



Subject card

Subject name and code	BIOACTIVE COMPOUNDS IN FOODS , PG_00039030						
Field of study	Biotechnology						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2021/2022		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Barbara Kusznierevicz					
	Teachers	dr hab. inż. Barbara Kusznierevicz dr hab. inż. Hanna Staroszczyk dr inż. Karol Parchem dr inż. Agata Sommer dr hab. inż. Edyta Malinowska-Pańczyk					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	15.0	60
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	60	10.0		30.0		100
Subject objectives	The aim of the course is to provide knowledge about the food bioactive substances, mainly plant secondary metabolites in the context of nutritional prophylaxis of chronic diseases. During lectures and seminars, students gain information on the most important groups of phytochemicals - their chemical structure, mechanisms of action and biotechnological methods of enriching food plants with these substances. During the laboratory classes, students acquire the ability to determine the content and selected biological activities of these compounds.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U04	Student is able to predict the potential properties of biologically active compounds based on the knowledge of their chemical structure.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		
	K7_K04	Student can independently solve problems, formulate questions for solving the problem or task.			[SK2] Assessment of progress of work [SK3] Assessment of ability to organize work		
	K7_W04	Student has an extended knowledge of the biologically active compounds with emphasis on nutritional aspects and the relationship between structure and properties of chemical compounds, including biomolecules.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	K7_U05	Student acquires skills using specialized apparatus			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		

Subject contents	<p>Lecture. Introduction statistical data, the most common causes of death in the world, the impact of nutrition on development of noncommunicable and communicable (including Covid-19) diseases, the idea of consuming and the basis of recommendation of eating 5 a day servings of vegetables and fruits, definition of terms: nutrients, non nutrients, antinutrients, functional foods, dietary supplements. Secondary metabolites of plants definition and division. An overview of the types, construction and biological activities: phenolic compounds, terpenoids, secondary metabolites of plants containing sulphur (glucosinolate-myrosinase system, system of alliin-alliinase), secondary metabolites of plants containing nitrogen (betalains, methylxanthines), essential unsaturated fatty acids, phospholipids, fibre. Probiotics and prebiotics as ingredients of bioactive food. Allergens, carcinogenic and toxic foods an overview of the types, sources, and biological activity. Overview of biotechnological methods of increasing the content of functional compounds in food plants.</p> <p>Laboratory. Determination of total antioxidant activity with spectrophotometric tests. Observation of plant enzymes such as mirozynaaza, alliinase, emulsin and polyphenoloxidase. Establishment, management and analysis of edible algae culture. Study on the impact of phytochemicals on the lipolytic enzymes. Determination of antimicrobial activity.</p> <p>Seminar. Introducing students to the principles of preparing scientific presentations and information on searching literature databases and evaluating the quality of publications found. Preparation of a presentation by the student with the use of review and original publications on a self-formulated topic concerning a selected group of biologically active substances.</p>		
Prerequisites and co-requisites	Knowledge of organic chemistry, general knowledge of the composition and chemical and functional properties of food ingredients.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory - tests	60.0%	20.0%
	seminary - presentations	60.0%	30.0%
	lecture - tests	60.0%	50.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> Red. Sikorski Z.E., Staroszczyk H. Chemia żywności. Tom 1. Główne składniki żywności; Tom 2. Biologiczne właściwości składników żywności. PWN. Warszawa 2017. 	
	Supplementary literature	<ul style="list-style-type: none"> Eds. Witczak A., Sikorski Z.E. Toxins and other harmful compounds in food. CRC Press. Boca Raton. London. New York. 2017. Eds. Sikorski Z.E. Chemical and functional properties of food components. CRC Press. Boca Raton FL 2002. Eds. Damodoran S., Parkin K.L. Fennema's Food Chemistry. CRC Press. Boca Raton. London. New York 2017. Watson R.R., Preedy V. Bioactive Foods in Promoting Health. Elsevier Science Publishing Co Inc. 2009. 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Nutrients, non-nutrients and anti-nutrients - differences and functions.</p> <p>Secondary plant metabolites - definition, function in plants, function as food ingredient in the human body.</p> <p>Nutritional prevention of civilization diseases. WHO guidelines.</p> <p>Health-benefits compounds in food examples and biological activities.</p> <p>Types and origin of mutagenic compounds found in food.</p> <p>Examples of toxic substances in food.</p>		
Work placement	Not applicable		