

<b>Subject name</b>	<b>Mathematical Analysis</b>	
<b>Subject code</b>	<b>E.1.MA.SC.ECTIE.A</b>	
<b>Department</b>	<b>Institute of Agricultural Engineering and Computer Science</b>	
<b>Faculty</b>	<b>Faculty of Production Engineering and Energetic</b>	
<b>Subject supervisor/Lecturer</b>	<b>Jerzy Malopolski Ph.D.</b>	
<b>General information</b>	<b>Teaching period</b>	<b>1 semester/winter semester</b>
	<b>ECTS credit</b>	<b>4</b>
	<b>Lectures total</b>	<b>15</b>
	<b>Classes</b>	<b>15</b>
<b>Objective and general description</b>	The aim of the course is to get the students familiar with the basic principles of mathematical analysis, especially with differential calculus of functions of one variable. This part of mathematical knowledge is necessary in the course of further study, mainly of subjects related to mathematics.	
<b>Lectures 15 hours</b>	<p>1. Introduction: logic, sets, various kinds of numbers, inequalities, the absolute value of a number and its geometrical interpretation (1 h).</p> <p>2. Infinite sequences: definition and examples, the limit of a sequence and its properties, subsequences, divergence to infinity, the number e (2 h).</p> <p>3. Functions and their limits: definitions, elementary functions, monotone functions, inverse functions, the limit of the function at a point, operations on the limit, infinite limits and limits at infinity, asymptotes (4 h).</p> <p>4. Continuity: definitions, geometrical interpretation, continuity of elementary functions, properties of continuous functions, discontinuities (1 h).</p> <p>5. Derivatives of the first order: definitions, geometrical interpretation, differentiation of elementary functions, arithmetical operations, differentiation of composite functions, extrema of functions, Rolle and Lagrange theorems, geometrical interpretation of the sign of a derivative (4 h).</p> <p>6. Derivatives of higher orders: definition, L'Hospital's rule, Taylor formula, approximation, a criterion for extrema, concavity and convexity of functions, geometrical interpretation of the second derivative (3 h).</p>	
<b>Classes 15 hours</b>	<p>1. Introduction – solving exercises (1 h).</p> <p>2. Infinite sequences – solving exercises (2 h).</p> <p>3. Functions and their limits – solving exercises (4 h).</p> <p>4. Continuity – solving exercises (1 h).</p> <p>5. Derivatives of the first order – solving exercises (4 h).</p> <p>6. Derivatives of higher orders – solving exercises (3 h).</p>	

**References**

1. Krysicki W., Włodarski L. 2004. Analiza matematyczna w zadaniach cz.1, PWN.
2. Kuratowski K. 1969. Introduction to calculus, Pergamon Press.
3. Rudin W. 1982. Principles of Mathematical Analysis, Warszawa.