Assessment and subject description

Óbuda University Kandó Kálmán Faculty of Electrical Engineering		Institute of Microelectronics and Technology		
Subject name and code: **Mathematics II KEXMA2ABNE** Credits**: 6** **Full time, Spring Semester** (2018-19)				
Course: Electrical engineering				
Responsible: Dr. Kovács, Judit		Teaching staff: Dr. Kovács, Judit		
Prerequisites: Mathematics I-Calculus I **NMXAN1EBNE**				
Contact hours per week:	Lecture: **3**	Class discussion: **3**	Lab hours: **0**	Tutorial: **0**
Assessment and evaluation: written examination				

Subject description

Aims:
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.

Topics to be covered:
Integral calculus. Multivariable calculus. Laplace transform. Differential equations. Probability Theory. Series of numbers and functions. Vector Calculus.

Topics	Week	Lessons
Lecture:13/02 ***Some topics in integral calculus.*** Method of partial fractions. ***Multivariable functions I.*** Basic concepts of multivariable functions.	**1.**	**3+3**
Lecture: 20/02 ***Multivariable functions II.*** Partial derivatives. Concept of double integral. Geometric meaning and properties of double integrals. Calculating double integrals on rectangle domains.	**2.**	**3+3**
Lecture: 27/02 ***Laplace transform*** Concept, convergence and properties of Laplace transform. Laplace transforms for basic functions. Inverse Laplace transform.	**3.**	**3+3**
Lecture:06/03 ***Ordinary differential equations I.*** Concept of ordinary differential equations. General, particular and singular solutions. Initial conditions. First order separable differential equations. Solving first and second order constant coefficient linear differential equations by the trial method.	**4.**	**3+3**
Lecture:13/03 ***Ordinary differential equations II.*** Solving constant coefficient linear differential equations by the method of Laplace transform.	**5.**	**3+3**
Lecture:20/03 ***Test 1***	**6.**	**3+3**
Lecture: 03/27 ***Probability Theory I.*** Basic concepts of event algebra. Operations of events. Probability of events. Kolmogorov axioms. Classical definition of probability.	**7.**	**3+3**
Lecture:03/04 ***Probability Theory II.*** Conditional probability and independent events. Concept of random variables and types. Discrete probability distributions. Expected value and variance.Uniform, binomial and Poisson distribution. Continuous probability distribution. Distribution function, density function, and properties. Expected value and variance. Uniform, exponential and normal distribution.	**8.**	**3+3**

Lecture:10/04 ***Series of numbers.*** Concept and properties of series. ***Series of functions*** Concept of series of functions. Convergence domains. Concept and convergence of power series. Applications (Taylor series). Trigonometric series. Fourier series and convergence.	**9.**	**3+3**
Holiday.	**10.**	**0+0**
Lecture: 24/04 ***Vector Calculus*** Concept of **vector-valued functions of a scalar variable**. Geometric and physical interpretation. Differentiability. Concept of **scalar-valued functions of a vector variable**. Differentiability (gradient). Differential operator. Concept of **vector-valued functions of a vector variable**. Divergence, curl. Potential. Conservative fields. Line integrals of vector fields.	**11.**	**3+3**
Holiday 01/05	**12.**	**0+3**
Lecture:08/05 ***Test 2***	**13.**	**3+3**
Lecture:15/05 ***Make-up Test***	**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.

	Time	**Length**	**Max. score**	**Topics**
Test 1	Week 6	60 minutes	50	Multivariable functions. Laplace transform. Differential equations.
Test 2	Week 13	60 minutes	50	Probability theory. Fourier series.
Make-up tests	Week 14	60 minutes	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 spring 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, but 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

12-01-19 Kovács Judit