

## COURSE DESCRIPTION

<b>Name of the higher education institution:</b> <i>University of Presov</i>	
<b>Name of the faculty/university workplace:</b> <i>Faculty of Management and Business</i>	
<b>Course code:</b> 7KFUM/MATH-ER/26	<b>Course title:</b> <i>Mathematics</i>
<b>Type, scope and method of educational activity:</b> <i>Type of educational activity: Lecture, Seminar</i> <i>Scope of educational activity: 2, 2 hour per week,</i> <i>Method of educational activity: Combined</i>	
<b>Number of credits:</b> 5	
<b>Recommended semester:</b> 2 <sup>nd</sup> year, 1 <sup>st</sup> semester	
<b>Degree of study:</b> 1.	
<b>Prerequisites:</b> ---	
<b>Conditions for passing the course:</b> <i>Assessment and completion of the course: Exam</i>  <i>Credits will be awarded to the student under the following conditions:</i> <ul style="list-style-type: none"> <li>- if he actively participates in seminars, and at the same time</li> <li>- if during the semester out of 2 continuous written examinations of 20 points (written in full-time or online tests, or homework in distance form) obtains a total of at least 20 points, and at the same time</li> <li>- if he / she obtains at least 50 points together (in sum) from continuous written examinations (maximum 40 points) and final 60-point written (or online) test.</li> </ul> <i>Credits will not be awarded to a student who does not meet all of the above conditions.</i>  <i>The overall evaluation is awarded to the student on the basis of the sum of points from the continuous written examinations and final written examination, as follows: A 100.00 - 90.00%; B 89.99 - 80.00%; C 79.99 - 70.00%; D 69.99 - 60.00%; E 59.99 - 50.00%; FX 49.99 and less%.</i>  <i>Methods of Education: The course employs frontal (lecture-based), group, and individual teaching methods. Students participate in face-to-face classes, work independently with literature, and access up-to-date content via e-learning through the Moodle LMS. They are encouraged to solve problems creatively and independently.</i>  <i>Completion of the course is conditioned by successful completion of the set conditions and fulfillment of the conditions of participation according to the Study Regulations of PU in Prešov.</i>	

**Learning outcomes:****Knowledge:**

*The graduate of the course knows (within the scope of knowledge given by the brief syllabus of the course), and on the basis of the acquired knowledge can:*

- to define and formulate basic theoretical concepts and methods in the field of linear algebra, theory of the function of one real variable, differential and integral calculus of a function of one real variable and some managerial applications,*
- to understand, to an appropriate extent, the mathematical apparatus of statistics and other professional management disciplines of a quantitative nature to be completed during the study,*
- to enhance his personality, because the acquired mathematical knowledge at the same time becomes part of his general intellectual basis for life and the building of his integrated personality.*

**Skills:**

*The graduate of the course is able, on the basis of acquired generally valid mathematical knowledge of the subject of a defined scope:*

- apply knowledge creatively in solving specific mathematical problems,*
- apply them to solve those problems from managerial theory and practice that necessarily lead to the solution of mathematical problems,*
- to seek further theoretical knowledge of mathematical theory and mathematical methods, building on the knowledge already acquired,*
- apply the newly sought knowledge in cooperation with an expert in mathematics in other fields of quantitative character and use them creatively in practice.*

**Competences:**

*The graduate of the course has the ability*

- make use of acquired knowledge and skills in the study of other disciplines of a quantitative nature,*
- use the acquired knowledge and skills in practice by demonstrating the ability to thoroughly analyze specific situations,*
- have qualities such as the ability to think logically and critically, the ability to self-discipline and self-control, creativity and the ability to be positive when new challenges arise.*

**Course content:**

- 1. N-dimensional vectors, definition, operations with vectors, linear dependence, and independence of the group of vectors.*
- 2. Matrix algebra, basic concepts, operations with matrices.*
- 3. Row echelon form of a matrix. Range of a matrix.*
- 4. Determinants definition, properties, calculation of determinants.*
- 5. Systems of the linear equations, Frobenius theorem, solving the systems using the Cramer's rule and Gaussian elimination method.*
- 6. Real function of one real variable, domain, range, and graph of a function. Operations with functions, composite, and inverse function.*
- 7. Elementary functions. Limit and continuity of a function. Derivative of a function.*

8. *Differential calculus of the function with one variable. Derivative rules and differentiation formulas. Derivative of a composite function, higher-order derivatives.*
9. *Monotonicity, local and global extrema of a function. Zero points, stationary and inflex points of a function. Concavity of a function.*
10. *Analyzing the behavior and graph of a function. Economic applications of differential calculus: analysis of a GDP curve, price elasticity of demand.*
11. *Antiderivative and indefinite integral. Properties and formulas of indefinite integrals.*
12. *Methods of the integration. Integration by substitution, integration by parts.*
13. *Definite integral. Newton – Leibniz formula.*

**Recommended literature:**

- BEEZER, R. A., 2014. *A First Course in Linear Algebra*. Washington: Congruent Press. ISBN 978-0-9844175-5-1.
- HERMAN, E. & G. STRANG, 2020. *Calculus Volume 1*. Houston: Rice University. ISBN 978-1-938168-02-4.
- ABBOTT, S., 2001. *Understanding Analysis*. Undergraduate Texts in Mathematics. New York: Springer-Verlag.
- RUDIN, Walter, 1976. *Principles of Mathematical Analysis*. New York: McGraw–Hill Publishing Co.; 3rd revised edition. ISBN 978-0-07-085613-4.
- NIKOLSKII, S. M., 2002. *Mathematical analysis*. New York: Springer-Verlag. ISBN 1-4020-0609-8.

**Language which is necessary to complete the course:** *English*

**Notes:**

*Student workload:*

- 17 % of the workload - participation in education (lectures and seminars),*
- 33 % of the workload - preparation for seminars and continuous tests,*
- 50 % of the workload - self-study, preparation for the exam.*

*An individualized approach is provided for students with special needs based on the recommendation of the faculty coordinator for students with special needs.*

**Course evaluation**

*Total number of students evaluated: 2*

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>FX</i>
<i>50%</i>	<i>0%</i>	<i>50%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>

**Lecturers:**

*prof. Ing. Dr. Róbert Štefko, Ph.D., guarantor*  
*Mgr. Tomáš Bačinský, PhD., co-guarantor, lecturer, examiner*

**Date of last change:** *September 1<sup>st</sup>, 2025*

**Approved by:** *prof. Ing. Dr. Róbert Štefko, Ph.D.*