



Subject card

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| Subject name and code | Essentials of Computer Science, PG_00058770 | | | | | | |
| Field of study | Environmental Engineering | | | | | | |
| Date of commencement of studies | October 2022 | | Academic year of realisation of subject | | 2022/2023 | | |
| Education level | first-cycle studies | | Subject group | | Obligatory subject group in the field of study 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 | Department Of Geotechnical And Hydraulic Engineering -> Faculty Of Civil And Environmental Engineering - > Wydział Politechniki Gdańskiej | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Wojciech Artichowicz | | | | |
| | Teachers | | dr inż. Wojciech Artichowicz dr inż. Wioletta Gorczewska-Langner mgr inż. Paweł Wielgat mgr inż. Dominika Kalinowska | | | | |
| Lesson types and methods of instruction | 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 | | 5.0 | | 45.0 | 110 |
| Subject objectives | Introduction to computation and data analysis using Python and the spreadsheet. | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [K6_U01] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions | Student knows the sources of knowledge on programming issues and data analysis. | [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information |
| | [K6_W14] knows and understands the methods of measuring basic quantities characteristic for fluid mechanics and hydraulics, hydrology; knows the calculation methods and IT tools necessary to analyze the results of laboratory and field work | Student is able to use a spreadsheet and the Python programming language to carry out hydraulic calculations and environmental data analysis. | [SW3] Assessment of knowledge contained in written work and projects |
| | [K6_W06] has a structured and theoretically founded knowledge in the field of computer science, numerical methods and the possibilities of their applications for solving tasks, description of phenomena related to the flow of water in the environment, in open pipes and channels, filtration, migration of pollutants | Student is able to perform basic hydraulic calculations using the Python language. | [SW3] Assessment of knowledge contained in written work and projects |
| | [K6_U02] can work individually and in a team; knows how to estimate the time needed to complete the task ordered; is able to develop and implement a work schedule that ensures deadlines | Student knows and is able to use in practice the methodology of kanban with the use of the Trello software. | [SU4] Assessment of ability to use methods and tools |
| Subject contents | <p>LECTURE:</p> <p>Problems of computing in engineering.</p> <p>The principles of how computer works.</p> <p>Number systems, binary system.</p> <p>Digital representation of data (numbers, images, files, etc.).</p> <p>Introduction to databases.</p> <p>Relational databases.</p> <p>Scrum and kanban work methodologies.</p> <p>LAB:</p> <p>Python programming:</p> <ul style="list-style-type: none"> • Jupyter Notebook environment • Basics of the Markdown language • the basics of the Python language • basic data structures in Python (tuples, lists, dictionaries, sets) • conditionals and loops • numpy library • scipy library • matplotlib library (pyplot) • implementation of hydraulic calculations | | |
| Prerequisites and co-requisites | Knowledge of basics computer and operating system service, Windows or Linux. Knowledge of the basics of Mathematics, and Hydraulics. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | complete lecture | 60.0% | 50.0% |
| | complete laboratory | 100.0% | 50.0% |
| Recommended reading | Basic literature | <p>1). Introduction to computational engineering hydraulics Szymkiewicz Romuald, Huang Suiliang, Szymkiewicz Adam Gdansk Tech Publishing house</p> <p>2) Python. Introduction. Edition V. Mark Lutz.</p> | |

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| | Supplementary literature | Python for Data Analysis. 3rd Edition. Wes McKinney |
| | eResources addresses | Adresy na platformie eNauczanie: |
| Example issues/ example questions/ tasks being completed | <p>Visualization of the IMGW data.</p> <p>Solution of the ordinary differential equation with the Euler's and trapezoidal methods</p> <p>Determination of the loss coefficient using the Colebrook-White's formula</p> | |
| Work placement | Not applicable | |

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