Assessment and subject description

<table>
<tr><td colspan="4">Óbuda University
Kandó Kálmán Faculty of Electrical Engineering</td><td colspan="3">Institute of Microelectronics and Technology</td></tr>
<tr><td colspan="7">Subject name and code: Mathematics II, KMEMA21ANC Credits: 6
Full-time, Spring Semester</td></tr>
<tr><td colspan="7">Course: Electrical engineering</td></tr>
<tr><td>Responsible:</td><td colspan="2">Dr. Baróti György</td><td>Teaching staff:</td><td colspan="3">Kurucz Zoltán, Schmidt Edit</td></tr>
<tr><td colspan="2">Prerequisites:</td><td colspan="5">Matematics I, KMEM11ANC</td></tr>
<tr><td>Contact hours per week:</td><td>Lecture: 3</td><td colspan="2">Class discussion.: 2</td><td>Lab hours: 0</td><td colspan="2">Tutorial: 0</td></tr>
<tr><td>Assessment and evaluation:</td><td colspan="6">written examination</td></tr>
<tr><td colspan="7">Subject description</td></tr>
<tr><td colspan="7">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.</td></tr>
<tr><td colspan="7">Topics to be covered: Integration of two-variable real-valued functions. Series of numbers and functions. Integral calculus II. Laplace transform. Ordinary differential equations. Probability theory.</td></tr>
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Topics	Week	Lessons
Integration of two-variable real-valued functions. Concept of double integral. Geometric meaning and properties of double integrals. Calculating double integrals on normal domains. Applications (Finding volume, etc.).	**1.**	**3+2**
Series. Concept and properties of series. Operations with series. Absolute convergence. Positive terms series. Convergence tests. Alternating series. Leibniz test for series. *Series of functions I.* Concept of series of functions. Pointwise convergence. Convergence domains. Sums. Convergence, differentiation and integration of power series. Taylor series. Maclaurin series. Lagrange residues.	**2.**	**3+2**
Series of functions II. Maclaurin series of common functions (e^x, cos x, sin x, sinh x, cosh x, binomial series, etc.) Application for calculating estimate values and definite integrals of functions. Trigonometric series. Fourier series and convergence. Decomposition of periodic signals into harmonic components of sines.	**3.**	**3+2**
Definite integrals II. Improper integrals. Numerical integration (trapezoidal rule, Simpson's rule).	**4.**	**3+2**
Test 1.	**5.**	**3+2**
Laplace transform. Concept, convergence and properties of Laplace transform. Laplace transforms for common functions of one variable. Inverse Laplace transform.	**6.**	**3+2**
Ordinary differential equations I. Concept of ordinary differential equations. General, particular and singular solutions. Initial conditions. First order separable and linear differential equations. Special first order differential equations.	**7.**	**3+2**
Ordinary differential equations II. Nonlinear second order differential equations missing x or y. Solving second order constant coefficient linear differential equations by the method of undetermined coefficients.	**8.**	**3+2**

Holiday	**9.**	**0**
Ordinary differential equations III. Solving constant coefficient linear differential equations by the method of Laplace transform. Application of differential equations for electricity.	**10.**	**3+2**
Probability theory I. Basic concepts of event algebra. Operations of events. Boolean algebras. Applications for electricity. Probability of events. Kolmogorov axioms. Classical definition of probability.	**11.**	**3+2**
Probability theory II. Simple random sampling with and without replacement. Conditional probability and independent events. Random variables and types. Probability density function, cumulative distribution function and properties. Expected value and variance. Types and caracteristics of discrete probability distribution. Binomial, hypergeometric, geometric and Poisson distribution.	**12.**	**3+2**
Test 2.	**13.**	**3+2**
Probability theory III. Types and caracteristics of continuous probability distribution. Uniform, exponential and normal distribution. Central limit theorem.	**14.**	**3+2**

Assessment

Students are expected to attend every lectures and class meetings. Students missing more classes than allowed in the Policy (TVSZ**) may not be given a signature ("banned")** 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 score 50 from the maximum score 100 to obtain signature.

	Time	Length	Max. score	Topics
Test1	12th March	45 minutes	50	Double integrals. Series of functions. Improper integrals.
Test 2	7th May	45 minutes	50	Laplace transform Differential equations. Solving differential equations by the method of Laplace transform.
Make-up tests	18th May.	45(75) minutes	50(100)	Topics of the missing tests.

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

- Any student not disabled may take an overall make-up test (topics of both test 1 and 2) with duration 75 minutes and max. score 100.
- Any student who has taken one of the tests and missed the other one for documented reasons, may also take a make-up only for the missing test.
- Any student who has taken both tests may take a make-up for the original test with smaller achieved score. In this case the score of the make-up test will be counted, even if it is smaller than the score 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.
- Any students not banned who could not get the signature in any ways in the autumn semester may take an overall make-up test once on a scheduled date during the first two weeks of the examination term. The overall make-up test of the examination term covers topics of both test 1 and 2 with duration 75 minutes and max. score 100.

Assessment and evaluation: written examination.

Any student may sign up for the exam only after obtaining the signature for the semester. Exam tests contain problem solving (score 50, duration 60 minutes) and theoretical questions (score 20, duration 15 minutes). Any students achieving less than score 35 will fail. Any students achieving at least score 35 will be given a cumulative score. If the student has not taken an overall test then the cumulative score is counted by the score of the exam plus 30 % of the score of the tests of the semester. If the student has taken an overall test then the cumulative score is counted by the score of the exam plus score 15. According to the cumulative score the mark of the exam is the following:

Cumulative score	Mark
86 - 100	”excellent” jeles (5)
74 - 85	”good” jó (4)
62 - 73	”fair” közepes (3)
50 - 61	”pass” elégséges (2)
0 - 49	”fail” elégtelen (1)

Suggested material

1. O.V Manturov: A Course of Higher Mathematics, Publisher Mir. Hardcover 1989, 461 pages, ISBN 5030002669
2. D. Faddeev, I. Sominski: Problems in Higher Algebra Publisher Mir. Moscow 1968, 316 pages
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. Boris V. Gnedenko: Theory of Probability, *Publisher Mir Moscow 1998,* 392 pages,ISBN 978-9056995850
6. Dr. Baróti Gy. - Kis M. - Schmidt E. - Sréterné dr. Lukács Zs.: Matematika Feladatgyűjtemény, BMF 1190, Bp. 2005

Budapest, 02-01-12 Dr. Baróti György (responsible)