KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Food Biotechnology	13.3.0527

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Chemii	Chemia	type	pierwszego stopnia
		form	stacjonarne
		specialty	chemia żywności
		specialization	wszystkie

Teaching staff

dr Joanna Jeżewska-Frąckowiak

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes, Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 15 hours, Laboratory classes: 30 hours

ECTS credits

4
classes - 45 h
tutorial classes – 10 h
student's own work – 45 h

Total: 100 h - 4 ECTS

The academic cycle

2024/2025 summer semester

Type of course

obligatory

Language of instruction

polish

Teaching methods

- conducting experiments
- designing experiments
- group work

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

Final evaluation

- Graded credit
- Examination

Assessment methods

- written exam with open questions
- (mid-term / end-term) test
- assignment work – project or presentation
- assignment work – completing a specific practical assignment
- written exam (test)

The basic criteria for evaluation

Lecture:
1. Test and open questions exam.
2. Final grade consistent with the scale given in UG Study Regulations
3. Additional term for the students, who didn't achieve 51% of possible assessment points.

Laboratory
1. Conducting the experiments during laboratory part, according to the given protocol.
2. Laboratory report in a written form.
3. Test.

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements

Biochemistry, Microbiology

B. Prerequisites

Aims of education

1. Presenting the topics given in lecture course contents.
2. Presenting microorganisms and basic food biotechnology processess
3. Presenting contemporary food biotechnology methods, with PCR for genetically modified food detection

Course contents

A. Lecture topics:
Food industry and agriculture, dairy industry, lactic acid bacteria and their characterics, homo- and heterofermentation, bacteriophage infections and applications, fermented dairy products, fermented plant products, fermentation in bread and meat, pre- and probiotics, acetic acid bacteria characteristics and applications, acids, contaminations in fruit, vegetable and fermentation industry, aminoacids bioproduction, transgenic plants and animals, biotic and abiotic factors resistance, plants as bioreactors and edible vaccines, bacterial insecticides, engineering of biotoxins, genetically modified organisms in food production, diagnostic methods for GMO detection in foods, legal regulation for GMOs, environmental release.
B. Laboratory topics:
The biotechnological process of semi-hard pressed rennet cheese production, with MSE bacterial starter culture, milk and starter culture bacterial species microscoping; PCR mediated genetically modified Roundup Ready® soy detection in the food samples, complete DNA purification on silica membranes, PCR products electrophoresis

Bibliography of literature

Literature required to pass the course

1. Bednarski W., Reps A. (red.) (2001) Biotechnologia żywności, WNT, Warszawa.

2. Synowiecki J. (red.) (2009) Wybrane zagadnienia z technologii fermentacyjnych przemysłu spożywczego, WPG, Gdańsk.

3. Glick B.R., Pasternak J.J., Patten Ch. L (2010) Molecular biotechnology, ASM PRESS, 4th ed.

4. Holt J.G., Krieg N.R., Sneath P.H.A., Staley J.T., Williams S.T. (2000) Bergey's Manual of Determinative Bacteriology, 9th ed., Lippincott Williams &Wilkins

5. Querci M., Maretti M., Mazzara M. Badanie próbek żywności na obecność Genetycznie Zmodyfikowanych Organizmów. European Comission Joint Research Centre, World Health Organization, Regional Office for Europe

6. Tengel C., Schüßler P., Setzke E., Balles J., Sprenger-Haußels M. (2001) PCR-Based Detection of Genetically Modified Soybean and Maize in Raw and Highly Processed Foodstuffs, BioTechniques 31:426-429.

Extracurricular readings

j.w. , Libudzisz, Z., Kowal, K., Żakowska, Z. Mikrobiologia techniczna., Wydawnictwo naukowe PWN, 2008

B. Literatura uzupełniająca

Glick, R.B., Pasternak, J.J., Patten, Ch.L., Molecular Biotechnology. Principles and applications of Recombinant DNA. 4th edition, ASM Press 2010
Joshi, V.K., Singh, R.S., Food biotechnology. Principles and Practices. 2012, IK International Publishing House Ltd., New Delhi

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

Knowledge

Student names and characterizes basic microorganisms applied in food biotechnology.
Student understands the role of microorganisms in food biotechnology.
Student names and describes the fermentation processes.
Student names and describes genetically modified microorganisms and organisms applications in food biotechnology.
Student names potential hazards of applying GMOs in food production
Student lists legal regulations of GMO usage in Poland and in the world.
Student describes possible method for obtaining transgenic plants and animals and describes potential directions of their features engineering.
Student names and characterizes contemporary methods for GMO diagnostics.

Skills

Student performs microscopy observations and analyses microbiological content of the chosen food products (milk, rennet cheese).
Student prepares semi-hard pressed rennet cheese, with an addition of enzyme and MSE bacterial starter culture.
Student proposes application of different microbiological techniques for quantitative-qualitative food analysis.
Student proposes methods for practical application of diagnostic methods, allowing for GMO detection and food quality assessment.

	Student names and values potential hazards, connected with industrial and agricultural processes, applied in food production, that may lead to losing the biodiversity or have the negative effect on human health. Student performs the detection of genetic modification in food products, applying PCR technique and electrophoresis.
	Social competence
	1. Student understands need of further education. 2. Student carefully i criticically expresses own opinions, bears in mind and values possibilities offered by modern food biotechnology and genetic engineering 3. Student is aware of food biotechnology and GMO applications potential hazards for environment and human health. 4. Student plans and performs given tasks working independently, is able to manage time and equipment, while working in team undertakes different roles.

Contact

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