

SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2022/2023 TO 2022/2023

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	Food biotechnology
Course/Module code *	
Faculty (name of the unit offering the field of study)	College of Natural Sciences Institute of Food and Nutrition Technology
Name of the unit running the course	Department of Bioenergetics, Food Analysis and Microbiology
Field of study	Food technology and human nutrition
Qualification level	
Profile	General academic
Study mode	Part-time
Year and semester of studies	Winter semester
Course type	Erasmus + program
Language of instruction	English
Coordinator	Maciej Kluz PhD
Course instructor	Maciej Kluz PhD

* - as agreed at the faculty

1.1. Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Colloquia	Lab classes	Seminars	Practical classes	Internships	others	ECTS credits
Winter	15			15					5

1.2. Course delivery methods

- conducted in a traditional way

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

EXAM

2. PREREQUISITES

Completed course: general and inorganic chemistry, organic chemistry, food microbiology, biochemistry

3. OBJECTIVES, LEARNING OUTCOMES, COURSE CONTENT, AND INSTRUCTIONAL METHODS

3.1. Course/Module objectives

O1	Discuss the characteristics and role of microorganisms in food hygiene.
O2	Discuss the food safety and hygiene.

3.2. COURSE/MODULE LEARNING OUTCOMES (TO BE COMPLETED BY THE COORDINATOR)

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	Has knowledge of the mechanisms of bioprocesses involving microorganisms.	K_W02
LO_02	Has knowledge of the principles of safe production of food produced by fermentation processes.	K_W09
LO_03	Knows the use and operation of bioreactors in the food industry.	K_W12
LO_04	Be able to analyse the ethical aspects arising from the use of microorganisms in fermentation processes.	K_U07
LO_05	Be able to analyse and solve technical problems related to food processing.	K_U11
LO_06	Understands and cares about the work ethic of the food biotechnology profession.	K_K04

3.3. Course content (to be completed by the coordinator)

A. Lectures

Content outline
Food biotechnology – general concept.
Concepts: bioprocess, biosynthesis, biodegradation, biotransformation.
Use of bioreactors in the food industry.
Characteristics of biotechnological process. Types of bioprocesses.
Bioreactor types.
Principles of culture in bioreactors. Characteristics of microorganisms used in biofermentation processes.
Bioprocess design.
Process control in the bioreactor.

A perspective on the development and use of bioprocesses in food production.
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B. Classes, tutorials/seminars, colloquia, laboratories, practical classes

Content outline
Getting to know health and safety rules in the workshop. Organizational activities.
Characteristics of microorganisms used in bioprocesses.
Principles of periodic and semi-continuous breeding.
Optimization of the culture medium. Sources of carbon ,nitrogen, micronutrients, macronutrients, bio stimulants used in bioprocesses.
Sterilization methods for bioreactors.
Optimization of processes in bioreactors.
Process analysis.
Final work.

3.4. Methods of Instruction

Lecture with multimedia presentation.

Laboratory: performing experiments, designing experiments, working in groups.

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes,...)
LO-01	Colloquium, written assessment, exam	Lectures, Lab
LO-02	Colloquium, written assessment, exam	Lectures, Lab
LO-03	Colloquium, written assessment, exam	Lectures, Lab
LO-04	Colloquium, written assessment, exam	Lectures, Lab
LO-05	Colloquium, written assessment, exam	Lectures, Lab
LO-06	Colloquium, written assessment, exam	Lectures, Lab

4.2 Course assessment criteria

A prerequisite for passing a course is the achievement of all the assumed learning outcomes. A positive grade in the course is determined by the number of points obtained in examinations (>50% of the maximum number of points): 2,0 (f); 50 % <; 3,0 (e) 51 - 65%; 3,5 (d); 66 - 75%, 4,0 (c); 76 - 85%, 4,5 (b); 86 - 92%; 5,0 (a) 93-100%.

**5. Total student workload needed to achieve the intended learning outcomes
– number of hours and ECTS credits**

Activity	Number of hours
Scheduled course contact hours	30
Other contact hours involving the teacher (consultation hours, examinations)	20
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	75
Total number of hours	125
Total number of ECTS credits	5

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	0
Internship regulations and procedures	0

7. Instructional materials

<p>Compulsory literature:</p> <ol style="list-style-type: none"> 1. Food Biotechnology, Donald Nash, 2018, Callisto Reference, ISBN: 9781632399458 2. Industrial Biotechnology: Microorganisms, Christoph Wittmann, James C. Liao, Sang Yup Lee, Jens Nielsen, Wiley-VCH, 2017, ISBN-13 : 978-3527341795 3. Biotechnology, John Smith, Cambridge University Press, 2009, ISBN: 0521711932
<p>Complementary literature:</p> <ol style="list-style-type: none"> 1. Biotechnology, David Clark, Elsevier Books, 2015, ISBN: 0123850150

Approved by the Head of the Department or an authorised person