University of Gdańsk

Subject card

Subject name and code	Numerical Methods and Programming - lecture, PG_00201450						
Field of study	Water Management and Protection of Water Resources						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Bachelor's studies		Subject group	Obligatory subject group in the field of study Subject group related to practical vocational preparation			
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	2.0			
Learning profile	practical		Assessment form	credit			
Conducting unit	Laboratory of Marine Geology -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Wiesław Miklaszewski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		1.0	19.0	50	
Subject objectives	The lectures will provide the basic knowledge of numerical methods and algorithms, as well as the basics of programming to a degree that allows you to understand the content of the lectures conducted in the further course of study and also allows you to perform the calculations necessary to carry out the tasks of a specialist in water management and protection.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-U07] The student can use literature and other available sources of information, including information technology, multimedia, Internet, databases, and select and critically evaluate information.	K_U07 - is able to use the literature and other available sources of information, including information technology, multimedia, Internet resources, databases, and to select and critically evaluate information	[SU4] test/exam - oral or written
[GWOZWL3-W04] The student is familiar with advanced research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including advanced statistical and IT tools enabling the description, modelling and interpretation of data concerning phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships within socio-ecological systems.	K_W04 - knows and understands basic programming to describe, model and interpret data on phenomena and processes in the aquatic environment and to describe relationships in social-ecological systems	[SW4] test/exam - oral or written
[GWOZWL3-W02] The student knows and understands the importance of advanced knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a a system of interrelated and interacting components.	K_W02 - knows and understands numerical methods and algorithms to study and understand the processes and phenomena occurring in the hydrosphere	[SW4] test/exam - oral or written

Subject contents

1. Basics of algorithms2. Errors in numerical calculations3. Basics of programming language, code organization, compilation steps.4. Data types, variables, operators, control instructions.5. Selected numerical algorithms, including: searching and sorting, interpolation, Monte Carlo method, pseudorandom number generators, cellular automata, discrete nonlinear dynamic systems6 Object-oriented programming - introduction.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	51.0%	100.0%

Recommended reading

Basic literature	Wprowadzenie do algorytmów, Cormen Thomas H., Leiserson Charles E., Rivest Ronald L, Clifford Stein, PWN
Supplementary literature	Wprowadzenie do algorytmów, Cormen Thomas H., Leiserson Charles E., Rivest Ronald L, Clifford Stein, PWN
eResources addresses	

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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