

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 3.				
Faculties in which the subject is taught: Mechatronics engineering, BSc				
Supervised by:	Dr. habil László Hanka		Instructors:	Dr. Zsombor Szilágyi
Prerequisites conditions:	Mathematics II, BTXMME2BNF			
Lessons per week:	Theory: 2	Practice (in Auditorium): 0	Laboratory: 2	Consultation:
Exam type (s,v,f):	exam			
Syllabus				
<i>Aim:</i> 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.				
<i>Curriculum:</i> Theory of Taylor-series. First order and second order differential equations. Laplace transform. Topics in probability theory. Basic continuous and discrete distributions, characterization of a distribution.				
Topics:			Lec.	Lab.
1. Concept of a differential equation. Elementary, directly integrable equations. General solution, particular solution. Initial value problems (IVP).			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. Application of differential equations in physics.			2	2
8. Midterm 1.			2	2
9. Introduction to probability theory. Basic concepts, axioms. Combinatorial methods. Classic probability.			2	2
10. Concept of the probability distribution. Discrete and continuous distributions, 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 short 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 made up later, retaken or improved. Students arriving late and missing the quiz will receive 0 points for that quiz.

There will be **two midterm tests** during the semester in lecture time, each of those worth 40 points. The scores from the quizzes and the two midterms are included in the final course score. The maximum total score is **$10 \cdot 2 + 40 + 40 = 100$ points**.

Make-up Policy for Midterm Tests:

Only **one midterm test** may be made up. A student who does not take either of the two midterm tests will be excluded from completing the course requirements.

Students who are officially excused from one of the midterm tests and provide valid documentation may take a make-up test on the day of the first Mathematics exam in the examination period. Students who wish to improve their score may also retake a midterm test on the same date. In all cases, **the result of the make-up/retake test replaces the original result**. The content of the make-up/retake test is identical to that of Midterm 1 or Midterm 2, respectively.

A student who does not take one of the midterm tests at the scheduled time and does not complete the make-up test will be excluded from completing the course requirements. In this case, the course may only be retaken **one year later**.

The procedure for obtaining a course grade/signature after the end of the teaching period is governed by the **HKR**.

Course Completion Signature

Obtaining the **course completion signature** is a prerequisite for taking the final examination.

A student receives the signature if they:

- complete the required midterm tests (see above), and
- take at least **7 of the 10 short quizzes**.

A student will be excluded from completing the course requirements if they:

- miss **4 or more short quizzes**, and/or
- fail to take both midterm tests, or
- fail to take one midterm test and do not complete the corresponding make-up test.

In such cases, the course may only be retaken **one year later**.

Since the award of the signature depends solely on attendance and the completion of the semester requirements, no student will receive a formal "**signature denied**" entry. Consequently, the signature cannot be obtained at a later date.

Examination

Obtaining the course completion signature is a prerequisite for taking the final examination.

The **final grade may be awarded** on the basis of the student's **cumulative semester score**. The grading scale and point thresholds are given below.

Students who do not qualify for an awarded grade (i.e., score fewer than **40 points**) or who wish to obtain a higher grade may take the final examination during the examination period.

The examination is a **90-minute written test** covering the entire semester's material and consists of computational problems. In this case, the points earned during the semester are **not carried over** to the examination.

Students who accept the awarded grade may not take the examination. Students who do not qualify for, or do not accept, the awarded grade retain their two examination opportunities.

The examination is graded as follows:

- 0-39%: fail (1)
- 40-54%: pass (2)
- 55-69%: satisfactory (3)
- 70-84%: good(4)
- 85-100%: excellent (5)**

Students taking an examination-only course are also not entitled to any carried-over points.

A failed examination may be retaken **once** as of right during a given examination period. A **third examination attempt** requires special permission from the Dean.

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