FACULTY of Chemistry

SUBJECT CARD

Name of subject in Polish: Inżynieria molekularna w analizie genomowej
Name of subject in English: Molecular engineering in genomic analyses
Main field of study (if applicable): Biotechnology
Specialization (if applicable): Bioinformatics,
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code: BTC024025
Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			45		
Number of hours of total student workload (CNPS)			60		
Form of crediting			crediting with grade		
For group of courses mark (X) final course					
Number of ECTS points			2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes			1,5		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The knowledge of basic molecular biology and genetic engineering.
2. The knowledge of the basic laboratory skills.
3. The ability of the basic laboratory calculations including calculations of mass and molar concentrations

SUBJECT OBJECTIVES

C1 Familiarization with analytical DNA techniques used in biotechnology, medicine, agriculture, archaeology and others.
C2 Ability to isolate genetic material.
C3 Familiarization with techniques used for detection of polymorphisms within genomic sequences.
C4 Familiarization with techniques used for editing of nucleotide sequence.
C5 Familiarization with techniques used for gene/genomes structure analysis.
C6 Familiarization with analysis of genes expression and their function.

SUBJECT LEARNING OUTCOMES

Relating to knowledge:

EU_W01 – knows basic molecular tools and techniques used for obtainment and analys DNA
PEU_W02 – knows basic techniques of isolation, amplification and biochemical/biophys description of DNA
PEU_W03 – knows techniques used for analysis of gene and genomes sequences
PEU_W04 – knows techniques used for analysis of gene expression and function
PEU_W05 – know the possible applications of genetic engineering in biotechnology, medicine, agriculture and others
PEU_W06 – know techniques of DNA sequence editing

Relating to skills:

A student who has completed the course:

PEU_U01 – can isolate genetic material from various sources
PEU_U02 – can plan restriction reaction and perform
PEU_U03 – can perform agarose gel electrophoresis and can interpret obtained results
PEU_U04 – can design primers and PCR program for enhancement of desired genome fragment
PEU_U05 – can use bioinformatics tools to compare genomic sequences

Laboratory		**Number of hours**
Lab 1	Introduction, Health and Safety training, discussion on form of crediting of the course and the general introduction of the objective of this course.	6
Lab 2	Isolation of the genetic material from the chick epithelium.	6
Lab 3	Polymorphism of the gene coding for alcohol dehydrogenase ADH3	6
Lab 4	Analysis of the insertion-deletion polymorphism of the gene coding for angiotensin convertase ACE.	6
Lab 5	The use of a single-nucleotide polymorphism to predict bitter-tasting ability.	6
Lab 6	Analysis of the meat product authenticity.	6
Lab 7	Detection of the transgenic soya beans in the food products /Analysis of the polymorphism of insertion of Alu element.	6
Lab 8	Test	3
…		
	Total hours	45

TEACHING TOOLS USED

N1. Short introduction
N2. Multimedia presentation
N3. Realisation of the laboratory protocol
N4. Calculations, problem solving
N5. Preparation of the final assessment
N6 Bioinformatics software

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
F1 (laboratory)	PEK_U01- PEK_U05	Written end-course examination and/or short question quiz at the beginning of the laboratory (according to teacher instructions presented during introduction laboratory)
F2 (laboratory)	PEK_U01- PEK_U05	Written assessment from the performer work
F3 (laboratory)	PEK_U01- PEK_U05	Activity and involvement during classes

P (laboratory) = 0,8·F1+0,15·F2 +0,05·F3

Attendance every class and submission of all the assessment is necessary to pass the course.

P (laboratory) = 3,0 if (0,8·F1+0,15·F2 +0,05·F3) = 60,0 – 70,0 points
3,5 if (0,8·F1+0,15·F2 +0,05·F3) = 70,1 – 75,0 points
4,0 if (0,8·F1+0,15·F2 +0,05·F3) = 75,1 – 80,0 points
4,5 if (0,8·F1+0,15·F2 +0,05·F3) = 80,1 – 85,0 points
5,0 if (0,8·F1+0,15·F2 +0,05·F3) = 85,1 – 90,0 points
5,5 if (0,8·F1+0,15·F2 +0,05·F3) = 90,1 – 100,0 points

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Brown, T.A. "Gene Cloning and DNA Analysis: An Introduction. John Wiley & Sons, 7th edition
[2] Experiment manuals available on the course-specific website only to qualified students

SECONDARY LITERATURE:

[1] Voet, D., Voet, J.G. „Biochemistry” Wiley & Sons, Inc., 4th edition
[2] Brown, T.A. "Genomy" PWN 2018
[3] Węgleński, P. "Genetyka molekularna" PWN 2012
[4] Berg, J.M., Tymoczko, J.L., Stryer, L. „Biochemia” PWN 2018
[5] Berg, J.M., Tymoczko, J.L., Stryer, L. „Biochemistry” W.H. Freeman and Co., New York – 9th edition
[6] http://www.blackwellpublishing.com/genecloning/

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Prof. dr hab. inż. Andrzej Ożyhar, andrzej.ozyhar@pwr.wroc.pl