University of Gdańsk

Subject card

Subject name and code	Numerical Methods and Programming - laboratory classes, PG_00201449						
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	3.0			
Learning profile	practical		Assessment form	credit			
Conducting unit	Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> 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	0.0	0.0	45.0	0.0	0.0	45
	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	45		2.0	28.0	75	
Subject objectives	Master the skills of: creating and managing code in an integrated programming environment; creating computer programs using library functions, basic standard input and output functions, control instructions; implementing custom functions, implementing algorithms that operate on arrays; using numerical libraries; creating programs based on the object-oriented programming paradigm;						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-K03] The student has the ability systematic further education and professional development, updating and expand their knowledge and skills, understands the limitations of his own knowledge in the context of civilization progress and recognizes authorities in the professional and scientific environment.	K_K03 - is ready for systematic further education and professional development, updating and expanding his knowledge and skills in the field of computational methods and programming languages, understands the limitations of his own knowledge in the context of the progress of civilization and recognizes the authorities in the professional and scientific environment	[SK2] presentation/project/paper/ report [SK6] demonstration of practical skills
[GWOZWL3-U08] The student can use basic mathematical and statistical methods to analyze data and describe phenomena and processes occurring in the environment, as well as methods of information technology to assess the risk of threats to the of the environment, especially the hydrosphere.	K_U08 - use basic computer programming as a method for data analysis and description of phenomena and processes occurring in the environment, as well as for risk assessment of environmental hazards, especially the hydrosphere	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU6] demonstration of practical skills
[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 - use the literature and other available sources of information, including information technology, multimedia, Internet resources, databases, and to select and critically evaluate information	[SU2] presentation/project/paper/ report [SU6] demonstration of practical skills
[GWOZWL3-U03] The student has the ability observe and describe the changes taking place in water management and predict further directions of its development as well as conduct a critical analysis of case studies of problems of water management and protection of water resources in terms of impact on ecological, social and economic systems; natural valorization and assessment of quality of the environment.	K_U03 - can apply to a basic degree computer programming in the process of natural valorization and environmental quality assessment	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU6] demonstration of practical skills
[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 [SW2] presentation/project/paper/ report

Subject contents

1. Integrated development environment, project creation, editing mechanisms and code management, compiling, running and debugging projects. 2. Syntactic elements of code, keywords, identifiers, operators, literals. 3. Library functions, basic standard input and output functions. 4. Control instructions - loops, conditional statements. 5. Implementation of functions/methods. 6. Implementation of algorithms operating on arrays. 7. Review of numerical libraries 8. Basics of object-oriented programming (e.g. scratch)

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
homework assessment	51.0%	30.0%
test	51.0%	40.0%
evaluation of class work	51.0%	30.0%

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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