

**Subject card**

|  |   |  |                               |                                     |                        |            |     |
|--|---|--|-------------------------------|-------------------------------------|------------------------|------------|-----|
| <b>Subject name and code</b>                       | Biologically active peptides, PG_00179516   |  |                               |                                     |                        |            |     |
| <b>Field of study</b>                              | Chemistry   |  |                               |                                     |                        |            |     |
| <b>Date of commencement of studies</b>             | October 2026  | <b>Academic year of realisation of subject</b>           |                               |                                     | 2026/2027              |            |     |
| <b>Education level</b>                             | Master's studies  | <b>Subject group</b>                                     |                               |                                     | Optional subject group |            |     |
| <b>Mode of study</b>                               | full-time studies   | <b>Mode of delivery</b>                                  |                               |                                     | at the university      |            |     |
| <b>Year of study</b>                               | 1   | <b>Language of instruction</b>                           |                               |                                     | Polish                 |            |     |
| <b>Semester of study</b>                           | 2   | <b>ECTS credits</b>                                      |                               |                                     | 2.0                    |            |     |
| <b>Learning profile</b>                            | academic  | <b>Assessment form</b>                                   |                               |                                     | credit                 |            |     |
| <b>Conducting unit</b>                             |   |  |                               |                                     |                        |            |     |
| <b>Name and surname of lecturer (lecturers)</b>    | <b>Subject supervisor</b>   |  | prof. dr hab. Krzysztof Rolka |                                     |                        |            |     |
|  | <b>Teachers</b>   |  |                               |                                     |                        |            |     |
| <b>Lesson types</b>                                | <b>Lesson type</b>  | Lecture  | Tutorial                      | Laboratory                          | Project                | Seminar    | SUM |
|  | <b>Number of study hours</b>  | 30.0   | 0.0                           | 0.0                                 | 0.0                    | 0.0        | 30  |
|  | E-learning hours included: 0.0  |  |                               |                                     |                        |            |     |
| <b>Learning activity and number of study hours</b> | <b>Learning activity</b>  | Participation in didactic classes included in study plan |                               | Participation in consultation hours |                        | Self-study | SUM |
|  | <b>Number of study hours</b>  | 30   |                               | 5.0                                 |                        | 40.0       | 75  |
| <b>Subject objectives</b>                          | introduction students with all issues listed in the lecture program content, discussion of the stereochemistry of peptides and proteins, familiarizing students with the basic classes of endogenous peptides, their structures and functions teaching students how to design of peptides, peptidomimetics of the presumed biological activity familiarizing students with peptidic drugs |  |                               |                                     |                        |            |     |

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| Learning outcomes  | Course outcome  | Subject outcome  | Method of verification            |
|  | [CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.  | Describes selected methods for the analysis of endogenous organic compounds  | [SW4] test/exam - oral or written |
|  | [CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.   | Understands the need for continuous education.<br>Is aware of the importance of peptides and their derivatives in functioning body.<br>Demonstrates cautious criticism in accepting information, especially available information. in the mass media.                              | [SK4] test/exam - oral or written |
|  | [CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.  | Characterizes endogenous peptides and discuss their importance for functioning microorganisms, plants and animals.<br>Based on the definition of torsion angles, it defines the three dimensional structure of peptides and proteins.  | [SW4] test/exam - oral or written |
| [CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field. | Lists examples of peptide drugs.<br>Characterizes methods for examining structure-activity relationships.<br>Characterizes the main methods of combinatorial chemistry.   | [SW4] test/exam - oral or written  |                                   |
| Subject contents   | <p>Peptide bond geometry, definitions of torsion angles of polypeptide chains. Canonical secondary structures and higher order structures. Application of combinatorial chemistry methods to select peptides with assumed biological activity (design, chemical synthesis and deconvolution of peptide libraries). Peptide and protein hormones. Plant peptides. Peptides with antibacterial and antifungal properties. Peptides with anti-cancer activity. Peptide vaccines. Peptides with immunological activity. Peptides isolated from venoms of various animal species and peptide toxins. Opioid peptides. Prospects for the use of peptides in medical therapy and diagnostics. Study of the relationship between the structure and activity of biologically active peptides. Physicochemical methods for determining the spatial structures of peptides..</p> |  |                                   |
| Prerequisites and co-requisites  | <p>Knowledge of organic, bioorganic and biochemistry, including: chemical formulas and mechanisms of action of basic groups of biomolecules (carbohydrates, proteins, peptides, nucleic acids) and basic metabolic pathways, know the basic methods of analyzing biomolecules (liquid chromatography, gel electrophoresis, mass spectrometry, proton resonance magnetic), basics of organic spectroscopy.</p>   |  |                                   |
| Assessment methods and criteria  | Subject passing criteria  | Passing threshold  | Percentage of the final grade     |
|  | Positive grade received in written exam composed of 5 open questions covering issues listed in the course contents  | 51.0%  | 100.0%                            |
| Recommended reading  | Basic literature  | <p>Handbook of biologically active peptides (A.J. Kerstin, red.) Elsevier 2006, Combinatorial peptide and nonpeptide libraries (G. Jung, red.) VCH 1996, N. Sewald, H. Jakubke, Peptides: chemistry and biology, Wiley-VCH Verlag, Monographic papers provided by the lecturer</p> |                                   |
|  | Supplementary literature  | <p>Monographic publications provided or recommended by the lecturer.</p>   |                                   |
|  | eResources addresses  |  |                                   |
| Example issues/<br>example questions/<br>tasks being completed   | <ol style="list-style-type: none"> <li>List examples of pituitary hormones, give their short description.</li> <li>Outline the role of the dihedral angles of the peptide main chain in formation of peptide secondary structure. List examples of canonical secondary structure.</li> <li>Give at least five examples of peptidic toxins.</li> <li>Give at least 5 examples of peptides used as drugs, give their short description.</li> <li>Advantages and limitations of using peptides as drugs.</li> <li>Outline the general strategy use in design of biologically active peptides.</li> </ol>   |  |                                   |
| Work placement   | Not applicable  |  |                                   |

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