

ENGINEERING MATHEMATICS 1
Course Code: MSB293ANEP
Semester: Autumn 2022/2023 1.

Course Syllabus
Lecture Monday 15:00-16:30 A019
Practice Group 01 Monday 16:45-18:15 A019
Practice Group 02 Friday 07:45-09:30 A017

General Information:

Name of Course:

ENGINEERING MATHEMATICS 1

Course Code:

MSB293ANEP Semester: 1st

Number of Credits:

4

Allotment of Hours per Week:

2 lectures, 2 practices

Evaluation:

Course grade

Prerequisites:

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Instructors:

Adél Iflinger, lecturer

Ágnes Lieberné Éliás lecturer

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Introduction, Learning Outcomes

Upon completion of this course, the student should be able to: **interpret**, and **put into practice**

- a. operations with vectors,
- b. elementary functions in one variable,
- c. sequences of real numbers
- d. differential calculus of functions

General Course Description and Main Content:

Brief Syllabus: This lecture and practical based course aim to give students a solid mathematics basis by covering the following topics: sets of numbers (natural, integer, rational, real, and complex numbers); vectors and operations with vectors, scalar, and vector products and their applications; sets and operations with sets; matrix and determinant, solving linear equation systems definition of functions. Presentation of elementary functions; polynomials; rational functions; algebraic functions, trigonometric and logarithmic functions. Sequences of real numbers (definition of monotonicity, limit, convergence, and divergence); limit and continuity of functions; types of discontinuity; definition of tangents; differential calculus of functions in one variable, differential coefficient, derivatives, relations between differentiability and continuity; rules of derivation, derivatives of elementary functions; osculating circles, the tangent of the plane curve at a given point.

Students learn the basics of mathematics enabling them to interpret and understand engineering sciences and through solving elementary tasks they deepen their basic theoretical knowledge in the field of engineering. The practical sessions are designed to complement the requirements of different specializations.

Methodology:

The presentations give an introduction to important mathematical techniques of exercise solving and the basic theory of calculus. Equal emphasis is given to learning new mathematics and to learning how to construct and write down correct mathematical arguments.

Schedule:

The study period in 15 weeks: September 5 - December 17 (2022)

1. (Sept.05.) Introduction to the course
2. (Sept.12.) Basic concepts of mathematics: definition, theory, proof, symbols of mathematics. Real numbers, sets and operations with sets.
3. (Sept.19.) Complex numbers: operations with algebraic form, trigonometrical and exponential form
4. (Sept.26.) Vectors and operations with vectors, scalar and vector products **1st Homework**
5. (Oct.03.) Matrix and determinant
6. (Oct.10.) Solving linear equation systems using Cramer's rule and Gauss-Jordan elimination
7. **(Oct.17.)** Definition of functions, presentation of elementary functions, operations on functions. **1st test**
8. (Oct.24.) Composite functions, invertible functions, restricting domains of functions. Inverse function, classifying functions, Logarithmical and exponential function
9. (Oct.31.) Autumn break – no class
10. (Nov.07.) Basic trigonometric constructions, trigonometric function and their inverses.
11. (Nov.14.) Sequences of real numbers **2nd Homework**
12. (Nov.21.) Limit and continuity of functions
13. (Nov.28.) Differential coefficient, derivative. Relations between differentiability and continuity.
14. (Dec.05.) Rules of derivation, derivatives of elementary functions
15. **(Dec.12.) 2nd test**

Correction period: December 17-21 (2022)

Attendance:

Attending is compulsory for all classes, and will impact the grade. Unexcused absences will adversely affect the grade, and in case of absence from more than 30% of the total number of lesson will be grounds for failing the class. It is also required to be in class at the beginning time and stay until the scheduled end of the lesson. Being late by more than 10 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

Evaluation + Grading

Grading will follow the course structure with the following weight:

1. Class participation, class activity 5 %
2. Homework 5 %.
3. Test 90 %

If the student misses one or both tests, they can be retaken in the first week of the exam period (Dec.17.). The same applies to improving previous grades.

Final grading scale

Numeric Grade:	5	4	3	2	1
Evaluation in points:	[85%-100%]	[%-84%]	[55%-69%]	[40%-55%]	[0-40%]

Students with special needs:

Students with special physical needs and requiring special assistance must first register with the Dean of the Students Office. All reasonable requests to provide an equal learning environment for all students is to be assured.

Required Reading and other Materials will be equivalent to:

GEORGE B. THOMAS, JR.: THOMAS' CALCULUS, PEARSON ADDISION WESLEY, 2005.
ANTHONY J. PETTOFREZZO: VECTORS AND THEIR APPLICATIONS, DOVER BOOKS ON MATHEMATICS, 2005.