University of Gdańsk

Subject card

Subject name and code	Mathematics and Statistics - lecture I, PG_00183915		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2027	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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	practical	Assessment form	credit
Conducting unit	Department of Geophysics -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Marcin Paszkuta	
	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

To acquire the knowledge, skills and competences necessary for further education in the field of water management and water resources protection. The lectures will impart the basic knowledge of higher mathematics to a degree that will enable the student to understand the content of the lectures given in the further course of study and to perform the calculations necessary for the tasks of a specialist in water management and water protection.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-W04] research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including basic 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.	W_1 [K_W02] Understands the importance of mathematical knowledge in order to understand processes and phenomena in water (Content 1-7)	[SW4] test/exam - oral or written
[GWOZWL3-W02] 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 system of interrelated and interacting components.	W_2 [K_W04] Use basic statistical tools to describe and interpret data on phenomena and processes (Content 1-7)	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>1. Basic functions of one and many variables and their properties,
2. The limit of a function,
3. The extremum of a function,
4. Elements of differential and integral calculus,
5. Complex numbers,
6. Elements of analytic geometry,
7. Elements of matrix calculus,Fundamentals of field theory.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></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>Obtain a minimum of 51% of the marks for the written examination in accordance with the Regulations of the of Studies of UG</td><td>51.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Fichtenholz G.M., 2007. Rachunek różniczkowy i całkowy, Wyd. Naukowe PWN, Warszawa</td></tr>
<tr><td>Supplementary literature</td><td>Włodarski W., Krysicki L., 2006. Analiza matematyczna w zadaniach, Wyd. Naukowe PWN, Warszawa</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. The limit of a function of one variable, conditions for the existence of a limit, continuity of a function of one variable, asymptotes of a function of one variable,
2. Derivative of a function of one variable, geometric sense, physical sense, operations on derivatives,
3 Functions of many variables, higher order derivatives,
4 Ordinary and partial differential equations, directional derivative,
5 Existence of the derivative versus continuity and differentiability, monotonicity conditions,
6 Extremes of functions, convex functions,
7 Indeterminate integrals, integral calculus, concept of a prime function, basic rules for calculating integrals,
8. Integration of measurable functions, examples of calculating indeterminate integrals, integration of trigonometric functions, recursive formula,
9. The definite integral, definitions and examples, geometrical and physical meaning of the integral
10. Complex numbers, geometric interpretation
11. Basic definitions, operations on matrices,
12. Determinants, properties,
13. Vectors, addition and subtraction of vectors, multiplication of a vector by a number, linear combination of vectors, decomposition of a vector into its components, versors, scalar product, vector product, mixed product,
14. Fields, vector field, scalar field, field operations: gradient, divergence.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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