



Subject card

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|---|---|--|--|-------------------------------------|--|---|-----|
| Subject name and code | Instrumental Analysis, PG_00053082 | | | | | | |
| Field of study | Chemistry | | | | | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | | | 2023/2024 | | |
| Education level | first-cycle studies | Subject group | | | Optional subject group 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 | 4 | ECTS credits | | | 2.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Department of Analytical Chemistry -> Faculty of Chemistry | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | prof. dr hab. inż. Piotr Konieczka | | | | |
| | Teachers | | | | | | |
| Lesson type and method 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 | | 2.0 | | 18.0 | 50 |
| Subject objectives | The analytical process, instrumental analytical methods (primary and absolute methods, indirect methods); theoretical basis and description of selected instrumental analytical techniques (spectroscopic techniques; chromatographic techniques and related, hyphenated techniques). | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | | Method of verification | |
| | K6_U07 | | can make accurate and precise measurement in the analytical laboratory | | | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools | |
| | K6_W03 | | has a basic knowledge of trends in the area of theoretical chemistry and is familiar with a number of engineering disciplines related to theoretical chemistry | | | [SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects | |
| | [K6_U08] is capable to design and carry out the experiment which is necessary to confirm a given hypothesis and sees wider context, often beyond-technical, of the analysed phenomena | | can design and conduct an experiment | | | [SU4] Assessment of ability to use methods and tools | |

| Subject contents | <p>Chromatographic techniques:</p> <ul style="list-style-type: none"> -quantitative analysis in GC -chromatographic detectors - the principle of operation and the area of use - liquid chromatography -mass spectrometry in chromatography <p>Hyphenated techniques -use in analytics</p> <p>Extraction techniques as a step of sample preparation</p> | | | | | | | | | | | |
|--|--|-------------------------------|--|--------------------------|---|-------------------------------|--------------------------|---|-------|-------------------------------|------|-------|
| Prerequisites and co-requisites | Basic knowledge of analytical chemistry on the theory of instrumental methods of analysis. | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>test</td> <td>60.0%</td> <td>50.0%</td> </tr> <tr> <td>participation in the lectures</td> <td>0.0%</td> <td>50.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | test | 60.0% | 50.0% | participation in the lectures | 0.0% | 50.0% |
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| Recommended reading | <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 33%;">Basic literature</td> <td colspan="2" data-bbox="799 810 1487 1122"> <p>1. A. Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa, 2002.</p> <p>2. Z. Witkiewicz, J. Hepter, Chromatografia gazowa, WNT, Warszawa, 2009.</p> <p>3. W. Szczepaniak, Metody instrumentalne w analizie chemicznej, PWN, Warszawa 2008.</p> </td> </tr> <tr> <td>Supplementary literature</td> <td colspan="2" data-bbox="799 1128 1487 1196"> <p>1. K. Kuklińska, A. Melnyk, B. Zabiegała, Spektrometr mas jako detektor chromatograficzny, połączenie GC-MS, Wydawnictwo PG, Gdańsk 2014</p> </td> </tr> <tr> <td>eResources addresses</td> <td colspan="2" data-bbox="799 1202 1487 1234"></td> </tr> </tbody> </table> | | | Basic literature | <p>1. A. Cygański, Metody spektroskopowe w chemii analitycznej, WNT, Warszawa, 2002.</p> <p>2. Z. Witkiewicz, J. Hepter, Chromatografia gazowa, WNT, Warszawa, 2009.</p> <p>3. W. Szczepaniak, Metody instrumentalne w analizie chemicznej, PWN, Warszawa 2008.</p> | | Supplementary literature | <p>1. K. Kuklińska, A. Melnyk, B. Zabiegała, Spektrometr mas jako detektor chromatograficzny, połączenie GC-MS, Wydawnictwo PG, Gdańsk 2014</p> | | eResources addresses | | |
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| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none"> 1 Give a definition of BTV. Explain how this parameter can be used in describing the sorption strength of a solid sorbent? 2. define the parameters that characterise the sorption media used for sampling analytes from the gas phase. 3. explain the principle of two-stage thermal desorption. 4. how (theoretically) using the gas chromatography technique can the BTV breakthrough volume be determined for the system: selected compound and adsorbent 5 Describe the principle of operation of a Split/Splitless dispenser operating in the splitless mode. 6. describe the phenomenon of discrimination. How it affects the quality of the chromatographic determination results obtained. 7) What is a typical CV-AAS instrument made up of? 8) State the basic parameters (descriptively) characterising the CV-AAS technique. 9) What are the physical and chemical properties of mercury used in the CV-AAS technique? 10. list the advantages of the CV-AAS technique. <p>Translated with www.DeepL.com/Translator (free version)</p> | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | |