DNA mutations: mutagens and types of.

Mutation inheritance and mutation effects

Pharmacogenomics: from genes to drugs.

Gene therapy history, methods, perspectives.

### SEMINARS

Chromosome - structure and methods of examination (cytogenetics, FISH, CGH)

DNA analysis in forensic medicine

Genetic basis of immunity

Cloning of animals and humans

Genetics of neoplasms

The Tcharnobył disaster and the risk of cancer

Epigenetic inheritance

Hybridisation microarrays in the analysis of gene expression and genetic polymorphisms

Genes and brains

Genetic basis of schizophrenia

Eugenics

Induced pluripotent stem cells

Gene therapy

Genetic basis of cardiovascular disease

Genetic basis of diabetes

Genetic prenatal and pre-implantation diagnostics

Next generation sequencing

Prerequisites and co-requisites	The basics of genetics and molecular biology at the level of the 1st degree biotechnology studies at the Faculty of Chemistry GUT		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture - final test	60.0%	60.0%
	seminars - speech ( presentation)	60.0%	40.0%
Recommended reading	Basic literature	powerpoint slides print-outs	
	Supplementary literature	Research articles cited in the lecture  Human Genetics: Concepts and Applications, Ricki Lewis, McGraw-Hill, 2005, 6-th edition  Essential Medical Genetics, Edward S. Tobias, Michael Connor, Malcolm Ferguson-Smith, John Wiley & Sons, Nov 15, 2011 Adopted at Cambridge University	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	<p>The size of human genome and the number of chromosomes.</p> <p>Is human genome structure unique?</p> <p>The number of human genes.</p> <p>Retrotranspozons i pseudogenes..</p> <p>Is human genome identical in all issues of a single individual? Is it identical in monozygotic siblings?</p> <p>Human and chimp genome - the genetic basis of humanity.</p> <p><i>The genomes of Homo sapiens and Homo neandertalis.</i></p>		
Work placement	Not applicable		