

## Subject card

|                                             |                                                                                                                                                     |                                                          |                                         |                                     |                                                                                                                                                |            |     |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Programming in Python, PG_00179334                                                                                                                  |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Field of study                              | Programowanie w języku Python                                                                                                                       |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Date of commencement of studies             | October 2023                                                                                                                                        |                                                          | Academic year of realisation of subject |                                     | 2025/2026                                                                                                                                      |            |     |
| Education level                             | Bachelor's studies                                                                                                                                  |                                                          | Subject group                           |                                     | Obligatory subject group in the field of study<br>Optional subject group<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                               | 3                                                                                                                                                   |                                                          | Language of instruction                 |                                     | Polish<br>Most of the literature on the subject is mainly or only available in English.                                                        |            |     |
| Semester of study                           | 6                                                                                                                                                   |                                                          | ECTS credits                            |                                     | 6.0                                                                                                                                            |            |     |
| Learning profile                            | academic                                                                                                                                            |                                                          | Assessment form                         |                                     | exam                                                                                                                                           |            |     |
| Conducting unit                             |                                                                                                                                                     |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                  |                                                          | mgr Laura Grzonka                       |                                     |                                                                                                                                                |            |     |
|                                             | Teachers                                                                                                                                            |                                                          |                                         |                                     |                                                                                                                                                |            |     |
| Lesson types                                | Lesson type                                                                                                                                         | Lecture                                                  | Tutorial                                | Laboratory                          | Project                                                                                                                                        | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                               | 30.0                                                     | 0.0                                     | 30.0                                | 0.0                                                                                                                                            | 0.0        | 60  |
|                                             | 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                                                                                                                               | 60                                                       |                                         | 0.0                                 |                                                                                                                                                | 0.0        | 60  |
| Subject objectives                          | Teaching students the Python language applications, in particular, creating web applications and the implementation of machine learning algorithms. |                                                          |                                         |                                     |                                                                                                                                                |            |     |

| Learning outcomes               | Course outcome                                                                                                                                                                                                                                              | Subject outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Method of verification                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                 | [INFL3_U06] is able to design, create, run and test programs using dedicated tools and adequate templates                                                                                                                                                   | <p>The student:</p> <p>Explains the principles of popular web frameworks and distinguishes their applications in the context of web development.</p> <p>Explains and characterizes selected machine learning algorithms.</p> <p>Designs and implements web applications in Python and tests their functionality with developer tools.</p> <p>Selects appropriate machine learning algorithms depending on the problem being analyzed.</p> <p>Works independently and as part of a team on programming projects using Python, adheres to established collaboration and code documentation standards.</p> | [SU2] prezentacja/projekt/referat/raport<br>[SU4] test/egzamin - ustny lub pisemny |
|                                 | [INFL3_W05] has general knowledge of various programming paradigms and programming languages; has detailed knowledge of object-oriented design and programming methods and patterns                                                                         | <p>The student:</p> <p>Characterizes object-oriented programming concepts based on developed applications.</p> <p>Organizes application code in a clear and structured manner.</p> <p>Demonstrates creativity in selecting an appropriate programming paradigm depending on the nature of the problem being solved.</p>                                                                                                                                                                                                                                                                                 | [SW4] test/egzamin - ustny lub pisemny<br>[SW2] prezentacja/projekt/referat/raport |
|                                 | [INFL3_U03] can design and analyze algorithms for their correctness and computational complexity using appropriate algorithmic techniques and data structures                                                                                               | <p>The student:</p> <p>Describes basic algorithms used in machine learning and identifies their capabilities and limitations.</p> <p>Implements machine learning algorithms in Python using appropriate libraries, and analyzes their correctness and performance. Draws conclusions regarding further development of the algorithms.</p> <p>Demonstrates responsibility for the reliability of computational analysis results and ensures the algorithmic correctness of developed solutions.</p>                                                                                                      | [SU2] prezentacja/projekt/referat/raport<br>[SU4] test/egzamin - ustny lub pisemny |
| Subject contents                | <p>The classes will be discussed:</p> <ul style="list-style-type: none"> <li>• Flask Framework,</li> <li>• Django framework,</li> <li>• Machine learning algorithms and their implementation in Python,</li> <li>• other applications of Python.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                    |
| Prerequisites and co-requisites | <ul style="list-style-type: none"> <li>• Knowledge of basic programming constructions available in Python</li> <li>• Knowledge of rules of the OOP</li> </ul>                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                    |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                    | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Percentage of the final grade                                                      |
|                                 |                                                                                                                                                                                                                                                             | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30.0%                                                                              |
|                                 |                                                                                                                                                                                                                                                             | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 70.0%                                                                              |

|                                                                |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recommended reading                                            | Basic literature                                                                                                                                                          | <ul style="list-style-type: none"> <li>Python language documentation available at <a href="https://docs.python.org/">https://docs.python.org/</a></li> <li>Documentation for training Python 101: <a href="https://python101.readthedocs.io/pl/latest/index.html">https://python101.readthedocs.io/pl/latest/index.html</a></li> <li>Flask framework documentation: <a href="https://flask.palletsprojects.com/en/stable/">https://flask.palletsprojects.com/en/stable/</a></li> <li>Documentation of the Django Framework: <a href="https://www.djangoproject.com/">https://www.djangoproject.com/</a></li> </ul> <p>The field of machine learning develops rapidly. In order to stay up to date, it is recommended to follow specialized blogs and portals as well as scientific literature. The teacher will provide current information in this respect at the beginning and/or during the classes. Examples of valuable pages that are worth visiting include:</p> <ul style="list-style-type: none"> <li>Machine Learning Mastery: <a href="https://machinelearningmastery.com">https://machinelearningmastery.com</a></li> <li>Medium: <a href="https://medium.com/tag/machine-learning">https://medium.com/tag/machine-learning</a></li> <li>Geeks For Geeks: <a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a></li> <li>Kaggle: <a href="https://www.kaggle.com/">https://www.kaggle.com/</a></li> </ul>               |
|                                                                | Supplementary literature                                                                                                                                                  | <p>A very good manual introducing the topic of machine learning:</p> <p>Brunton, S. L., &amp; Kutz, J. N. (2021). <i>Data-Driven Science and Engineering</i>. <a href="https://doi.org/10.1017/9781009089517">https://doi.org/10.1017/9781009089517</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                | eResources addresses                                                                                                                                                      | <p>Basic</p> <p><a href="https://www.kaggle.com/">https://www.kaggle.com/</a> - Website Kaggle. Access: 14.07.2025</p> <p><a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a> - Website Geeks For Geeks. Access: 14.07.2025</p> <p><a href="https://medium.com/tag/machine-learning">https://medium.com/tag/machine-learning</a> - Machine Learning topic on Medium platform. Access: 14.07.2025</p> <p><a href="https://machinelearningmastery.com">https://machinelearningmastery.com</a> - Website Machine Learning Mastery. Access: 14.07.2025</p> <p><a href="https://www.djangoproject.com/">https://www.djangoproject.com/</a> - Django framework documentation. Access: 14.07.2025</p> <p><a href="https://flask.palletsprojects.com/en/stable/">https://flask.palletsprojects.com/en/stable/</a> - Flask framework documentation. Access: 14.07.2025</p> <p><a href="https://python101.readthedocs.io/pl/latest/index.html">https://python101.readthedocs.io/pl/latest/index.html</a> - Documentation for training Python 101. Access: 14.07.2025</p> <p><a href="https://docs.python.org/">https://docs.python.org/</a> - Python language documentation. Access: 14.07.2025</p> <p>Supplementary</p> <p><a href="https://doi.org/10.1017/9781009089517">https://doi.org/10.1017/9781009089517</a> - Book "Data-Driven Science and Engineering" on the website of the Cambridge University Press. Access: 14.07.2025</p> |
| Example issues/<br>example questions/<br>tasks being completed | <p>The grade of the laboratory part of the course will be given based on projects.</p> <p>The grade of the lecture part of the course will be given based on an exam.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Work placement                                                 | Not applicable                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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