University of Gdańsk

Subject card

Subject name and code	Selected aspects of toxicology of natural substances and ethnopharmacology, PG_00197687		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Optional subject group 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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Kamila Kitowska	
	Teachers	dr hab. Kamila Kitowska	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	16.0	0.0	0.0	0.0	0.0	16
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	16	5.0	29.0	50

Subject objectives

The aim of the course is to learn about specific groups of organic compounds present in nature, their chemical structure, properties and functions. Students have the opportunity to obtain information about the biological activity of selected compounds, their importance in biotechnology. Students will also learn about the possibilities of using natural compounds for therapeutic purposes. During the course the student will gain knowledge about the basic concepts and terminology used in the chemistry of organic compounds of natural origin, their use in biotechnology and other areas of human activity. Students will gain knowledge in the field of chemistry, botany and toxicology necessary to understand the functions of many groups of natural compounds originated from plants and animals.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_W03] The graduate knows and understands selected issues of organism-environment interdependence	Stuydents know the possibilities of using natural compounds for therapeutic purposes, they also know the basic concepts and terminology used in the chemistry of organic compounds of natural origin and their use in biotechnology. Students have the knowledge of chemistry, botany and toxicology necessary to understand the functions of many groups of natural compounds originated from plant and animal.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BIOTECHL3_W05] The graduate knows and understands basic mechanisms of the development of disorders vital functions; the causes and symptoms of selected disorders and pathophysiological changes, biochemical disorders, neoplasm; methods of assessing these disorders in the field of medical biotechnology and molecular diagnostics	Students know the groups of organic compounds present in nature, their chemical structure, properties and function. They also know the biological activities of selected compounds, their importance for the organism and applications in biotechnology.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

Subject contents

The subject includes multimedia and conversational lectures on the following topics: 1. Natural lipophilic compounds. Waxes, phospholipids, cerebrosides, sphingomyelins. Liposomes - composition, structure and application. Lipid microdomains in biological membranes. Are the lipophilic compounds toxic? 2. Selected peptide hormones. Structure of neuropeptides - potential therapeutic agents. Peptide antibiotics, peptide toxins of various species.
3. Toxic substances from plants/ animal organisms. 4. Selected oligosaccharides common in nature. Glycosides. Glycoproteins, antigenic determinants and blood groups. 5. Alkaloids - selected compounds from plants and animals. Plant metabolites and their use in medicine. Alkaloids - drugs or poisons? Neurotoxins from plants and fungi. 6. Psychoactive compounds (narcotic alkaloids, opioid peptides). 7. Selected steroid compounds and their biological roles (vitamin D, cholesterol, steroid hormones, natural contraceptive compounds, anabolic steroids, anticancer drugs). 8. Isoprene compounds. Terpenes and terpenoids. Selected terpene fragrance compounds. Vitamins A, E and K. 9. Pheromones.
10. Photoreactive compounds occurring in nature, natural dyes, pigment disorders. 11. Bioluminescence. Phototoxicity

Prerequisites and co-requisites

Competencies and skills specified for Modules 01-04 are required

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	51.0%	100.0%

Recommended reading

Basic literature	Materials provided by lecturer. Aleksander Kołodziejczyk. 2015. Naturalne związki organiczne. Wydawnictwo Naukowe PWN Stanley E. Manahan. 2018. Toksykologia środowiska. Aspekty chemiczne i biochemiczne Donald G. Barceloux. 2009. Medical Toxicology of Natural Substances. Foods, Fungi, Medicinal Herbs, Plants, and Venomous Animals. John Wiley & Sons, Inc
Supplementary literature	-
eResources addresses	

Example issues/ example questions/ tasks being completed

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Work placement

Not applicable

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