GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00052084		
Field of study	Nanotechnology		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2023/2024
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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Zakład fizyki nanomateriałów -> Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Wojciech Sadowski	
	Teachers	prof. dr hab. inż. Wojciech Sadowski	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	E-learning hours included: 0.0						
	Additional information: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33618						

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	30	2.0	18.0	50

Subject objectives	
	Thermodynamic and kinetic aspects of the crystallization process (phase equilibrium, diffusion). Fundamentals of nanothermodynamics. The specificity of the process of nanocrystallization. The structure of real crystals - defects. Crystal growth methods (bulk crystals, nanocrystals and nanostructures). Crystal structure analysis methods. Examples of crystallization of selected systems. .

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K05	The student is able to present the effects of his work, convey information in a generally understandable way, communicate, make self-assessment and constructive assessment of the effects of other people's work.	[SK2] Assessment of progress of work
K6_U08	He can present the basic facts of materials science and nanotechnology and related fields in a popular way.	[SU1] Assessment of task fulfilment
K6_W07	Has systematic knowledge of the physical and chemical foundations of nanotechnology	[SW1] Assessment of factual knowledge
K6_K04	The student is able to work in a team.	[SK1] Assessment of group work skills

Subject contents

1.Thermodynamic and kinetic aspects of the crystallization process (phase equilibrium, diffusion).

2. Fundamentals of nanothermodynamics. The specificity of the process of nanocrystallization.

3. The structure of real crystals - defects.

4. Crystal growth methods (bulk crystals, nanocrystals and nanostructures).

5 Crystal structure analysis methods.

6. Examples of crystallization of selected systems. .

Prerequisites and co-requisites

Introduction to nanotechnology. Crystallography.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Credit for the lecture content	50.0%	60.0%
Preparation of crystal growth project and seminar presentation	100.0%	40.0%

Recommended reading

Basic literature	I..I.V. Markov "Crystal Growth for beginners". World Scientific (2003, 2nd edition) 2. D.T.J. Hurle, ed. "Handbook of Crystal Growth", vol. 1-a North Holland (1993)
Supplementary literature	1. A. A. Chernov. Modern Crystallography. III Crystal Growth. Springer-Verlag. Berlin Heidelberg New York Tokyo 1984 2. Crystal Growth Edited by Brian R. Pamplin, Copyright 1980 Elseier 3. Nanocrystals Forming Mesoscopic Structures. Edited by Marie Paule Pileni 2005 WILE-VCH.
eResources addresses	Adresy na platformie eNauczanie: Wzrost kryształów - Moodle ID: 33618 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33618

Example issues/ example questions/ tasks being completed

Pursuant to point subject content.

Work placement

Not applicable