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. László Hanka**	Instructors:	**Zsombor SZILÁGYI**

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: Firts order and second order differential equations. Laplace transform. Topics in probability theory. Basic continuous and discrete distributions, characterization of a distibution.

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. Concept of Laplace-transform. Basic theorems. Basic rules, formulas.	**2**	**2**
6. Applications of Laplace-transform in the theory of linear differential equations.	**2**	**2**
7. **Midterm 1.**	**2**	**2**
8. Introduction to probability theory. Basic concepts, axioms. Combinatorical methods. Classic probability.	**2**	**2**
9. Conditional probability, Bayes-theorem.	**2**	**2**
10. Concept of the probability distribution. Discrete and continuous distributons, and their characterization. Expected value, standard deviation, pdf, cdf.	**2**	**2**
11. Discrete distributions: hypergeometric, binomial, Poisson.	**2**	**2**
12. Continuous distributions: uniform, exponential, normal.	**2**	**2**
13. Physical applications of probability theory.	**2**	**2**
14. **Midterm 2.**	**2**	**2**

Semester requirements
2 midterm tests, exam.

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!!! Quiz test can't be retaken and can't be improved and if you miss, can't be make it up!!!

Two **midterm tests**: On the 7th and 14th week. Its subjects are the topics covered up to the 6th week and up to weeks 8-13 respectively, both the theory and the problems. On the test you can get 40-40 points. If you take both midterm tests, you get a signature.

In case you missed or failed one 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 the exam period. In this case the last result will be taken to the exam! If you miss both tests, you can't complete the course, you have to register for it again one year later.

If you have a signature, considering your total scores, you get an exam mark. Every exam mark will be registered in Neptune – including fail(1) – if you are registered for an exam.

If you got fail(1) or if you want to improve your exam mark you have only one possibility for taking that in the exam period. The exam covers every topic. On the exam you can get 100 points.

The **grade** is determined by the sum of the points you achieved on the tests (quizzes and midterm) or 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: