GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Drug Design, PG_00058244		
Field of study	Biotechnology		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Szczeblewski	
	Teachers	dr inż. Paweł Szczeblewski dr hab. inż. Tomasz Laskowski dr inż. Julia Borzyszkowska-Bukowska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	5.0	15.0	50

Subject objectives	The aim of this course is to acquaint students with modern methods of designing molecules with the desired properties, and especially with the desired biological activity. Students learn the mechanisms of drug activity at the molecular level, the basic mechanisms of so called selective toxicity as well as the methods of its determination.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W02] has advanced knowledge of structure and activity of enzymes and biologically active compounds also in pharmacological context, knows basic instrumental methods of qualitative and quantitative analysis and activity studies of biomolecules	The student knows the basic classes of natural compounds and their structural elements that determine biological activity. He can indicate the basis of selective toxicity in the host-pathogen system.	[SW1] Assessment of factual knowledge
[K7_W10] has knowledge in the field of bioprocess technology and engineering and knowledge in the field of engineering design of technical objects and processes including engineering graphics with the use of computer-aided design and databases	The student is able to use spreadsheets and other computational tools to find the most optimal structure in terms of biological activity. Is able to use the Hansch and Free-Wilson Method in practice	[SW3] Assessment of knowledge contained in written work and projects
[K7_U04] is able to predict potential properties of biomolecules and biologically active compounds on the basis of knowledge of their chemical structure and apply methods of molecular modelling of biomolecules	The student understands the structure-activity relationship for biologically active compounds and is able to pre-design new molecules with desired properties using computational methods.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K7_K03] is conscious and able to explain the importance of the development of science and technology for the economy	The student is aware of the problems of the modern world and the high mortality resulting from the limited number of chemotherapeutic agents used and sees the need to constantly search for new ones.	[SK2] Assessment of progress of work
[K7_K02] is aware of the limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training	The student keeps up to date with the latest achievements in the field of designing new chemotherapeutic agents.	[SK3] Assessment of ability to organize work

Subject contents

Chemotherapy and selective toxicity

Testing of potential chemotherapeutic agents

Structure - activity relationships

Quantitative Structure Activity Relationships (QSARs)

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Assessment of laboratory reports	60.0%	50.0%
Theory test	60.0%	50.0%

Recommended reading

Basic literature	Educational materials provided by the lecturer
Supplementary literature	R.B. Silverman, M.W. Holladay, "The Organic Chemistry of Drug Design and Drug Action", Academic Press, 2014
eResources addresses	Adresy na platformie eNauczanie: PROJEKTOWANIE NOWYCH CHEMOTERAPEUTYKÓW - Moodle ID: 42622 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42622

Example issues/ example questions/ tasks being completed

Find the relationship between the antimicrobial activity of a specific group of compounds and their physicochemical properties

Find the structure-activity relationships within the particular set of compounds

Find the optimal doses of a given preparation for a specific strain of mice

Work placement

Not applicable

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