GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Essentials of Computer Science I, PG_00042889		
Field of study	Environmental Engineering		
Date of commencement of studies	October 2021	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	2	Language of instruction	Polish
Semester of study	4	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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Wojciech Artichowicz	
	Teachers	mgr inż. Paweł Wielgat mgr inż. Dominika Kalinowska dr inż. Wojciech Artichowicz dr inż. Wioletta Gorczewska-Langner	

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.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U11] can use selected computer programs to support design, including CAD graphics programs	The student can use spreadsheet and language Python programming to carrying out the calculations hydraulics and data analysis environmental.	[SU1] Assessment of task fulfilment
[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_W15] 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	The student can use spreadsheet and language Python programming to carrying out the calculations hydraulics and data analysis environmental.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>LECTURE:

Problems of computing in engineering.

The principles of how computer works.

Number systems, binary system.

Digital representation of data (numbers, images, files, etc.).

Introduction to databases.

Relational databases.

Scrum and kanban work methodologies.

LAB:

Python programming:

• 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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of basics computer and operating system service, Windows or Linux. Knowledge of the basics of Mathematics, and Hydraulics.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>complete lecture</td><td>60.0%</td><td>50.0%</td></tr><tr><td>complete laboratory</td><td>100.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>1). Introduction to computational engineering hydraulics Szymkiewicz Romuald, Huang Suiliang, Szymkiewicz Adam Gdansk Tech Publishing house

2) Python. Introduction. Edition V. Mark Lutz.</td></tr><tr><td>Supplementary literature</td><td>Python for Data Analysis. 3rd Edition. Wes McKinney</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Visualization of the IMGW data.

Solution of the ordinary differential equation with the Euler's and trapezoidal methods

Determination of the loss coefficient using the Colebrook-White's formula</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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