

<b>Course title</b> Fizykochemia ciała stałego / Physical chemistry of solid		<b>ECTS code</b> 13.3.0397	
<b>Name of unit administrating study</b> Faculty of Chemistry			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Chemistry	Bachelor	Full-time studies	
<b>Teaching staff</b> dr hab. Artur Sikorski, prof. UG			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b> 1	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> lecture		classes - 15 h tutorial classes – 2 h student's own work – 8 h	
<b>B. The realization of activities</b> in-class learning		Total: 25 h - 1 ECTS	
<b>C. Number of hours</b> 15 h lecture			
<b>The academic cycle</b> Second year, summer semester			
<b>Type of course</b> Obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b>  Lecture (multimedia presentation)		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
		<b>A. Final evaluation, in accordance with the UG study regulations</b> course completion (with a grade)	
		<b>B. Assessment methods</b> written exam - test containing open and closed questions	
		<b>C. The basic criteria for evaluation or exam requirements</b> <ul style="list-style-type: none"> <li>• a test exam consisting of 20-25 open and closed questions, covering issues mentioned in the lecture's program content;</li> <li>• final grade according to the scale of grades given in the Study Regulations</li> <li>• additional written exam for students who did not obtain the required 51% in the first term</li> </ul>	
<b>Required courses</b>  completed courses in “General chemistry” and “Physical chemistry”			
<b>Introductory requirements</b>  none			
<b>Aims of education</b> Familiarizing of students with definition and structure of solid, with basic physicochemical properties of solids, and laws describing them, with classification of solids based on various criteria and with relationships between structure of solids and their physicochemical properties			
<b>Course contents</b> The role of physicochemistry of solid in modern chemistry. Definition of solids. Solid amorphous substances, crystals and quasicrystals. Unit cell. Crystallographic systems. Crystal lattice. Space lattice. Symmetry in crystal morphology. Classes of symmetry and their symbolism. Space groups and their symbolism. Classification of crystals based on chemical structure and stoichiometric ratios. Structures of selected elements and chemical compounds. Techniques used for determining the structure and properties of solids. Relationships between structure and selected physicochemical properties of solids			

## **Bibliography of literature**

### **A. Literature required to pass the course**

1. Bojarski Z., Gigla M., Stróż K., Surowiec M., Krystalografia, PWN, 2008.
2. Trzaska Durski Z., Trzaska Durska H., Podstawy krystalografii strukturalnej i rentgenografii, Oficyna Wydawnicza Politechniki Warszawskiej, 2003.
3. Atkins P. Chemia fizyczna, PWN, 2016.

### **B. Extracurricular readings**

1. Penkala, T., Zarys Krystalografii, PWN, 1983.
2. Luger, P., Rentgenografia strukturalna monokryształów, PWN, 1989.
3. Wells, A. F., Strukturalna chemia nieorganiczna, WNT, 1993.

## **Knowledge**

Student: knows the role of physicochemistry of solid in modern chemistry, knows definition of solid, characterizes crystallographic systems, knows different types of unit cells, distinguishes the crystal lattice from the space lattice, characterizes the various elements of the space lattice (directions, planes), lists and describes the elements of point and translational symmetry, describes different types of crystal packing of atoms, ions and molecules in crystal lattice, describes various criteria of classifications of solids, characterizes the structure of selected elements and chemical compounds, determines the relationship between structure and physicochemical properties of compounds

## **Skills**

Student:

- organizes workshop.
- solves scientific problems, critically refers to the results obtained,
- proposes alternative methods of solving scientific problems,
- analyzes the results obtained based on their knowledge,
- draws conclusions based on experimental data,
- verifies the results based on literature data

## **Social competence**

Student:

- strives to acquire knowledge,
- works independently, and in a team performing different roles in it,
- shows creativity during the presentation of results,
- engages in solving scientific problems,
- cares for the acquisition of knowledge by others,
- discusses scientific problems (theses)