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 III, BTXMME3BNF **Credits: 5**

Full-time, semester 1.

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

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

Prerequisites conditions: **Mathematics II signature**

Lessons per week:	Theory: 2	Practice (in Auditorium): 0	Laboratory: 2	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. Concept of a differential equation. Elementary, directly integrable equations. General solution, particular solution.	**2**	**2**
2. Separable differential equations.	**2**	**2**
3. First order linear differential equations. Method of „variation of constant.”	**2**	**2**
4. Second order linear differential equations with constant coefficients. „Method of undetermined coefficients.”	**2**	**2**
5. Physical applications of differential equations.	**2**	**2**
6. Concept of Laplace-transform. Basic theorems.	**2**	**2**
7. Applications of Laplace-transform in the theory of linear differential equations.	**2**	**2**
8. Physical applications of Laplace-transform.	**2**	**2**
9. Introduction to probability theory. Basic concepts, axioms. Combinatorical methods. Classic probability.	**2**	**2**
10. Conditional probability, Bayes-theorem.	**2**	**2**
11. Concept of the probability distribution. Discrete and continuous distributons, and their characterization. Expected value, standard deviation, pdf, cdf.	**2**	**2**
12. Discrete distributions: hypergeometric, binomial, Poisson.	**2**	**2**
13. Continuous distributions: uniform, exponential, normal.	**2**	**2**
14. Physical applications of probability theory.	**2**	**2**

Semester requirements

1 midterm test.

Requirements:

There will be 10 **blitz quizzes**, each worth 2 points. You can miss at most 3 quizzes! If you miss more than three, you can't get a signature!!!

One **midterm test**: On the 10th week. Its subjects are the topics covered up to the 7th week, both the theory and the problems. On the test you can get 30 points. If you take the midterm, you get a signature.

In case you missed or failed the test you have to retake it in order to qualify for the exam. If you passed the test you may retake it if you want to try to improve your score. In this case the last result will be taken to the exam!

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 14. On the exam you can get 50 points. 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 (quizzes and midterm) and on the exam. The intervals are as follows:

0-39%: fail (1)
40-54%: pass (2)
55-69%: satisfactory (3)
70-84%: good(4)
85-100%: 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
Paul Dawkins: Differential Equations, Prentice-Hall, 2007

Offered: