

Assessment and subject description

Óbuda University				
Kandó Kálmán Faculty of Electrical Engineering		Institute of Microelectronics and Technology		
Subject name and code: Mathematics I- Calculus I KTXMA1EBNF				
Credits: 6				
Full time, Autumn Semester (2023-2024/1)				
Course: Electrical engineering				
Responsible: Dr. Galántai, Aurél		Teaching staff: Stanics, Olivér; Farkas, Zoltán		
Prerequisites: ---				
Contact hours per week:	Lecture: 3	Class discussion.: 3	Lab hours: 0	Tutorial: 0
Assessment and evaluation: written examination				
Subject description				
<i>Aims:</i> Emphasis is on basic topics of mathematics. Class discussions help students to solve problems in connection with the topics. This course will promote the development of algebraic and analytic skills as well as conceptual understanding.				
<i>Topics to be covered:</i> Sets, sets of numbers, operations. Complex numbers. Vectors. Linear algebra. Sequences. Real-valued functions of one variable. One-variable calculus.				
Lecture: Monday 05:05 pm – 07:30 pm (Place: TA.2.220)				
Classroom discussion: Monday 12:35 pm – 3:10 pm (Place: TG.F.19)				
Topics			Week	Lessons
Lecture: 06/09 Classroom discussion: 06/09 <i>Sets, sets of numbers I.</i> Sets, operations on sets. Natural numbers, primes. Integers, rational and irrational numbers. Real numbers. The n -th power, identities. The n -th root, identities. Algebraic expressions, identities. Equations, inequalities.			1.	3+3
Lecture: 13/09 Classroom discussion: 13/09 <i>Sets, sets of numbers II.</i> Basic trigonometry. Concept and representation of complex numbers. Introduction of 3 forms of complex numbers.			2.	3+3
Lecture: 20/09 Classroom discussion: 20/09 Elementary operations in different forms of complex numbers. Quadratic equations. Polynomials, factorization of polynomials.			3.	3+3
Lecture: 27/09 Classroom discussion: 27/09 <i>Vectors.</i> Concept of vectors, components. Operations on vectors. Geometric applications. <i>Linear algebra.</i> Concept of matrices. Basic operations on matrices. Determinants. Calculation of 2-nd order and 3-rd order determinants.			4.	3+3
Lecture: 04/10 Classroom discussion: 04/10 <i>Real-valued functions of one variable I.</i> Relations, real-valued functions of one variable. Domain, range, intercepts. Linear functions, quadratic functions. Power functions. The logarithm, identities. Exponential and logarithm functions. Equations.			5.	3+3
Lecture: 11/10 Classroom discussion: 11/10 <i>Real-valued functions of one variable II.</i> Operation on functions. Composite functions, inverse functions. Monotonicity, local extrema. Convexity. Even and odd functions, periodicity. Linear transformation of functions. Elementary functions. Trigonometric, inverse trigonometric functions.			6.	3+3
Lecture: 18/10 Classroom discussion: 18/10 <i>Test 1.</i>			7.	3+3

Lecture: 25/10 Classroom discussion: 25/10 <i>Sequences.</i> Concept of sequences. Bounded sequences, monotonicity, limit of sequences, convergence, divergence. Types of sequences. <i>Real-valued functions of one variable III.</i> Limits of functions at finite points and involving infinity. One-sided limits. Continuity. Limits of extra interest.		8.	3+3	
Lecture: 01/11 Classroom discussion: 01/11 The Lecture and the classroom discussion are missed. /"Mindenszentek"/		9.	0+0	
Lecture: 08/11 Classroom discussion: 08/11 <i>Differential calculus</i> Concept of the differential quotient. Geometric and physical meaning. Derivatives of elementary functions. Rules for finding the derivative. Higher derivatives. Mean value theorems. L'Hospital's rule. Discussion of functions by using derivatives. Examples. Optimization problems. Linear approximation of functions. Numeric solution of equations by the Newton-method.		10.	3+3	
Lecture: 15/11 Classroom discussion: 15/11 <i>Indefinite integrals I.</i> Concept of primitive functions and indefinite integrals Properties. Integrals of basic functions. Techniques of integration: basic rules, integration by parts, integration by substitution.		11.	3+3	
Lecture: 22/11 Classroom discussion: 22/11 <i>Definite integrals.</i> Concept of definite integrals. Properties. Newton-Leibniz-rule. Applications. Numeric integration. Improper integrals. Integrals of rational functions. Partial fractions in integration.		12.	3+3	
Lecture: 29/11 Classroom discussion: 29/11 <i>Test 2.</i>		13.	3+3	
Lecture: 06/12 Classroom discussion: 06/12 <i>Make-up tests</i>		14.	3+3	
Assessment				
Requirements of the signature: Students are expected to attend every lectures and class meetings. Students overtaking the possible misses according to Policy (TVSZ) may not be given a signature (will be given "disabled") and there will be no make-up allowed under any circumstances. Students are expected to take all tests as scheduled below. Students need to achieve at least total score 50 from the maximum score 100 and at least score 15 from the maximum score 50 at each tests to obtain signature. No electronic devices are allowed to be used during any tests. Code of Student Conduct and Disciplinary Procedures of Óbuda University is the base of judging cheating on writing tests. In the case of cheating, the test score is 0 point.				
	Date	Length	Max. score	Topics
Test 1	Week 7	60 minutes	50	Sets of numbers. Complex numbers. Vectors. Linear algebra. Real functions of one variable.
Test 2	Week 13	60 minutes	50	Differential calculus of real-valued functions with one variable Indefinite integrals.
Make-up tests	Week 14	60-60 minutes	50-50	Topics of the corresponding tests.

Make-up tests week 14:

Students overtaking the possible misses according to Policy (TVSZ) will be given **"disabled"**.
Students missing both tests will be given **"disabled"**.

Make-up tests are available only for students not "disabled".

There are make-up tests for both tests as follows:

- Students who missed one test for documented reasons, may take a make-up for the missing test on week 14.
- Students who have taken both tests, not achieving the minimum total score 50, or not achieving the minimum score 15 only at one test, may take a make-up for the test with lower score on week 14.
- Students who have taken both tests, achieving the minimum total score 50 and the minimum score 15 at each test, may take a make-up for the original test with smaller achieved score on week 14. In this case the score of the make-up test will be counted, even if it is smaller than that of the original test. If the achieved score of both original tests are equal, then the student may decide which make-up test to take.

Students missing one test and its make-up, will be given **"disabled"**.

Overall make-up test in the examination term:

The overall make-up test is available only for students not "disabled".

Students who could not get signature in the semester may take an overall make-up test once on a scheduled date at the beginning of the examination term.

Students who have taken both tests, not achieving the minimum score 15 at any of the tests, or not achieving the minimum score 15 at one test and missing from the other test, may not take a make-up on week 14. They may take the overall make-up test of the examination term.

The overall make-up test of the examination term covers topics of both tests 1 and 2 with duration 75 minutes and max. score 100. Students achieving at least score 50 from the maximum score 100 will get the signature.

Offered marks:

Students may get an offered mark only after obtaining signature.

The offered mark "good" (4) may be obtained by students taking both tests and achieving at least 75 but less than 88 points as total score.

The offered mark "excellent" (5) may be obtained by students taking both tests and achieving at least 88 points as total score.

For offered marks, **make-up tests may not be taken into consideration.**

Type of exam: written examination

Students may set for the exam only after obtaining signature.

Evaluation of the exam:

Exam tests contain problem solving (score 50, duration 60 minutes) and theoretical questions (score 20, duration 15 minutes). No electronic devices are allowed to be used during exams.

Any students achieving less than score 21 will fail. Any students achieving at least score 21 will be given a cumulative score. If the student has taken the overall make-up test then the cumulative score is counted by the score of the exam plus score 15. Otherwise, the cumulative score is counted by the score of the exam plus 30 % of the total score of the tests of the semester. According to the cumulative score, the mark of the exam is the following:

Cumulative score	Mark
88 - 100	"excellent" jeles (5)
75 - 87	"good" jó (4)
63 - 74	"fair" közepes (3)
50 - 62	"pass" elégséges (2)
0 - 49	"fail" elégtelen (1)

Recommended reference resources

1. Kovács, J., Schmidt, E., Szabó, L.A.: Mathematics, ÓE KVK 2103, Budapest, 2013
2. Kovács, J., Schmidt, E.: Mathematics. Problem Solving, E-learning
3. RA Adams, Ch Essex: Calculus: A Complete Course , Publisher: Toronto, Pearson Canada 2009,
973 pages, ISBN 9780321549280
4. Elliott Mendelson: 3000 Solved Problems in Calculus, McGraw-Hill, New-York 2009,
455 pages, ISBN 9780071635349
5. Dr. Baróti Gy. - Kis M. - Schmidt E. - Sréterné dr. Lukács Zs.:
Matematika Feladatgyűjtemény, BMF 1190, Bp. 2005