

## Subject card

|                                             |                                                                                                                                                                                                                                                                                           |                                                          |                                                                                                                                                                                                                                                      |                                     |                                                                             |            |     |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Programming Languages, PG_00198495                                                                                                                                                                                                                                                        |                                                          |                                                                                                                                                                                                                                                      |                                     |                                                                             |            |     |
| Field of study                              | Informatics                                                                                                                                                                                                                                                                               |                                                          |                                                                                                                                                                                                                                                      |                                     |                                                                             |            |     |
| Date of commencement of studies             | October 2026                                                                                                                                                                                                                                                                              |                                                          | Academic year of realisation of subject                                                                                                                                                                                                              |                                     | 2027/2028                                                                   |            |     |
| Education level                             | Bachelor's studies                                                                                                                                                                                                                                                                        |                                                          | Subject group                                                                                                                                                                                                                                        |                                     | Obligatory subject group 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                           | 3                                                                                                                                                                                                                                                                                         |                                                          | ECTS credits                                                                                                                                                                                                                                         |                                     | 5.0                                                                         |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                  |                                                          | Assessment form                                                                                                                                                                                                                                      |                                     | exam                                                                        |            |     |
| Conducting unit                             | Institute of Informatics -> Faculty of Mathematics, Physics and Informatics -> Rector                                                                                                                                                                                                     |                                                          |                                                                                                                                                                                                                                                      |                                     |                                                                             |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                        |                                                          | dr hab. Wiesław Pawłowski                                                                                                                                                                                                                            |                                     |                                                                             |            |     |
|                                             | 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                                 |                                                                             | 65.0       | 125 |
| Subject objectives                          | The aim of this course is to familiarize students with the most important mechanisms offered by modern programming languages, including elements of functional and object-oriented programming, as well as the use of type systems.                                                       |                                                          |                                                                                                                                                                                                                                                      |                                     |                                                                             |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                                            |                                                          | Subject outcome                                                                                                                                                                                                                                      |                                     | Method of verification                                                      |            |     |
|                                             | [INFOL3_W05] knows and understands advanced concepts in the field of various programming paradigms and programming languages; as well as object-oriented design and programming methods and patterns                                                                                      |                                                          | Can solve programming problems using the learned programming paradigms.<br><br>Is familiar with the key features of functional and object-oriented programming models.                                                                               |                                     | [SW5] implementation of a problem task                                      |            |     |
|                                             | [INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems                                                                                                                                                                                   |                                                          | Given a description of a problem, can formalize a solution by selecting elements from the learned programming paradigms and associated techniques                                                                                                    |                                     | [SU4] test/exam - oral or written<br>[SU5] implementation of a problem task |            |     |
|                                             | [INFOL3_U06] is able to select and apply appropriate IT methods and tools to solve complex problems, is able to use acquired knowledge by appropriately selecting sources and information derived from them, and perform evaluation, critical analysis, and synthesis of this information |                                                          | Can use the necessary tools—a code editor, a compiler, and tools that support the compilation process.<br><br>Is able to analyze programming problems and is willing to consult technical documentation, specialized literature, and expert sources. |                                     | [SU4] test/exam - oral or written<br>[SU5] implementation of a problem task |            |     |

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| Subject contents                                               | The course covers programming paradigms and the most important concepts offered by modern programming languages. <ul style="list-style-type: none"><li>• Functional programming: functions (including functions as values), higher-order functions, tail recursion.</li><li>• Use of type systems, type parameterization, polymorphic types.</li><li>• Object-oriented programming concepts—objects, classes, and interfaces, inheritance and parameterization mechanisms.</li></ul> In addition to the language mechanisms listed above, the course will also cover tools that support the development, testing, and deployment of programs. |                                                                                                                                                                                                                                                                                                                                          |                               |
| Prerequisites and co-requisites                                | none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                          |                               |
| Assessment methods and criteria                                | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Passing threshold                                                                                                                                                                                                                                                                                                                        | Percentage of the final grade |
|                                                                | oral exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 51.0%                                                                                                                                                                                                                                                                                                                                    | 20.0%                         |
|                                                                | programming colloquia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 51.0%                                                                                                                                                                                                                                                                                                                                    | 80.0%                         |
| Recommended reading                                            | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>• Lecture materials (slides and code examples)</li><li>• J. Resig, B. Bibeault, J. Maras, <i>Secrets of the JavaScript Ninja</i>, Second Edition, Manning, 2016.</li><li>• M. Odersky, L. Spoon, B. Venners, F. Sommers, <i>Programming in Scala</i>, Fifth Edition, Artima Press, 2021.</li></ul> |                               |
|                                                                | Supplementary literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>• D. Wampler, <i>Programming Scala</i>, Third Edition. O'Reilly Media, 2021.</li></ul>                                                                                                                                                                                                             |                               |
|                                                                | eResources addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                          |                               |
| Example issues/<br>example questions/<br>tasks being completed |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                          |                               |
| Work placement                                                 | Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                          |                               |

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