

Course title Wykład specjalizacyjny - Genetyka molekularna / Graduate study lecture - Molecular genetics		ECTS code 13.3.0546	
Name of unit administrating study Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Chemistry	Masters	Full-time studies	
Teaching staff dr inż. Joanna Jeżewska-Fraćkowiak, dr hab. Agnieszka Żylicz-Stachula, prof. nadzw.			
Forms of classes, the realization and number of hours		ECTS credits 3	
A. Forms of classes, in accordance with the UG Rector's regulations lecture		classes - 30 h tutorial classes – 25 h student's own work – 10 h	
B. The realization of activities in-class learning		Total: 75 h - 3 ECTS	
C. Number of hours 30 h lecture			
The academic cycle First year, summer semester			
Type of course obligatory		Language of instruction Polish	
Teaching methods Lecture with multimedia presentation Discussion		Form and method of assessment and basic criteria for evaluation or examination requirements	
		A. Final evaluation, in accordance with the UG study regulations course completion (with a grade)	
		B. Assessment methods Written test, essay	
		C. The basic criteria for evaluation or exam requirements <ul style="list-style-type: none"> • 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 	
Required courses and introductory requirements None			
Aims of education <ol style="list-style-type: none"> 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 regularory 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

A. 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

B. 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

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.