GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Semiochemical compounds - in life and in love, PG_00069270		
Field of study	Chemistry		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Organic Chemistry -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Krystyna Dzierzbicka	
	Teachers		

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	0.0	45

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	45	5.0	25.0	75

Subject objectives

Discussion of individual groups of semiochemical compounds (pheromones, allelochemicals, hormones, nucleic acids) and methods of their preparation.

Preparation of selected preparations of semiochemical compounds in accordance with the List of Preparations containing single-step, two-step and multi-step syntheses covering various chemical processes, e.g. acylation, alkylation, esterification, oxidation, reduction.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K03] understands non-technical aspects and effects of the graduate's activities, including the impact of the chemical industry on the environment	The student has knowledge of chemistry and the use of semiochemical compounds and the synthetic aspects of their preparation.	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work
[K7_U01] integrates and interprets information from literature, databases and other sources	The student is able to use the acquired information to plan selected syntheses of semiochemical compounds.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K7_W01] recognizes problems of modern chemistry, including properties and obtaining chemical compounds, necessary for making calculations, including the dependence of the compound's structure and its reactivity	The student identifies individual classes of semiochemical compounds. The student classifies the mechanisms of organic reactions in the synthesis of infochemical compounds, hormones, nucleic acids.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

Subject contents	1. Infochemical compounds synthesis, properties and applications 1.1. Pheromones 1.1.1. Division and production of pheromones 1.1.2. Synthesis of selected groups of pheromones, e.g. sex, path, alarm, aggregation, defense 1.1.3. Role of chirality in the interaction of pheromones 1.2. Allelochemical compounds 1.2.1. Allomones 1.2.2. Kairomones 1.2.3. Synomones Hormones synthesis, properties and applications 2.1. Female and male sex hormones 2.2. Insect hormones 2.3. Plant hormones 3. Nucleic acids 3.1. Chemical Synthesis of Oligonucleotides and Polynucleotides 3.2. Peptide Nucleic Acids - PNA 3.3. Use of Nucleic Acids in Molecular Therapy and Diagnostics
Prerequisites and co-requisites	The student should have knowledge of a basic course in organic chemistry and biochemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Performing planned syntheses of compounds in accordance with the list.	100.0%	50.0%
Accumulation of 60% of points in the two mandatory lecture colloquia.	100.0%	50.0%

Recommended reading

Basic literature	1. Kołodziejczyk A., *Natural Organic Compounds*, PWN, Warsaw 2013. 2. Bhat S., Nagasamnpagi B., Meenakshi. *Natural Products. Chemistry and Application.* Alpha Science International Lad. Oxford U.K. 2009. 3. Bhat S., Nagasamnpagi B., Sivakumar M. C*hemistry of Natural Products.* Springer, Narosa, Berlin, Heidelberg, New York, New Delhi 2005. 4. Carolsfeld i in. *Hormones and Bahavior.,* 1997, 31, 256-268. 5. Stryer L., *Biochemistry*, PWN, Warsaw, 1997.
Supplementary literature	Textbooks selected by the student that discuss the given topics.
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Propose a method for the synthesis of the selective pheromone heptan-2-one from the appropriate alkyne. 2. Propose a synthesis of caprylic acid, one of the fatty acids in the path pheromone of wood ants, using diethyl malonate. 3. Propose a synthesis of 2-methylheptan-4-one (ant alarm pheromone) using butanal and 1-chloro-2-methylpropane and other necessary reagents. Present the mechanism of the individual stages of synthesis. 4. Indicate the differences between hormones and pheromones. 5. Provide an example of the synthesis of any nucleoside. 6. Provide an example of the synthesis of any oligonucleotide.
Work placement	Not applicable