

## General Information:

	<b>MATHEMATICS FOR INFORMATION TECHNOLOGY 1</b>
<b>Name of Course:</b>	<b>TECHNOLOGY 1</b>
<b>Course Code:</b>	IVB291ANMI
<b>Semester:</b>	1 <sup>st</sup>
<b>Number of Credits:</b>	6
<b>Allotment of Hours per Week:</b>	2 lectures, 2 practices
<b>Evaluation:</b>	Exam (with grade)
<b>Prerequisites:</b>	–
<b>Instructors:</b>	<b>Dóra SZEGŐ, lecturer</b> Office: 7624 Hungary, Pécs, Boszorkány u. 2. Room B-241 Office phone: +36 72 503 650 / 23858 E-mail: <a href="mailto:szego.dora@mik.pte.hu">szego.dora@mik.pte.hu</a>

## Introduction, Learning Outcomes

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

- operations with vectors,
- elementary functions in one variable,
- sequences of real numbers
- differential calculus of functions

## General Course Description and Main Content:

Brief Syllabus: 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; 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 will learn the basics of mathematics, enabling them to interpret and understand engineering sciences and through solving elementary tasks they will deepen their basic theoretical knowledge in the field of engineering. The practical sessions are designed to complement the requirements of different specialisations.

## Methodology:

The presentations introduce 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:**

Study period in 15 weeks: September 2 – December 13 (2019)

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

Correction period: December 16-20 (2019)

Exam: January 6 (2020)

### **Attendance:**

Attending is required all classes, and will impact the overall grade (max. 10%). Unexcused absences will adversely affect the grade, and absence from more than 30% of the total number of lessons will be grounds for failing the class. It is required to be present in class at the beginning time and stay until the scheduled end of the lesson, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid justification, such as a doctor's note.

### **Evaluation + Grading**

Grading will follow the course structure with the following weighting:

1. Class participation, class activity 10 %
2. Coursework 10 %.

3. Test 80 %
4. Offered exam grade: over 65 % during the study and correction period.
5. Written exam in the exam period. A minimum of 55% is required to pass the exam.

### **Grading scale**

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

### **Students with special needs:**

Students with special needs and/or 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 ADDISON WESLEY, 2005.
- ANTHONY J. PETTOFREZZO: VECTORS AND THEIR APPLICATIONS, DOVER BOOKS ON MATHEMATICS, 2005.