



Subject card

|   |  |  |                                     |            |   |   |     |
|---|--|--|-------------------------------------|------------|---|---|-----|
| Subject name and code                       | Software Engineering, PG_00044135  |  |                                     |            |   |   |     |
| Field of study                              | Mathematics  |  |                                     |            |   |   |     |
| Date of commencement of studies             | October 2026   | Academic year of realisation of subject  |                                     |            |   | 2026/2027   |     |
| Education level                             | second-cycle studies   | Subject group  |                                     |            |   | Specialty 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                               | 1  | Language of instruction  |                                     |            |   | Polish  |     |
| Semester of study                           | 2  | ECTS credits   |                                     |            |   | 4.0   |     |
| Learning profile                            | general academic profile   | Assessment form  |                                     |            |   | assessment  |     |
| Conducting unit                             | Institute of Applied Mathematics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology   |  |                                     |            |   |   |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   | dr hab. Paweł Pilarczyk  |                                     |            |   |   |     |
|   | Teachers   | dr hab. Paweł Pilarczyk  |                                     |            |   |   |     |
| Lesson types                                | Lesson type  | Lecture  | Tutorial                            | Laboratory | Project   | Seminar   | SUM |
|   | Number of study hours  | 30.0   | 0.0                                 | 15.0       | 15.0  | 0.0   | 60  |
|   | E-learning hours included: 0.0   |  |                                     |            |   |   |     |
|   | eNauczanie source address: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=46659">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=46659</a><br>Moodle ID: 5568 Inżynieria oprogramowania 2027<br><a href="https://enauczanie.pg.edu.pl/2025/course/view.php?id=5568">https://enauczanie.pg.edu.pl/2025/course/view.php?id=5568</a>  |  |                                     |            |   |   |     |
| 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   | 5.0                                 | 35.0       | 100   |   |     |
| Subject objectives                          | Becoming familiar with basic methods of software engineering and acquiring the ability to apply these methods in practice. This concerns group work on a large scale IT project at all the stages of software production: beginning with requirements engineering, through requirements analysis, software design, implementation, testing, installation, to the stage of software maintenance. Also getting acquainted with basic issues regarding IT project management, such as quality management. |  |                                     |            |   |   |     |
| Learning outcomes                           | Course outcome   | Subject outcome  |                                     |            | Method of verification  |   |     |
|   | [K7_W03] demonstrates knowledge advanced computation techniques, supporting the work of a mathematician and understand their limitations.  | Knows software engineering methods for designing, creating, testing and maintaining software.  |                                     |            | [SW1] Assessment of factual knowledge<br>[SW2] Assessment of knowledge contained in presentation<br>[SW3] Assessment of knowledge contained in written work and projects  |   |     |
|   | [K7_K03] works as a team; understands the necessity of systematic work on all projects that are long-term in nature, understands and appreciates the importance of intellectual honesty in one's own activities and the activities of other people; behaves ethically  | Describes selected software development processes (such as waterfall, iterative, agile). Can develop software in a team. Is able to conduct requirements solicitation, requirements analysis, and to design software. Can use UML to model selected aspects of software. Knows and understands ethics code of a software engineer. |                                     |            | [SK1] Assessment of group work skills<br>[SK3] Assessment of ability to organize work<br>[SK4] Assessment of communication skills, including language correctness<br>[SK5] Assessment of ability to solve problems that arise in practice |   |     |
|   | [K7_U10] understands the mathematical foundations of the analysis of algorithms and computational processes, constructs algorithms with good numerical properties, used to solve typical and unusual mathematical problems   | Can design and create software that satisfies given requirements.  |                                     |            | [SU1] Assessment of task fulfilment<br>[SU4] Assessment of ability to use methods and tools   |   |     |

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| Subject contents   | Course content – lecture<br>Introduction to software engineering. Ethics code. Software development processes. Requirements engineering. Structural and object-oriented methods. Using the UML in modelling. Testing software. IT project management, quality management. Software maintenance. Critical systems. Agile Manifesto and agile methods, including Scrum. |   |                               |
|  | Course content – laboratory<br>Applying the software engineering methods to designing specific software, including preparation of UML diagrams and user stories.  |   |                               |
|  | Course content – project<br>Practical development of software prototypes complying with specified requirements.   |   |                               |
| Prerequisites and co-requisites                                | Ability to write computer programs, e.g. in Python, C, or HTML/JavaScript.  |   |                               |
| Assessment methods and criteria                                | Subject passing criteria  | Passing threshold   | Percentage of the final grade |
|  | quizzes (in writing, 10 minutes each)   | 60.0%   | 50.0%                         |
|  | laboratory assignments, project, presentations  | 60.0%   | 50.0%                         |
| Recommended reading  | Basic literature  | Krzysztof Sacha, Inżynieria oprogramowania, PWN 2010.<br>Mariusz Chrapko, Scrum. O zwinnym zarządzaniu projektami. Wydanie II rozszerzone, Helion 2014.   |                               |
|  | Supplementary literature  | Ian Sommerville, Software Engineering, Pearson, 10th edition, 2015.<br>Roger S. Pressman, Software Engineering: A Practitioner's Approach, McGraw Hill; 8th edition, 2014.<br>Russ Miles, Kim Hamilton, Learning UML 2.0: A Pragmatic Introduction to UML, O'Reilly and Associates, 2006.<br>Kenneth S. Rubin. Essential Scrum: A Practical Guide to the Most Popular Agile Process. Pearson Education, 2013. |                               |
|  | eResources addresses  |   |                               |
| Example issues/<br>example questions/<br>tasks being completed | Requirements engineering.<br>Software development processes.<br>Verification and validation.<br>Agile methods and the Manifesto.<br>Ethics code of a software engineer.<br>The INVEST features of user stories.   |   |                               |
| Practical activities within the subject                        | Not applicable  |   |                               |

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