# Tárgytematika

**Félév:** 2021/22/1 **Tárgynév:** Műszaki Matematika 1. **Tárgykód:** MSB293ANEP

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|---|---|
| **Felelős szervezet neve:** | Mérnöki és Smart Technológiák Intézet |
| **Felelős szervezet kódja:** | MIK-MS |
| **Tárgyfelelős neve:** | Dr. Perjésiné Dr Hámori Ildikó Viktória |
| **Tárgy követelménye:** | Vizsga |
| **Tárgy heti óraszáma:** | 2/2/0/0 |
| **Tárgy féléves óraszáma:** | 10/10/0/0 |

**Oktatás célja:**

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

1. operations with vectors,
2. elementary functions in one variable,
3. sequences of real numbers
4. differential calculus of functions

This lecture and practical based course aims to give students a solid mathematics basis through 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, 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 specialisations.

**Tantárgy tartalma:**

## Planned schedule

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**Tantárgy tartalma:**

1. Basic concepts of mathematics: definition, theory, proof, symbols of mathematics. Real numbers, sets and operations with sets
2. Complex numbers: operations in algebraic, trigonometrical and exponential form
3. Vectors and operations with vectors, scalar and vector products
4. Matrix and determinant
5. Solving linear equation systems using Cramer's rule and Gauss-Jordan elimination
6. **1st test**
7. Definition of functions, presentation of elementary functions operations on function
8. *Autumn break – no class*
9. Inverse function, classifying functions, Logarithmical and exponential function
10. Basic trigonometric constructions, trigonometric function and their inverses.
11. Sequences of real numbers
12. Limit and continuity of functions
13. Differential coefficient, derivative Relations between differentiability and continuity Rules of derivation, derivatives of elementary functions
14. **2nd test**
15. Corrections

**Számonkérési és értékelési rendszere:**

**Evaluation + Grading**

Class presence is compulsory.

In order to get a Signature the student has to:

- Attend class. If the student misses over 30% of the total number of classes, the signature will be denied. Being late by over 10 minutes constitutes missing.
- Write both tests and achieve over 50% on the two combined, over 40% each. If the student misses one or both tests, they can be retaken in the last week of the study period. The same applies to improving previous grades.

Grading will follow the course structure with the following weighting:

1. Midterm tests: 50%
2. Final exam: 50%. A minimum of 55% is required to pass the exam.

Offered exam grade: **over 65%** during the study period.

**Grading scale**

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**Számonkérési és értékelési rendszere:**

| Numeric grade | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| Evaluation in points | 89-100% | 77-88% | 76-66% | 55-65% | 0-54% |

In the case of an illness or family emergency, the student must present a valid justification, such as a doctor's note.

**Kötelező irodalom:**

George B. Thomas, Jr.: Thomas' Calculus, Pearson Addision Wesley, 2005.

Anthony J. Pettofrezzo: Vectors and Their Applications, Dover Books on Mathematics, 2005.