Course description, requirements

Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering	Institute of Natural Sciences and Basic Subjects (TAI)

Course title and code: Mathematics II, BTXMME2BNF **Credits: 4**
Full-time, semester 2.

Faculties in which the subject is taught: **Mechatronics engineer, BSc**

Supervised by:	**Dr. Hanka László**	Instructors:	Dr. Hanka László

Prerequisites conditions: **Mathematics I. signature**

Lessons per week:	Theory: 2	Practice (in Auditorium): 2	Laboratory: 0	Consultation:
Exam type (s,v,f):	exam			

Syllabus

Aim: The purpose of the lecture is to present efficient mathematical tools that can be successfully applied in engineering sciences. In the framework of the practice lessons, the students deepen their knowledge through practical tasks, thereby becoming able to solve complex engineering problems at the end of the semester.

Curriculum: Elementary algebra, Polynomials, Trigonometry, vector geometry, Complex algebra, Functions, Sequences, Limit, Differentiation and its applications.

Topics:	Lec.	Lab.
1. Total function analysis. Constructing graph of a function using differentiation.	**2**	**2**
2. Indefinite integral, basic concepts, integration rules. Integration by parts. Integration by substitution.	**2**	**2**
3. Definite integral, basic concepts, Newton-Leibniz theorem.	**2**	**2**
4. Applications. Calculation of area, volume of a surface of revolution.	**2**	**2**
5. Matrix algebra, basic operations. Product of matrices. Determinants. Inverse of a matrix.	**2**	**2**
6. Systems of linear equations. Gauss and Gauss-Jordan method. Cramer's rule.	**2**	**2**
7. Eigenvalue and eigenvector of a linear map.	**2**	**2**
8. Functions of two variables, partial derivative.	**2**	**2**
9. Error estimation. Local extrema.	**2**	**2**
10. Double integrals over rectangular and normal domain.	**2**	**2**
11. Number series, basic concepts. Geometric series. Convergence tests.	**2**	**2**
12. Function series, basic concepts. Region of convergence.	**2**	**2**
13. Taylor series, applications, Taylor formula, error estimation.	**2**	**2**
14. Applications of Taylor series. Integration and approximation.	**2**	**2**

Semester requirements
written exam

Requirements: 10 blitz quizzes, 1 midterm

There will be 10 blitz quizzes, each worth 2 points.
The **blitz quiz** will be taken always at the beginning of the lesson on every thursday. The quiz can't be retaken, made up and can't be improved. If you are late, the quiz will be considered by zero point!
The **midterm test**: On the 10th week. Its subjects are the topics covered up to the 7th week, only computational problems. On the test you can get 30 points.
The **prerequisite for the signature** is taking the midterm, and taking at least 7 blitz quizzes. In case you missed or failed the midterm test you have to retake on the last week. If you want to improve the midterm, you can retake it on the last week. But the last result will be taken into consideration.
Altogether you can get 50 points during the semester. If you take the midterm and at least 7 quizzes you get a signature, and you can take exam.
If you miss the midterm and its retake and/or you miss more than 3 quiz tests, the course can't be completed, in this case you have to register for the course again in the following year!
If you have a signature, you are free to take the **exam** in the exam period. The exam covers only the topics presented between weeks 8 and 13. On the exam you can get 50 points. The exam is written, only computational problems, the minimum score you have to get in order to pass is 15 points.
The **grade** is determined by the sum of the points you achieved on the tests (midterm and quizzes) and on the exam. The intervals are as follows:

0-49%: fail (1)
50-62%: pass (2)
63-74%: satisfactory (3)
75-87%: good(4)
88-100%: excellent (5)

Exam method: written

Literature:

Mandatory:
Thomas Calculus I-III.; Pearson Addison- Wesley, 2005
Stewart Calculus; Brooks, 2008
Sheldon Ross: A first course in probability, Pearson, 2010

Offered:

Budapest, 24. january, 2025.

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Lecturer