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** (2020-21)				
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:09/02 ***Some topics in integral calculus.*** Method of partial fraction decomposition ***Hyperbolic functions.***	**1.**	**3+3**
Lecture: 16/02 ***Multivariable functions*** Basic concepts of multivariable functions. Partial derivatives. Concept of double integral. Geometric meaning and properties of double integrals. Calculating double integrals on rectangle domains.	**2.**	**3+3**
Lecture: 23/02 ***Laplace transform*** Concept, convergence and properties of Laplace transform. Laplace transforms for basic functions. Inverse Laplace transform. ***Ordinary differential equations I*** Concept of ordinary differential equations. General, particular and singular solutions. Initial conditions. Solving constant coefficient linear differential equations by the method of Laplace transform.	**3.**	**3+3**
Lecture:02/03 ***Ordinary differential equations II*** First order separable differential equations. Solving first and second order constant coefficient linear differential equations by the trial method.	**4.**	**3+3**
Lecture:09/03 ***Probability Theory I*** Basic concepts of event algebra. Operations of events. Probability of events. Kolmogorov axioms. Classical definition of probability.	**5.**	**3+3**
Lecture:16/03 ***Test 1***	**6.**	**3+3**
Lecture: 23/03 ***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.	**7.**	**3+3**

Lecture:30/03 ***Probability Theory III*** Continuous probability distribution. Distribution function, density function, and properties. Expected value and variance. Uniform, exponential and normal distribution.	**8.**	**3+3**
Holiday:06/04	**9.**	**0+3**
Lecture:13/04 ***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.	**10.**	**3+3**
Lecture: 20/04 ***Vector Calculus I*** Concept of **vector-valued functions of a scalar variable**. Geometric and physical interpretation. Differentiability.	**11.**	**3+3**
Lecture:27/04 ***Vector Calculus II*** Concept of **scalar-valued functions of a vector variable**. Differentiability (gradient). Differential operator.	**12.**	**3+3**
Lecture:04/05 ***Vector Calculus III*** Concept of **vector-valued functions of a vector variable**. Divergence, curl. Potential. Conservative fields. Line integrals of vector fields.	**13.**	**3+3**
Lecture:11/05 ***Test 2***	**14.**	**3+3**

Assessment

<u>Requirements of the signature</u>:

Homework

Students are expected to hand in homework as detailed in the moodle site of the course. Students need to achieve at least 70% from the total score of the homeworks to obtain signature.

Tests

Students are expected to take 2 tests as scheduled below. Students need to achieve at least 50% from the total score and at least 30% of each test to obtain signature. Tests will be either online or onsite, depending on the actual situation. In the case of onsite tests, <u>no electronic devices are allowed to be used.</u> 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	Integral calculus. Multivariable functions. Laplace transform. Differential equations.
Test 2	Week 14	60 minutes	50	Probability theory. Fourier series. Vector analysis

Banned
Students handing in less than 8 homeworks will be given ”banned”.
Students missing both tests will be given ”banned”.

Signature retake exam in the examination term:
The signature retake exam is available only for students not ”banned”.

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.
The retake examination covers topics of both tests 1 and 2 with duration 75 minutes. Students achieving at least 50% from the maximum score will get the signature.

Type of exam: written examination
Exams will be either online or onsite, depending on the actual situation. No electronic devices are allowed to be used during onsite exams. Code of Student Conduct and Disciplinary Procedures of Óbuda University is the base of judging cheating on exams. In the case of cheating, the mark of the exam is “fail” (1).
Students may register for the exam only after obtaining signature.
Evaluation of the exam:
Exam tests contain problem solving and theoretical questions (duration 75 minutes).
According to result of the exam, the mark is the following:

Result	Mark
90 – 100%	”excellent” jeles (5)
80 – 89%	”good” jó (4)
70 – 79%	”fair” közepes (3)
51 – 69%	”pass” elégséges (2)
0 – 50%	”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

22-01-21 Kovács Judit