GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00052084		
Field of study	Wzrost kryształów		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2025/2026
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	Division of Nanomaterials Physics -> 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. Wojciech Sadowski	
	Teachers	prof. dr hab. inż. Wojciech Sadowski	

Lesson types

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

eNauczanie source addresses:

Moodle ID: 2107 Wzrost kryształów 2025
https://enauczanie.pg.edu.pl/2025/course/view.php?id=2107

Additional information:

Wykład prowadzony bezpośrednio audytoryjne z wykorzystaniem prezentacji, uzupełnionej o komentarz prowadzącego.

Zajęcia projektowe poprzedzone wprowadzeniem do metodyki projektowania wybranych kryształów, bezpośrednimi konsultacjami dotyczącymi wyboru techniki projektowania i prezentacją bezpośrednią projektów.

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. .

PROJECT: Basics of crystal growth process design (Selection of materials compounds, substances, and structural systems for crystallization, selection of a given material crystallization method and its technological description).
Project presentation.

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] Ocena postępów pracy
K6_U08	He can present the basic facts of materials science and nanotechnology and related fields in a popular way.	[SU1] Ocena realizacji zadania
K6_W07	Has systematic knowledge of the physical and chemical foundations of nanotechnology	[SW1] Ocena wiedzy faktograficznej
K6_K04	The student is able to work in a team.	[SK1] Ocena umiejętności pracy w grupie

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.

PROJECT:
Basics of crystal growth process design.
Selection of materials compounds, substances, and structural systems (e.g., Si, C, GaGs, AlInSb, etc.) for crystallization.
Selection of a given material crystallization method and its technological description.
Analysis of the physicochemical properties and applications of the designed crystals.
Project presentation.

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	
Example issues/ example questions/ tasks being completed	Pursuant to point subject content. 1.Thermodynamic and kinetic aspects of the crystallization process 2. Phase equilibrium, diffusion. 3. The structure of real crystals - defects. 4. Crystal growth methods 5 Crystal structure analysis methods. ...	
Practical activites within the subject	Not applicable	

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