



## Subject card

|   |  |   |                                     |            |  |         |     |
|---|--|---|-------------------------------------|------------|--|---------|-----|
| Subject name and code                       | Chemistry II, PG_00039780  |   |                                     |            |  |         |     |
| 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<br>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   |         |     |
| Semester of study                           | 2  | ECTS credits  |                                     |            | 3.0  |         |     |
| Learning profile                            | general academic profile   | Assessment form   |                                     |            | assessment   |         |     |
| Conducting unit                             | Department of Inorganic Chemistry -> Faculty of Chemistry  |   |                                     |            |  |         |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   | prof. dr hab. inż. Jarosław Chojnacki   |                                     |            |  |         |     |
|   | Teachers   | prof. dr hab. inż. Jarosław Chojnacki<br>dr inż. Daria Kowalkowska-Zedler   |                                     |            |  |         |     |
| Lesson types and methods of instruction     | Lesson type  | Lecture   | Tutorial                            | Laboratory | Project  | Seminar | SUM |
|   | Number of study hours  | 0.0   | 0.0                                 | 30.0       | 0.0  | 0.0     | 30  |
|   | E-learning hours included: 0.0   |   |                                     |            |  |         |     |
|   | Adresy na platformie eNauczanie:<br>Chemia II (2022) - Moodle ID: 22272 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22272">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22272</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  | 8.0                                 | 37.0       | 75   |         |     |
| Subject objectives                          | Confrontation of knowledge on reactivity of basic classes of inorganic substances: elements, acids, bases and salts with laboratory practice. Consolidation of material learnt during the first semester of Chemistry I. Basics of classical qualitative analysis of inorganic ions. |   |                                     |            |  |         |     |
| Learning outcomes                           | Course outcome   | Subject outcome   |                                     |            | Method of verification   |         |     |
|   | K6_U05   | Independently investigates and interprets the chemical properties of the sample received and appoints its composition             |                                     |            | [SU1] Assessment of task fulfilment  |         |     |
|   | K6_K01   | Understands the importance of different behaviour of separate ions and mixtures. Appreciates the need to extend the skills gained |                                     |            | [SK5] Assessment of ability to solve problems that arise in practice   |         |     |
|   | K6_U01   | The Student selects a method of analysis which allows unambiguous identification of the sample                                    |                                     |            | [SU4] Assessment of ability to use methods and tools   |         |     |
|   | K6_W02   | Gain knowledge about chemical reactivity of substances in solutions: salts, acids, alkalis and properties of popular metals       |                                     |            | [SW1] Assessment of factual knowledge  |         |     |

| Subject contents   | <p>During the laboratory classes a student examines over one hundred processes of chemical reaction. On the basis of literature he chooses proper reactions and while examining them, he identifies the presence of specific ions in solutions. Next, he examines the basic chemical and physical properties of the material received for further analysis.</p> <p>Later, the student plans to conduct proper experiments. Finally, he analyses their processes and on this basis, he identifies the received sample for analysis.</p> <p>1. Qualitative analysis of selected cations (<math>\text{Ag}^+</math>, <math>\text{Hg}_2^{2+}</math>, <math>\text{Pb}^{2+}</math>, <math>\text{Cu}^{2+}</math>, <math>\text{Hg}^{2+}</math>, <math>\text{Cd}^{2+}</math>, <math>\text{Bi}^{3+}</math>, <math>\text{Ni}^{2+}</math>, <math>\text{Co}^{2+}</math>, <math>\text{Fe}^{3+}</math>, <math>\text{Zn}^{2+}</math>, <math>\text{Mn}^{2+}</math>, <math>\text{Al}^{3+}</math>, <math>\text{Ca}^{2+}</math>, <math>\text{Ba}^{2+}</math>, <math>\text{K}^+</math>, <math>\text{NH}_4^+</math>, <math>\text{Na}^+</math>, <math>\text{Mg}^{2+}</math>).</p> <p>2. Qualitative analysis of selected anions. (<math>\text{Cl}^-</math>, <math>\text{Br}^-</math>, <math>\text{I}^-</math>, <math>[\text{Fe}(\text{CN})_6]^{4-}</math>, <math>[\text{Fe}(\text{CN})_6]^{3-}</math>, <math>\text{NO}_2^-</math>, <math>\text{CH}_3\text{COO}^-</math>, <math>\text{NO}_3^-</math>, <math>\text{MnO}_4^-</math>, <math>\text{SO}_3^{2-}</math>, <math>\text{CO}_3^{2-}</math>, <math>\text{C}_2\text{O}_4^{2-}</math>, <math>\text{BO}_3^{3-}</math>, <math>\text{C}_4\text{H}_4\text{O}_6^{2-}</math>, <math>\text{PO}_4^{3-}</math>, <math>\text{S}_2\text{O}_3^{2-}</math>, <math>\text{CrO}_4^{2-}</math>, <math>\text{SO}_4^{2-}</math>)</p> <p>3. Qualitative analysis of selected inorganic compounds: acids, bases, salts and metals</p> |                               |  |                          |  |                               |                                |               |        |                      |  |  |
|--|---|-------------------------------|--|--------------------------|--|-------------------------------|--------------------------------|---------------|--------|----------------------|--|--|
| Prerequisites and co-requisites                                | Positive note from the exercises part of Chemistry I  |                               |  |                          |  |                               |                                |               |        |                      |  |  |
| Assessment methods and criteria                                | <table border="1" data-bbox="448 685 1487 750"> <thead> <tr> <th data-bbox="448 685 794 719">Subject passing criteria</th> <th data-bbox="794 685 1141 719">Passing threshold</th> <th data-bbox="1141 685 1487 719">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 719 794 750">Collection of points for tasks</td> <td data-bbox="794 719 1141 750">55.0%</td> <td data-bbox="1141 719 1487 750">100.0%</td> </tr> </tbody> </table>   |                               |  | Subject passing criteria | Passing threshold  | Percentage of the final grade | Collection of points for tasks | 55.0%         | 100.0% |                      |  |  |
| Subject passing criteria                                       | Passing threshold   | Percentage of the final grade |  |                          |  |                               |                                |               |        |                      |  |  |
| Collection of points for tasks                                 | 55.0%   | 100.0%                        |  |                          |  |                               |                                |               |        |                      |  |  |
| Recommended reading  | <table border="1" data-bbox="448 757 1487 1176"> <tbody> <tr> <td data-bbox="448 757 794 1070">Basic literature</td> <td colspan="2" data-bbox="794 757 1487 1070">           1. J. Prejzner, Chemia Nieorganiczna - Laboratorium - skrypt, Wydawnictwo PG 2004<br/><br/>           2. J. Minczewski, Z. Marczenko, Chemia Analityczna Tom 1, PWN Warszawa 1997<br/><br/>           3. J. Sawicka i inni, Tablice Chemiczne, Wydawnictwo Podkowa Gdańsk 2002         </td> </tr> <tr> <td data-bbox="448 1070 794 1104">Supplementary literature</td> <td colspan="2" data-bbox="794 1070 1487 1104">Not specified</td> </tr> <tr> <td data-bbox="448 1104 794 1176">eResources addresses</td> <td colspan="2" data-bbox="794 1104 1487 1176">Chemia II (2022) - Moodle ID: 22272<br/><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22272">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22272</a></td> </tr> </tbody> </table>  |                               |  | Basic literature         | 1. J. Prejzner, Chemia Nieorganiczna - Laboratorium - skrypt, Wydawnictwo PG 2004<br><br>2. J. Minczewski, Z. Marczenko, Chemia Analityczna Tom 1, PWN Warszawa 1997<br><br>3. J. Sawicka i inni, Tablice Chemiczne, Wydawnictwo Podkowa Gdańsk 2002 |                               | Supplementary literature       | Not specified |        | eResources addresses | Chemia II (2022) - Moodle ID: 22272<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22272">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22272</a> |  |
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| Supplementary literature                                       | Not specified   |                               |  |                          |  |                               |                                |               |        |                      |  |  |
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| Example issues/<br>example questions/<br>tasks being completed | <p>Write chemical equations for reactions of nitrates of III group cations with excess of KOH.</p> <p>Write chemical equations for reactions of nitrates of III group cations with excess of <math>\text{NH}_3 \cdot \text{H}_2\text{O}</math>.</p> <p>How to detect <math>\text{NO}_3^-</math> in the presence of <math>\text{NO}_2^-</math> ?</p>   |                               |  |                          |  |                               |                                |               |        |                      |  |  |
| Work placement   | Not applicable  |                               |  |                          |  |                               |                                |               |        |                      |  |  |

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