



Food biotechnology
Educational subject description sheet

Basic information

Field of study Food technology and human nutrition		Education cycle 2021/22	
Speciality -		Subject code WBiNoZNTZS.I20BO.0724.21	
Organizational unit The Faculty of Biotechnology and Food Science		Lecture languages english	
Study level First-cycle (engineer) programme		Mandatory optional	
Study form Full-time		Block major subjects (conducted) in foreign languages	
Education profile General academic		Disciplines Food technology and nutrition	
		Subject related to scientific research Yes	
		Subject shaping practical skills Nie	
Teacher responsible for the subject	Ludwika Tomaszewska-Hetman		
Other teachers conducting classes	Ludwika Tomaszewska-Hetman		
Period Semester 6	Examination exam	Number of ECTS points 3.0	
	Activities and hours lecture: 15 laboratory classes: 20		

Goals

C1	The lecture programme allows students to familiarize themselves with the field of biotechnology and basic issues related to the use of industrial microorganisms. The content of the lectures includes information on the acquisition, improvement and storage of strains, as well as description of selected biotechnological processes of production of consumption additives, description of conducting different fermentation processes and functions of microorganisms in fermented foods.
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Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	The student knows and understands the basics of biotechnological processes, can describe the typical technologies leading to the production of various bioproducts; can indicate biotechnological methods of waste product utilization	NT_P6S_WG09	written exam, written credit, oral credit
Skills - Student can:			
U1	The student can operate the basic equipment in the biotechnology laboratory	NT_P6S_UW02	written credit, oral credit, observation of student's work, active participation, performing tasks
U2	The student is able to assess the food product in terms of sensory, physicochemical, microbiological and toxicological properties	NT_P6S_UW02	written credit, oral credit, observation of student's work, active participation, performing tasks
U3	The student is able to convert data of the analysis and compile the results; prepare and discuss the report	NT_P6S_UK12	written credit, oral credit, observation of student's work, active participation, report, performing tasks
U4	The student is able to use appropriate terminology in English	NT_P6S_UK14	written credit, oral credit, active participation, report
Social competences - Student is ready to:			
K1	The student is ready to critically assess his knowledge and skills, is aware of the progress and changes in the discipline of food technology and human nutrition	NT_P6S_KK01	observation of student's work, active participation

Balance of ECTS points

Activity form	Activity hours*
lecture	15
laboratory classes	20
exam participation	2

exam / credit preparation	20	
consultations	2	
class preparation	15	
report preparation	5	
Student workload	Hours 79	ECTS 3.0
Workload involving teacher	Hours 39	ECTS 1.4
Practical workload	Hours 25	ECTS 1.0

* hour means 45 minutes

Study content

No.	Course content	Activities
1.	<p>W. 1. Introduction to biotechnology; history and scope of biotechnology applications, especially in food production.</p> <p>W. 2. Industrial microorganisms - technological characteristics.</p> <p>W. 3. Acquisition, improvement and storage of industrial strains.</p> <p>W. 4. Conducting bioprocesses (breeding techniques, bioreactors, unit operations in the industry).</p> <p>W. 5-6. Biotechnological production of food additives - amino acids and vitamins.</p> <p>W. 7. Biotechnological production of food additives - organic acids.</p> <p>W. 8. Biotechnological production of food additives - polysaccharides.</p> <p>W. 9. Biotechnological production of food additives - dyes.</p> <p>W. 10-11. Food fermentation - spontaneous and controlled fermentations, used microorganisms and their functions in the processing of plant and animal raw materials.</p> <p>W. 12-13. Selected biocatalysis processes in food production.</p> <p>W. 14-15. Biotechnological management of by-products and wastes of the food industry.</p>	lecture
2.	<p>Exercise. Characteristics of microbial groups used in biotechnology. Biopolymer degradation - diffusion tests</p> <p>Exercise II. Methods for determining microbial biomass</p> <p>Exercise III. Hydrolysis of sucrose using immobilized yeast cells of <i>Saccharomyces cerevisiae</i></p> <p>Exercise IV. Biosynthesis of citric acid part 1</p> <p>Exercise V. Biosynthesis of citric acid part 2</p>	laboratory classes

Course advanced

Teaching methods:

presentation / demonstration, teamwork, lecture, practical simulation training, classes, classes can be carried out synchronously in remote mode

Activities	Examination methods	Percentage in subject assessment
lecture	written exam	50%
laboratory classes	written exam, written credit, oral credit, observation of student's work, active participation, report, performing tasks	50%

Entry requirements

BIOLOGY, CHEMISTRY, BIOCHEMISTRY, GENERAL MICROBIOLOGY

Literature

Obligatory

1. Wojtatowicz M., Stempniewicz R., Żarowska B., Rymowicz W., Robak M.: Mikrobiologia ogólna. Wydawnictwo UP we Wrocławiu, 2008
2. Mikrobiologia żywności - teoria i ćwiczenia, Red. Wojtatowicz M., Stempniewicz R., Żarowska B., Wydawnictwo UP we Wrocławiu, Wrocław, 2009
3. Biotechnologia. Podstawy mikrobiologiczne i biochemiczne, Chmiel A., PWN 1998
4. Biotechnologia żywności, Bednarski W. Red. Bednarski W., Reps A., PWW, Warszawa 2019

Optional

1. Podstawy biotechnologii, Red. Ratledge C., Kristiansen B., PWN, Warszawa 2013

Kierunkowe efekty uczenia się

Kod	Treść
NT_P6S_KK01	Critical assessment of their knowledge and skills, is aware of the progress and changes in the discipline of food technology and human nutrition
NT_P6S_UK12	Prepare reports, short communications and other documents in the field of food technology and human nutrition, present them and justify their position
NT_P6S_UK14	Use a foreign language at B2 + level of the European Training Description System and to a higher degree use a specific terminology
NT_P6S_UW02	Apply appropriate physical, chemical, biological and sensory techniques using laboratory equipment and control-measuring devices used in food analysis, and develop and interpret the collected results
NT_P6S_WG09	Basics of biotechnological processes, describes examples of bioprocesses using microorganisms and enzymes applied in food biotechnology and the utilization of the food industry wastes