University of Gdańsk

Subject card

Subject name and code	What can electrochemical methods offer in the study of biologically active compounds?, PG_00080777		
Field of study	Chemical Business, Chemistry, Environmental Protection		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	English English
Semester of study	6	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Bioinorganic Chemistry -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Mariusz Makowski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	2.0	33.0	50

Subject objectives

Presenting how small molecules interact with the DNA chain is essential in pharmaceuticals research.
Familiarize students with an electrochemical approach to the study of drug-biomolecule interactions, with particular emphasis on voltammetric techniques.
Familiarize students with theoretical and practical aspects of electrochemical methods in the analysis of biomolecule interactions

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_W10] Enumerates and describes the basic aspects of the construction, operation and use of measuring apparatus and equipment used in experimental works in the field of chemistry and related sciences.	Students understand the need of learning and update knowledge, the practical application of the acquired knowledge and skills in solving problems	[SW4] test/exam - oral or written
[CHEML3_K06] Raises her/his professional and personal competences by using information provided in various sources.	Students know: types of drug-DNA interactions, theoretical and practical aspects of electrochemical methods in the analysis of biomolecule interactions, principles of voltammetric methods	[SK4] test/exam - oral or written

Subject contents

Topics of the lecture: electrochemical methods consisting in electrolysis of the diffusion layer and current measurements, voltammetric methods, cyclic voltammetry, differential pulse voltammetry, electrochemical characteristics of biologically active compounds, redox potential in healthy cells and neoplastic cells, types of drug-DNA interactions, techniques used to describe the interactions principles of measurements with electrochemical techniques, types of electrodes and research approaches, the use of voltammetric methods to study drug-DNA interactions

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Assessment criteria in accordance with the University of Gdańsk Study Regulations</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>SCB de Oliveira, VC Diculescu, AM Chiorcea Paquim, AM Oliveira-Brett - Electrochemical Biosensors for DNADrug Interactions</td></tr>
<tr><td>Supplementary literature</td><td>A Mukherjee WD Sasikala - Advances in Protein Chemistry and Structural Biology</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Characterize the interaction plot of any particle with DNA based on measurements using the switchSense technique.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.