



## Subject card

Subject name and code	Chemistry of nanomaterials, PG_00052075						
Field of study	Nanotechnology						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Andrzej Okuniewski					
	Teachers	dr inż. Andrzej Okuniewski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	15.0	45
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Chemia nanomateriałów 2022 - Moodle ID: 19806 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19806">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19806</a>						
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	50.0	100		
Subject objectives	The aim of the course is to familiarize students with various types of nanomaterials with particular emphasis on chemical aspects, i.e. their synthesis, modification methods, properties and application.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_K05	knows how to prepare a multimedia presentation based on information from a scientific article and present it in a manner analogous to a conference presentation (specific criteria as to the content and duration of the presentation)	[SK4] Assessment of communication skills, including language correctness
	K6_W05	knows the basic concepts of inorganic, organic and physical chemistry related to nanotechnology	[SW1] Assessment of factual knowledge
	K6_W06	has knowledge of the synthesis and methods of chemical modification of nanomaterials; can explain the influence of structure on the physical and chemical properties of nanomaterials; for selected examples knows how to propose a modification method leading to the desired properties	[SW1] Assessment of factual knowledge
	K6_U08	is able to analyze the material contained in a scientific article, interpret and translate it so that it is understandable for a group of students	[SU5] Assessment of ability to present the results of task
K6_U01	knows how to search scientific journals in the field of nanotechnology and use the information contained therein (in English)	[SU2] Assessment of ability to analyse information	
Subject contents	<p><b>Lectures:</b> Obtaining nanostructures of various dimensions based on metallic, ceramic, semiconductor, magnetic, polymer and hybrid materials. Research and prediction of the structure and properties of nanomaterials. Surface modification methods. Elements of coordination and supramolecular chemistry. The influence of structure on the properties of nanomaterials. Examples of the use of nanomaterials in science, medicine and everyday life. Calculation exercises.</p> <p><b>Seminars:</b> Students prepare individual presentations (along with a multimedia presentation) based on scientific articles published in last year's issue of the Nanotechnology journal.</p> <p>The detailed program of the lecture and seminars is available on the "eNauczanie" platform.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	assessment	60.0%	60.0%
	seminars	60.0%	40.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>C. N. R. Rao, A. Mueller, A. K. Cheetham (ed.): The Chemistry of Nanomaterials. Synthesis, Properties and Applications. <i>Wiley-VCH</i>, Weinheim, 2004.</li> </ul>	
	Supplementary literature	<ul style="list-style-type: none"> <li>L. V. Interrante, M. J. Hampden-Smith (ed.): Chemistry of Advanced Materials. <i>Wiley-VCH</i>, New York, 1998.</li> <li>E. Roduner: Nanoscopic Materials. Size-Dependent Phenomena. <i>RCS Publishing</i>, Cambridge, 2006.</li> <li>L. Cademartiri, G. A. Ozin: Nanochemia. Podstawowe koncepcje. <i>Wydawnictwo Naukowe PWN</i>, Warszawa, 2011.</li> <li>K. J. Klabunde, R. M. Richards (ed.): Nanoscale Materials in Chemistry. <i>Wiley</i>, Hoboken, 2009.</li> </ul>	
	eResources addresses	Chemia nanomateriałów 2022 - Moodle ID: 19806 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19806">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19806</a>	
Example issues/ example questions/ tasks being completed	Available on the "eNauczanie" platform.		
Work placement	Not applicable		