



## Subject card

Subject name and code	CRYSTALLOGRAPHY, PG_00039781						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2021	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	1	Language of instruction				Polish no	
Semester of study	2	ECTS credits				4.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Maria Gazda				
	Teachers		dr inż. Kacper Dzierzgowski prof. dr hab. inż. Maria Gazda				
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						
Adresy na platformie eNauczenie: krystalografia 1 -2021/22 - Moodle ID: 19936 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19936">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19936</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	30	15.0		55.0		100
Subject objectives	Learning the basics of crystallography						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W02	the student has knowledge of physics and chemistry useful for formulating and solving simple tasks in the field of crystallography			[SW1] Assessment of factual knowledge		
	K6_K01	the student understands the need to improve professional and personal competences; is aware of its own limitations and knows when to turn to experts, is able to properly define priorities for the implementation of tasks set by himself or other			[SK2] Assessment of progress of work		
	K6_U05	the student is able to independently learn the basics of crystallography			[SU1] Assessment of task fulfilment		
	K6_U01	the student is able to use properly selected analytical and experimental methods and devices that enable the measurement of the basic quantities characterizing crystalline materials			[SU1] Assessment of task fulfilment		
K6_W04	the student knows the basic aspects of the construction and operation of an X-ray diffractometer			[SW1] Assessment of factual knowledge			

Subject contents	<p>Intruduction</p> <p>Basic quantities used to describe lattice networks, crystallographic patterns. Crystal symmetry. Examples of real crystal structures. Their characteristics and some properties. Inverse network: definition, physical interpretation. Methods of studying the structure of crystals. Structure defects. Types and their influence on the properties of crystalline matter. Chemical bonds. How crystals are formed: crystallization, crystal morphology. Physical properties of crystals</p>											
Prerequisites and co-requisites	no											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 562 794 591">Subject passing criteria</th> <th data-bbox="799 562 1137 591">Passing threshold</th> <th data-bbox="1142 562 1481 591">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 598 794 627">lecture: quiz</td> <td data-bbox="799 598 1137 627">51.0%</td> <td data-bbox="1142 598 1481 627">70.0%</td> </tr> <tr> <td data-bbox="456 633 794 663">lab.&gt; raports</td> <td data-bbox="799 633 1137 663">51.0%</td> <td data-bbox="1142 633 1481 663">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	lecture: quiz	51.0%	70.0%	lab.> raports	51.0%	30.0%
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Recommended reading	<table border="1"> <tbody> <tr> <td data-bbox="456 674 794 703">Basic literature</td> <td colspan="2" data-bbox="799 674 1481 703">any textbook on crystallography</td> </tr> <tr> <td data-bbox="456 710 794 739">Supplementary literature</td> <td colspan="2" data-bbox="799 710 1481 739">any textbook in crystallography or solid state physics</td> </tr> <tr> <td data-bbox="456 745 794 797">eResources addresses</td> <td colspan="2" data-bbox="799 745 1481 797">           krystalografia 1 -2021/22 - Moodle ID: 19936  <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19936">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19936</a> </td> </tr> </tbody> </table>			Basic literature	any textbook on crystallography		Supplementary literature	any textbook in crystallography or solid state physics		eResources addresses	krystalografia 1 -2021/22 - Moodle ID: 19936 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19936">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19936</a>	
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Example issues/ example questions/ tasks being completed	<p>1 How many atoms A and B (A - smaller, B - larger) are there in the unit cell (cube) shown in Figure 2? What is the structure? What is the coordination number of the B atom? What is the summary formula for this relationship? 2 Draw and mark according to the plane definition (411), (002) and (100) in the orthorhombic crystal with lattice constants <math>a = 4 \text{ \AA}</math>, <math>b = 2 \text{ \AA}</math> and <math>c = 8 \text{ \AA}</math> Write the indicators of the planes equivalent to the plane (100). 3. Write Laue's condition and explain its quantities.</p>											
Work placement	Not applicable											

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