


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Graduate study lecture - Molecular genetics		13.3.0546	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	drugiego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	chemia biomedyczna, analityka i diagnostyka chemiczna, chemia i technologia środowiska, chemia obliczeniowa
		specialization	wszystkie
Teaching staff			
prof. dr hab. Piotr Skowron; dr hab. Agnieszka Żylicz-Stachula, profesor uczelni; dr Joanna Jeżewska-Fraćkowiak			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Lecture		classes - 30 h	
The realization of activities		tutorial classes – 25 h	
classroom instruction		student's own work – 10 h	
Number of hours		Total: 75 h - 3 ECTS	
Lecture: 30 hours			
The academic cycle			
2022/2023 summer semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
- discussion		Final evaluation	
- multimedia-based lecture		Graded credit	
		Assessment methods	
		Written test, essay	
		The basic criteria for evaluation	
		Final grade covers results after written test and essay	
		Discussion participation contributes to the final grade	
		final grade according to the scale of grades given in the Study Regulations	
		supplementary written evaluation for students who did not obtain the required 51% in the first term	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
none			
B. Prerequisites			
none			
Aims of education			
1. Presenting the chemical composition and structure of genome and the laws of inheritance.			
2. Presenting the gene processing (replication, repair, recombination, transcription, translation, gene expression regulation).			
3. Pointing the differences in structures and functions of Procaryotic and Eucaryotic genes.			
4. Presenting DNA sequencing techniques and contemporary trends in this field.			
Course contents			

Chemical composition, structure and physical organisation of genetic material, genetic code, genes versus phenotype, Mendelian laws, bacteriophages, DNA replication, DNA repair, mutations, DNA recombination, DNA transcription, catalytic and regulatory RNA, translation, gene expression regulation, transcriptional switches: inducible and repressible operon, catabolic repression, sources of genetic diversity, structure and function of Eucaryotic genes.

Sanger's DNA sequencing, pyrosequencing, next generation sequencing (NGS), NGS methods applications, genome sequencing, templates preparation, contig assembly, strategies for genome sequencing, first sequenced genome, Human Genome Project, genome mapping, microarrays.

Bibliography of literature

Literature required to pass the course

1. Genomy, Brown T.A., PWN 2009
2. Podstawy Biologii Komórki, Alberts B. i inni, PWN 2009
3. Biochemia, Stryer L. PWN 1999 lub nowsze
4. Genetyka molekularna, red. Węgleński P., PWN 2008

Extracurricular readings

1. Recombinant DNA. Genes and genomes a short course, Watson J.D., Cold Spring Harbour Laboratory Press 2007
2. Genes IX, Lewin B., Jones and Bartlett Publishers 2008

The learning outcomes (for the field of study and specialization)

Knowledge

1. Student knows chemical composition and structure of genome.
2. Student describes topics presented in the course contents, related to gene processing (replication, repair, recombination, transcription, translation, gene expression regulation).
3. Student defines Mendelian laws, genetic code and its meaning.
4. Student lists and describes differences in the structure and function of Prokaryotic and Eucaryotic genes.
5. Student lists and describes DNA sequencing techniques.
6. Student describes possibilities and advantages of modern strategies for genome sequencing.

Skills

Social competence

1. Student understands need of further education.
2. Student carefully and critically expresses own opinions regarding inheritance.
3. Student realizes the relations between nature phenomena observations and the possibility to form general scientific laws.
4. Student realizes and appreciates possibilities offered by contemporary molecular genetics.

Contact

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