University of Gdańsk

# Subject card

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|---|---|---|---|
| Subject name and code | Monographic lecture - Modern methods of chemical synthesis, PG_00082498 | | |
| Field of study | Chemistry | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | 2025/2026 |
| Education level | Master's studies | Subject group | Obligatory subject group in the field of study<br>Optional subject group |
| 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 | 3.0 |
| Learning profile | academic | Assessment form | credit |
| Conducting unit | Faculty of Chemistry -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. Elżbieta Jankowska | |
| | Teachers | dr hab. Elżbieta Jankowska | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 0.0 | 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 | 40.0 | 75 |

**Subject objectives**

Familiarizing students with:
- basic rules of carrying organic synthesis
- modern methods of organic synthesis, allowing the formation of new carbon-carbon and carbon-heteroatom bonds
- modern techniques of organic synthesis, including asymmetric catalysis and multi-component reactions (for instance Mannich, Ugi, and Passerini reactions)
- the concept of retrosynthesis

Enabling students to acquire skills of designing multi-step syntheses of organic compounds

<table>
<tr><td>Learning outcomes</td><td>
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<tr><th>Course outcome</th><th>Subject outcome</th><th>Method of verification</th></tr>
<tr><td>[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.</td><td>The student:<br>- critically analyzes the possibility of<br>application of a selected chemical reaction to obtain the desired product;<br>- predicts expected side reactions that make it difficult to obtain the correct product from given substrates;<br>- evaluates the risks associated with<br>a given type of reaction and proposes<br>ways to enable the safe carry out the desired<br>transformations;</td><td>[SW1] oral statement/ conversation/discussion</td></tr>
<tr><td>[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.</td><td>The student:<br>- gets involved in a team work in solving project-type tasks;<br>- discusses in a group the methods of solving synthetic problems;<br>- presents the group's proposed solutions of synthetic problems</td><td>[SK1] oral statement/conversation/ discussion</td></tr>
<tr><td>[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.</td><td>The student:<br>- is familiar with modern methods of organic synthesis, allowing the formation in<br>molecules new carbon-carbon and carbon-heteroatom bonds;<br>- knows modern techniques of organic synthesis, such as asymmetric catalysis<br>and multicomponent reactions (e.g., Mannich, Ugi, Passerini reaction)</td><td>[SW5] implementation of a problem task</td></tr>
<tr><td>[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.</td><td>The student:<br>- predicts the structure of products, based on the structure of substrates and the applied reaction conditions</td><td>[SW5] implementation of a problem task</td></tr>
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<tr><td>Subject contents</td><td>- creation of new carbon-carbon bonds using, inter alia, Heck reaction, Suzuki reaction, olefin metathesis, Michael reaction, Robinson annulation<br>- creation of new carbon-heteroatom bonds using, inter alia, Sharpless, Jacobsen, Mitsunobu and Buchwald-Hartwig reactions<br>- modern techniques of organic synthesis, including: asymmetric catalysis, multicomponent reactions (for instance Mannich, Ugi and Passerini reactions)<br>- recognition of syntons in organic molecules, designing synthetic pathways for selected organic compounds</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Completed course in "Organic Chemistry"</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>problem tasks</td><td>51.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>J. Clayden, N. Greeves, S. Warren, Organic chemistry</td></tr>
<tr><td>Supplementary literature</td><td>G.S. Zweifel, M.H. Nantz, P. Somfai, Modern organic synthesis. An introduction. Wiley 2017</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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