GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Crystallography, PG_00059031		
Field of study	Materials Engineering, Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2022	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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Maria Gazda	
	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	0.0	0.0	30

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	30	5.0	65.0	100

Subject objectives

Gaining knowledge on the fundamentals of crystallography and relations between the crystal structure and properties of materials.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K01	understands the need to improve competences in the description and examination of the structure of materials; is aware of their own limitations and knows when to turn to experts,understands the need to improve competences in the description and examination of the structure of materials; is aware of their own limitations and knows when to turn to experts,	[SK2] Assessment of progress of work
K6_W02	has knowledge of geometric and chemical crystallography	[SW1] Assessment of factual knowledge
K6_U01	can use devices such as X-ray diffractometer, optical microscope, laboratory scale; can calculate and measure density	[SU1] Assessment of task fulfilment
K6_W04	knows the basic aspects of the construction and operation of devices such as X-ray diffractometer, optical microscope, laboratory scale	[SW1] Assessment of factual knowledge
K6_U05	can independently learn the elements of crystallography	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Basic definitions, crystallographic equations; Symmetry of crystals, symmetry groups. Examples of crystals, their characteristic features and structural properties . Reciprocal lattice: definitione and interpretation . Methods of structural studies. Structural defects - their influence on the selected properties.

Crystal growth , Morphology of crystals.

Physical properties of crystals. Anisotropy.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>No requirements</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>test</td><td>51.0%</td><td>65.0%</td></tr>
<tr><td>Laboratory - average mark</td><td>51.0%</td><td>30.0%</td></tr>
<tr><td>Homework</td><td>30.0%</td><td>5.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Krystalografia, Bojarski i inni

Any textbook on crystallography</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. How many atoms belong to the cel shown in the figure 1? What is the coordination numer of larger atom?

2. Define Miller indices. Draw the planes (411), (002) and (100) in an orthorhombic crystal of cel parameters a = 4 Å, b = 2 Å i c = 8 Å. Give indices of the planes equivalent to (100).

3. Crystal has two mirror planes: one perpendicular to y and other to z. Determine points equivalent to ¼ ¾ ½.. What multiplicity has this point?

4. Calculate packing density for bcc structure.

5. What information may be obtained on the basis of X-ray diffraction investigation of a monocrystal?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
</table>