KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Diploma lecture - Essentials of genetic engineering	13.3.0668

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Chemii	Chemia	type	pierwszego stopnia
		form	stacjonarne
		specialty	chemia biomedyczna, chemia kosmetyków, analityka i diagnostyka chemiczna, chemia żywności
		specialization	wszystkie

Teaching staff

dr hab. Agnieszka Żylicz-Stachula, profesor uczelni

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 30 hours

ECTS credits

2
classes 30 h
tutorial classes 5 h
student's own work 15 h
TOTAL: 50 h - 2 ECTS

The academic cycle

2024/2025 summer semester

Type of course

obligatory

Language of instruction

polish

Teaching methods

- designing experiments
- discussion
- group work
- multimedia-based lecture
- problem solving

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

- (mid-term / end-term) test
- graded course credit based on individual grades obtained during the semester

The basic criteria for evaluation

final written test consisting of test questions, open tasks and simulation exercises, covering issues mentioned in the lecture's program content
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
General Chemistry, Organic Chemistry, Biochemistry, General Microbiology

B. Prerequisites
proper use of the chemical/biological terminology and nomenclature, knowledge of the basic functions and structure of the prokaryotic and eukaryotic cell, knowledge of cellular biochemical processes

Aims of education

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acquainting students with all issues mentioned in the lecture's program content
acquainting students with the basic properties of biological macromolecules: DNA, RNA and proteins;
acquainting students with selected mechanisms of genetic regulation in gene expression;
acquainting students with the current possibilities, limitations and the anticipated trends in modern genetic engineering and molecular biotechnology

Course contents

genetic engineering and molecular biotechnology: concepts, history, achievements, perspectives, threats; recombinant microorganisms and transgenic animals; structure and applications of GFP; PCR as a DNA amplification method and diagnostic tool (definition, selected modifications and applications); nucleic acid isolation techniques; molecular cloning procedures; basic molecular tools (vectors, polymerases, ligases, nucleases and other DNA modifying enzymes); restriction endonucleases and their applications; methods of introducing recombinant DNA into cells; methods of selecting positive bacterial clones; nucleic acid sequencing by the chain termination method (Sanger sequencing); selected gene expression systems;

Bibliography of literature

Literature required to pass the course

A.2. Literature for individual studies

1. Węgleński, P.: Genetyka molekularna. Wydawnictwo naukowe PWN 2006

2. Brown, T.A.: Genomy. Wydawnictwo naukowe PWN 2009

Extracurricular readings

1. Watson, J.D., Myers, R.M., Caudy, A.A., Witkowski, J.A.: Recombinant DNA. Genes and genomes – a short course. 2007.
2. Buckingham, M.L., Flaws, L.: Molecular diagnostics: Fundamentals, Methods and Clinical Applications. 2007
3. Glick, B.R., Pasternak, J.J., Patten, C.L.: Molecular biotechnology: Principles and applications of recombinant DNA. 2009

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

Knowledge

Understands and describes the structure of DNA, RNA and proteins,
Understands and describes the processes of replication, transcription and translation,
Describes selected mechanisms of gene expression regulation,
Lists, characterizes and understands the methods used in molecular biotechnology and genetic engineering,
Lists basic molecular tools used in genetic engineering.

Skills

Designs DNA starters and PCR reaction conditions,
Analyzes DNA sequences,
Identifies the sequences recognized by restriction endonucleases and anticipates the DNA restriction fragments obtained with these enzymes,
Lists potential practical applications of the discussed techniques and molecular tools,
Proposes the use of specific molecular techniques and molecular tools to solve a problem.

Social competence

Understands the need for further education,
Being cautious and critical when expressing opinions,
Obtains an awareness of the relationship between human genetic material and human health and life span,
Realizes and appreciates the possibilities created by modern molecular biotechnology and genetic engineering,
Understands social, environmental and economic effects and potential risks posed by modern genetic engineering.

Contact

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