



Subject card

Subject name and code	Sensing materials, PG_00049386						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2025/2026	
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	4	Language of instruction				Polish	
Semester of study	7	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Radosław Pomećko				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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		3.0		27.0	75
Subject objectives	Getting to know the different methods of determination the level and kinds of analytes using electrochemical sensors. Understanding the mechanisms that describe the operation of those sensors. The acquisition of practical ability in the construction and operation of chemical sensors. To acquaint students with the miniaturization of sensors and new materials to make them. Design of new technical solutions relating to the broad range of chemical sensors.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W06] Knows and understands the basic processes occurring in the life cycle of devices, facilities and systems specific to a given field of study.		Student has the knowledge and practice which are necessary to analyze and solve given problems.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U52] can determine properties of materials and biomaterials used in biomedical engineering		Student has the knowledge to determine the key properties of applied sensor materials		[SU2] Assessment of ability to analyse information		
Subject contents	Classification of chemical sensors. Basics of molecular recognition.						
Prerequisites and co-requisites	Basics of physical chemistry and electrochemistry						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Project		60.0%		20.0%		
	Exam		55.0%		50.0%		
	Practical tasks		60.0%		30.0%		

Recommended reading	Basic literature	<p>1. Z. Brzóska, W. Wróblewski: Sensory chemiczne, wyd. PW 1999</p> <p>2. J. Wang: Analytical electrochemistry, J. Wiley&Sons, New Jersey 2006</p> <p>3. Praca zbiorowa: Elektroanaliza w ochronie środowiska natur, pod red. R. Kalvody (tł. K. Sykut)</p> <p>4. Materiały wykładowe</p>
	Supplementary literature	<p>1. M. J. Sienko, R.A. Plane: Chemia, podstawy i własności, WN-T Warszawa 1980, 1-sze wyd. polskie</p> <p>2. A. Kisza: Elektrochemia II, Elektrodyka, WN-T W-wa 2001</p> <p>3. A. Sharma, K.R.Rogers: Biosensors, artykuł przeglądowy w Meas. Techno. 461-472 (1994)</p> <p>4. Marek Blicharski, Inżynieria materiałowa, Wydawnictwo Naukowe PWN, WNT, Warszawa 2019 (wydanie IV)</p> <p>5. Jan Pielichowski, Andrzej Puszyński, Chemia polimerów, Fosze, Rzeszów 2015</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Computational methods used in potentiometry</p> <p>2. Knowledge of the structure and properties of ISE</p> <p>3. Issues optimization</p> <p>4. Review of biosensors for use in biomedical engineering</p> <p>5. Construction and operation of optical sensors</p>	
Work placement	Not applicable	

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