



Subject card

Subject name and code	Essentials of Computer Science II, PG_00042626						
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			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Wojciech Artichowicz					
	Teachers	dr inż. Wojciech Artichowicz mgr inż. Paweł Wielgat dr inż. Wioletta Gorczewska-Langner					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	20.0	0.0	0.0	35
	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	35		6.0		85.0	126
Subject objectives	Introduction to computation and data analysis using Python.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W05] knows the theoretical basis of hydromechanics and its practical models, necessary to solve technical problems in the field of environmental engineering (sanitary engineering, water melioration, water management and flood protection, pollution spread)	Student is able to write programs solving simple tasks of computational hydraulics.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_K01] can think and act in a creative and enterprising way; can set priorities for the implementation of an individual or group task; understands the need for continuous training and professional responsibility for their activities and team	The student is able to work with the use of time and project management tools.	[SK3] Assessment of ability to organize work [SK2] Assessment of progress of work
	[K6_U11] can use selected computer programs to support design, including CAD graphics programs	The student is able to perform simple calculations of the environmental engineering industry	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
	[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 has the knowledge about the basic numerical methods and has the ability to implement them in the spreadsheet.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_W01] has knowledge in the field of mathematics, including: linear algebra, mathematical analysis and elements of mathematical statistics, probability theory, applications of mathematics, including mathematical methods and numerical methods, necessary for: 1) description and analysis of hydrological phenomena; 2) description and analysis of meteorological phenomena; 3) solving project tasks of the sanitary industry;	Student has the ability to perform the basic statistical analysis of the hydrological data.	[SW3] Assessment of knowledge contained in written work and projects
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 laboratory	100.0%	50.0%
	complete lecture	60.0%	50.0%
Recommended reading	Basic literature	1). Introduction to computational engineering hydraulics Szymkiewicz Romuald, Huang Suiiang, Szymkiewicz Adam Gdansk Tech Publishing house 2) Python. Introduction. Edition V. Mark Lutz.	
	Supplementary literature	Python for Data Analysis. 3rd Edition. Wes McKinney	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	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		
Work placement	Not applicable		