KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Advanced chemistry laboratory - microbiology	13.3.0406

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Chemii	Chemia	type	drugiego stopnia
		form	stacjonarne
		specialty	chemia biomedyczna, chemia i technologia środowiska, analityka i diagnostyka chemiczna, chemia obliczeniowa
		specialization	wszystkie

Teaching staff

dr Joanna Jeżewska-Frąckowiak; dr Joanna Żebrowska; dr Daria Krefft

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes

The realization of activities

classroom instruction

Number of hours

Laboratory classes: 20 hours

ECTS credits

2
classes 20 h
tutorial classes 5 h
student's own work 25 h
TOTAL: 50 h - 2 ECTS

The academic cycle

2022/2023 winter semester

Type of course

obligatory

Language of instruction

polish

Teaching methods

- Analysis and development of experimental results and preparation of a written abstract.
- conducting experiments
- designing experiments
- group work

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

Final evaluation

Graded credit

Assessment methods

- (mid-term / end-term) test
- assignment work – project or presentation
- assignment work – completing a specific practical assignment
- Performing given laboratory tasks and their documentation, open questions test

Completing the given laboratory task- practical part
Completing the given check test- theoretical part

The basic criteria for evaluation

The following aspects contribute to the final grade:
1. Written test
2. Assessment of the abstract and graphical abstract, prepared on the basis of laboratory tasks results.
3. Assessment of the laboratory schedule prepared by the students team.
Additional term of written test for the students, who didn't achieve 51% of possible assessment points.
Final grade consistent with the scale given in UG Study Regulations

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements
none

B. Prerequisites

none

Aims of education

1. Presenting GLP rules and laboratory safety instructions for the microbiology lab.
2. Presenting techniques for the bacterial lysate preparation.
3. Presenting chromatography separation of cellular proteins on the ion exchange media in micro scale.
4. Presenting the electrophoretic separation method for the chromatography fractions of bacterial cell proteins.
5. Practicing the skill of independent experimental work and solving problems, arising in the course of conducting microbiological and chemical experiments.
6. Practicing the skill of team work and rational tasks division, also preparing the schedule of works to complete, which involves susbsequent lab meetings.

Course contents

· GLP and lab safety in microbiology/biotechnology lab
· cell proteins functions
· protein isolation and three stage purification strategy from the cell sources
· cell lysis methods
· ion exchange chromatographic separation
· SDS-PAGE electrophoretic separation
· Performing the project, involving protein extraction from Escherichia coli cells, ion exchange media separation of isolated proteins, followed by quantitative (spectrophotometric) and qualitative (SDS-PAGE electrophoresis) analysis. Graphical and critical description of the obtained results in the form of abstract and graphical abstract.

Bibliography of literature

Literature required to pass the course

1. Ciepiela A.P. Ćwiczenia z biologii molekularnej. Kozak Druk S.C., Siedlce 2005 (str. 15-20, 29-33, 80-88).
2. Stepnowski P. i wsp. Techniki separacyjne. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2010
3. IRL Press, Oxford University Press, 1993.

Extracurricular readings

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

Knowledge

1. Students know GLP and lab safety rules in the microbiology lab.
2. Students know procedures of isolation and three stage purification of proteins from the cellular source.
4. Students know and differentiate methods of bacterial cell lysis, basing on their mechanisms.
5. Students know the principles of protein separation in ion exchange chromatography.
6. Students know the principles of protein separation during the polyacrylamide gel electrophoresis SDS-PAGE.
7. Students know the rules of preparing the scientific abstract, based on the experimental data.

Skills

1. Students prepare the laboratory place and the equipment for microbiological work. Students prepare the laboratory tasks schedule, involving the subsequent meetings and divide the tasks among team members.
2. Students perform chemical calculations, essential for conducting the microbiology experiments.
3. Students perform bacterial cell lysis.
5. Students perform the separation of soluble and insoluble bacterial cell proteins.
6. Students separate obtained bacterial proteins, using preparative ion exchange chromatography.
7. Students perform polyacrylamide gel electrophoretic (SDS-PAGE) separation of obtained protein fractions.
8. Students rationally plan the schedule of performed experiments.
9. Students disscuss the experimental problems, applying the adequate scientific vocabulary.
10. Students prepare the experimental results in the form of abstract and graphical abstract, drawing graphs and filling in the tables.

	Social competence 1. Students understand need of further education. 2. When preparing a conclusive statement- blend interdisciplinary knowledge from the different fields. 3. Show creativeness in the individual and team work, divide tasks and exact their performance. 4. Follow the rules of work with microorganisms. 5. Pay attention and work with extra care while handling the chemical substances and biological material.

Contact

j.jezewska-frackowiak@ug.edu.pl