GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Elementary Mathematics, PG_00047357		
Field of study	Informatics		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2021/2022
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	1	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Mathematics Center -> Vice-Rector for Education		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Magdalena Musielak	
	Teachers	dr Magdalena Musielak mgr inż. Dorota Żarek mgr inż. Wojciech Dąbrowski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	0.0	0.0	0.0	60

E-learning hours included: 0.0

Adresy na platformie eNauczanie:
WETI (Informatyka) - Matematyka 2021/22 (M.Musielak) - Moodle ID: 15372
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15372

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	6.0	84.0	150

Subject objectives

Students obtain competences in the range of using methods of elementary mathematics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] Knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	Student names the basic properties of elementary functions and plots their graphs. Student solves equations and inequalities with elementary functions. Student costructs inverse functions of exponential, logarytmic, trygonometric and cyclometric functions. Student solves exercises involving infinite sequences. Student understands the notion of a continuous function and uses limits of functions to determine continuity.	[SW1] Assessment of factual knowledge
[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn	Student uses the methods of elementary mathematics to formulate and solve simple problems in other areas of mathematics and informatics	[SU4] Assessment of ability to use methods and tools

Subject contents

The set of real numbers and its subsets. The absolute value of a real number. Bounded sets and their upper and lower bounds. The continuity axiom of real numbers' set. The Newton binomial. Functions and their properties. Domain and co-domain, the graph of a function. Transformations of function graphs. Monotone, even and periodic functions. Injection, surjection and bijection. Countable and uncountable sets. Function composition. The inverse function. Operations on polynomials. The roots and factorization of a polynomial, Bezout"s theorem. Rational roots of a polynomial with integer coefficients. Rational functions, equations and inequalities. Factorization of a rational function into partial fractions. Power functions. Equations and inequalities with irrational functions. Exponential functions, equations and inequalities. The exp(x) function. Hyperbolic functions. Logarithms and their properties. The decimal and natura logarithm. Logarithmic functions as inverses of exponential functions. Logarithmic equations and inequalities. The measure of angles in radians and degrees. Trigonometric functions of an arbitrary angle. Graphs of trigonometric functions. Trigonometric formulas and identities. Trigonometric equations and inequalities. Cyclometric functions. Operations on vectors. Vectors in a two-dimensional coordinate system.The length of a vector. Scalar (dot) product. Line on the plane (direction, normal, general and parametric equations). Circle, ellipse, parabola, hyperbola. Number sequences. The arithmetic and the geometric sequence. The sum of n terms of an arithmetic and a geometric sequence. The sum of an infinite geometric sequence. Conversion of decimal periodic fractions into common fractions. Sequences given with recurrent formulas. The limit of a sequence. Properties of convergent sequences. Limit of a function. Continuous functions and their properties.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterms	50.0%	40.0%
Final exam	40.0%	60.0%

Recommended reading

Basic literature	Wikieł B. (red), „Matematyka. Podstawy z elementami matematyki wyższej", Wydawnictwo Politechniki Gdańskiej
Supplementary literature	W. Żakowski - Algebra i analiza matematyczna dla licealistów i kandydatów na wyższe uczelnie, WNT, Warszawa 1999 M.Bryński, N.Dróbka, K.Szymański, ,,Matematyka dla zerowego roku studiów wyższych. Elementy analizy matematycznej", Wydawnictwa Naukowo-Techniczne
eResources addresses	WETI (Informatyka) - Matematyka 2021/22 (M.Musielak) - Moodle ID: 15372 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15372

Example issues/ example questions/ tasks being completed

1. Solve the inequality (x4+x2-10x) / (1-sin 2 πx)<0.
2. Solve the equation 9log3√sin x - 41/2+\log2cos x - log2 0,5=0.
3. Find the domain, the set of values and sketch the graf of the function f(x)=π+1/2 arcsin(1-2x)
. Determine the inverse function of f.
4. Evaluate tan(\arccos(2/3)+cos(arctan(2/3).
5. For the sequence an=(3n)!/n3n evaluate the limit limn→∞(an+1/an).
6. Using the three-series theorem find the limit of the sequence xn= 2/√(n4+2)+4/√(n4+4)+6/√(n4+6)+...
+2n/√(n4+2n)

Work placement

Not applicable