GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Elementary Mathematics, PG_00047357 | | |
| Field of study | Electronics and Telecommunications | | |
| Date of commencement of studies | October 2020 | Academic year of realisation of subject | 2020/2021 |
| Education level | first-cycle studies | Subject group | Obligatory subject group in the field of study<br>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 Krzysztof Radziszewski | |
| | Teachers | mgr Dorota Grott<br>mgr Anetta Brękiewicz-Sieg<br>dr Krzysztof Radziszewski<br>mgr Małgorzata Suchecka | |

**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 - EiT - Matematyka 2020/2021 (K.Radziszewski) - Moodle ID: 6129
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6129

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**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 basic properties of elementary functions. Student defines the basic concepts of differential calculus of one variable function. Student uses the first and second derivatives of a function to analyze its properties. | [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 solves equations and inequalities with elementary functions. Student solves exercises involving arithmetic and geometric sequences. Student applies the concepts of limit, continuity, and derivatives of functions to solve curve sketching problems. | [SU4] Assessment of ability to use methods and tools |

## Subject contents

Number sets. Absolute value of a real number. Exponentiation. Rational powers. Factorial. Binomial. Functions and their properties. Polynomials. Calculus with polynomials. Rational functions. Rational equations and inequalities. Power functions. Roots equations and inequalities. Exponential functions. Exponential equations and inequalities. Hyperbolic functions. Logarithms of numbers and their properties. Logarithmic functions. Logarithmic equations and inequalities. Trygonometric functions. Trigonometric formulas and identities. Trygonometric equations and inequalities. Cyclometric functions. Number sequences and their properties. The arithmetic and the geometric sequence. Limit of a sequence. Euler"s number. Proper and improper limit of a function. Continuity. Derivatives. Differentiation rules. Derivatives and differentials of higher order. Applications of Taylor and Maclaurin formula.
Increasing and decreasing functions. Maximum and minimum values. Concavity and points of inflection. Indeterminate forms and De l'Hospital rule. Asymptotes of function. Applications of differential calculus to studying properties of one variable functions.

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Final exam | 50.0% | 70.0% |
| Activity | 0.0% | 5.0% |
| Test | 50.0% | 25.0% |

## Recommended reading

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|---|---|
| Basic literature | Wikieł B. (red), „Matematyka. Podstawy z elementami matematyki wyższej", Wydawnictwo Politechniki Gdańskiej |
| Supplementary literature | M.Bryński, N.Dróbka, K.Szymański, ,,Matematyka dla zerowego roku studiów wyższych. Elementy analizy matematycznej", Wydawnictwa Naukowo-Techniczne |
| eResources addresses | WETI - EiT - Matematyka 2020/2021 (K.Radziszewski) - Moodle ID: 6129 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6129<br>WETI - EiT - Matematyka 2020/2021 (K.Radziszewski) - Moodle ID: 6129 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6129<br>WETI - EiT - Matematyka 2020/2021 (K.Radziszewski) - Moodle ID: 6129 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6129<br>WETI - EiT - Matematyka 2020/2021 (K.Radziszewski) - Moodle ID: 6129 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6129<br>WETI - EiT - Matematyka 2020/2021 (K.Radziszewski) - Moodle ID: 6129 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6129 |

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|---|---|
| Example issues/ example questions/ tasks being completed | 1. Solve the equation $\|x-3\|^2 - 4\|x-3\| - 12 = 0$.<br><br>2. Finf the domain and the set of values of the function $f(x) = \pi - 2 \arcsin(3-x)$. Determine the inverse function of f.<br><br>3. Find the derivative of $f(x) == (\ln x)^x$.<br><br>4. Evaluate the limit of a given sequence $a_n = n ( \ln(2n-1) - \ln(2n+1) )$.<br><br>5. Find local extremes and intervals of monotonicity of the function $f(x) = x - \operatorname{arctg} 2x$. |
| Work placement | Not applicable |