GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00065593		
Field of study	Nanotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jacek Ryl	
	Teachers	prof. dr hab. inż. Jacek Ryl	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	90.0	15.0	15.0	120

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	120	5.0	25.0	150

Subject objectives

The aim of the team research project is to develop the student's research skills in the area of printing electrochemical sensor flow systems and the use of sensor modifications based on conducting polymers. Through individual projects and testing new solutions under the detailed supervision of a supervisor, the student will gain a deeper understanding of the practical applications and challenges related to electrochemistry in medicine and will shape their skills in innovation and creativity in science.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K04	The student has the skills to plan and produce electrode materials that can be used for diagnostic purposes.	[SK2] Assessment of progress of work
K6_U09	The student has the skills to plan and produce electrode materials that can be used for diagnostic purposes.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
K6_U06	The student has the skills to plan and produce electrode materials that can be used for diagnostic purposes.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
K6_U04	The student has the skills to plan and produce electrode materials that can be used for diagnostic purposes.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

Subject contents

Work within the microteam together with the supervisor, dedicated to the production of flow systems, electrochemical characterization of electrode materials, their functionalization with conducting polymers and measurements of sensors in laboratory conditions. Students' own work consisting in finding literature solutions for functionalization with receptors, selection of the analyte being the subject of research, optimization of the conducted detection processes.

Prerequisites and co-requisites

Basic knowledge of electrochemistry and materials engineering, polymer technologies and 3D printing

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Project</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Bard, Faulkner, Electrochemical Methods: Fundamentals and Applications 2nd Edition</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">JCR articles</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">What electrochemical tools can be used for detection?What are popular conducting polymers for electrode functionalization?</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
</table>

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