GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of Nanotechnology, PG_00049373		
Field of study	Podstawy nanotechnologii		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2026/2027
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	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	dr inż. Marta Prześniak-Welenc	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	0.0	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

The aim of the course is to gain knowledge of the basics of nanotechnology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U52] can determine properties of materials and biomaterials used in biomedical engineering	Students can identify and analyze the properties of materials and biomaterials in the context of nanotechnology applied in biomedical engineering.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania
[K6_U07] can apply methods of process and function support, specific to the field of study	The student understands how to employ specific support methods and functions in the field of biomedical engineering using techniques characteristic of nanotechnology.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania [SU2] Ocena umiejętności analizy informacji
[K6_W52] Knows and understands, to an advanced extent, selected aspects of chemistry and biochemistry, constituting general knowledge related to the field of study	The student knows and understands selected aspects within the scope of chemistry and biochemistry in the context of nanotechnology.	[SW2] Ocena wiedzy zawartej w prezentacji

<table>
<tr><td>Subject contents</td><td>Course content – lecture
What is nanotechnology. Elements of solid state physics: crystalline structure of solids, bonds, phonons, band structure. Physical phenomena in nanostructures, quantum wells. Methots of nanosized materials preparations:thin films, nanorods, quantum dots, nanopowdwes. Electrica, amgnetic, aptical and mechanical properties of nanosized materials. Photonic structures. Methods of nano-materials examonation (AFM, STM and nanoindentation). Physical properties of nanotunes and graphen, Nanotechnology applications.

qantum Hall effect, tunneling effect, balistic charge transport, absorption and emission of radiation, lasers, Coulomb blocade, photonic structures, nanomagnetism. 5. Physical properties of nanotubes. 6. Elements of nanoelectronics</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of basics of classical and contemporary physics.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>50.0%</td><td>66.6%</td></tr>
<tr><td>Paricipation in lessons, doing reports</td><td>50.0%</td><td>33.4%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Nanotechnologie. Red. Nauk. R.W.Kelsall i in. PWN 2008.

2. Wstęp do fizyki ciała stałego. C. Kittel, PWN, 1999</td></tr>
<tr><td>Supplementary literature</td><td>1. Introduction to nanotechnology. Ch.P.Poole Jr, F.J.Owens. Wiley 2003</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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