



Subject card

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						
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.						

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>	

	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	