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| **Title and Code of the subject: Mathematics, MTB7005A** | **ECTS Credit Points:** 4 |
| **Type of the subject:** compulsory | |
| **Ratio of theory and practice:** 66.6%/33.3% (credit%) | |
| **Type and number of classes per semeste**r: 28 hours lecture and 14 hours practice  **Number of teaching hours / week:** 2+1 (lecture and practice) | |
| **Type of exam:** exam in writing | |
| **Subject in the curriculum:** semester I. | |
| **Preliminary requirements:**- | |

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| **Summary of content - theory**: |
| Course objectives: The main goal of the subject is that students are introduced to the basic methods and terminology or definitions in mathematics which can be used in our subject. The differential calculus of one-variable function and its practical application is in the center of interest as well as the extreme value and elasticity calculation of one-variable function. During the course of practical lessons students should gain experience in problem solving from the various topics of the subject.  **Schedule:**   1. Review of Algebra. Operations. Exponents and Radicals. Algebraic Expressions. Equations. Inequality. Summation Notation. 2. Sets. Set Operations. Sets of Numbers. Cardinality. 3. Functions I. Cartesian Coordinate Systems. Lines. Linear Functions. Applications in Life Sciences. 4. Functions II. Properties of Functions. Quadratic Functions. Polinomial and Rational Functions. Translation and Reflection. Applications in Life Sciences. 5. Functions III. Exponential, Logarithmic and Trigonometric Functions. Applications in Life Sciences. 6. Functions, Limits and Continuity. 7. Differentiation I. Differential Calculus Rules. Higher Order Derivatives. 8. Differentiation II. Curve Sketching. 9. Differentiation III. Optimization, Elasticity and Other Applications. 10. Matrix Algebra I. Matrix Operations. 11. Matrix Algebra II. Gauss-Jordan Elimination. 12. Matrix Algebra III. Eigenvalues and Eigenvectors. 13. Mathematics of Finance. Compound Interest. Present Value. Annuities. Present Value of Annuity. Future Value of Annuity. Amortization of Loans. 14. Summary. Evaluation, Practice for the Examination. |
| **Summary of content - practice**: |
| **Schedule:**   1. Review of Algebra. Operations. Exponents and Radicals. Algebraic Expressions. Equations. Inequality. Summation Notation. 2. Sets. Set Operations. Sets of Numbers. Cardinality. 3. Functions I. Cartesian Coordinate Systems. Lines. Linear Functions. Applications in Life Sciences. 4. Functions II. Properties of Functions. Quadratic Functions. Polinomial and Rational Functions. Translation and Reflection. Applications in Life Sciences. 5. Functions III. Exponential, Logarithmic and Trigonometric Functions. Applications in Life Sciences. 6. Functions, Limits and Continuity. 7. Differentiation I. Differential Calculus Rules. Higher Order Derivatives. 8. Differentiation II. Curve Sketching. 9. Differentiation III. Optimization, Elasticity and Other Applications. 10. Matrix Algebra I. Matrix Operations. 11. Matrix Algebra II. Gauss-Jordan Elimination. 12. Matrix Algebra III. Eigenvalues and Eigenvectors. 13. Mathematics of Finance. Compound Interest. Present Value. Annuities. Present Value of Annuity. Future Value of Annuity. Amortization of Loans. 14. Summary. Evaluation, Practice for the Examination. |
| **Literature, handbooks in English** |
| 1. Greenwell, Raymond N.; Ritchey, Nathan P.; Lial, Margaret: Calculus for the Life Sciences: Global Edition, Pearson Education, 2014, ISBN-13: 9781292062334 2. E. Haeussler – R. Paul – P. Wood (2014): Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences, 13th Edition, PEARSON, UK, ISBN:978-1-29202-114-0 3. R.J. Harschbarger – J. J. Reynolds (2015): Mathematical application for Management, Life and Social Sciences, Brooks/Cole, USA, Belmont, CA, ISBN: 978-1305108042, 1111 pages 4. S. T. Tan (2013): Applied Mathematics for Managerial, Life and Social Sciences, Sixth Edition, Brooks/Cole, Belmont, CA, USA, ISBN:1-133-10894-6, Pages 955 5. K. Sydastaer – P. Hammond (2008): Essential Mathematics for Economic Analysis, Prentice Hall, London, UK, ISBN: 978-0-273-71324-1 |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| * Ability to understand both concrete and abstract problems * Proficient in communicating mathematical ideas * Detail-oriented * Ability to make critical observations * Accurately organize, analyze, and interpret data * Extract important information and patterns * Assess and solve complex problems |

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| **Responsible lecturer:** Peter Lengyel associate professor, PhD |
| **Other lecturer(s):** |

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| **Terms of course completion:** |
| Evaluation will be made according to the results of the midterm (in the 3rd, 5th, 7th, 9th, 11th, 14th week) or the final (in the examination period) tests. Each student gets a recommended grade if the final score from the tests reaches at least 58% of the obtainable total. Every student must receive a signature, too. Those students who were not able to obtain signature or grade during the learning period, will be given 3 extra chances during the exam period.  The current score limits are as follows:  Before the examination period  Six tests.  Not compulsory to accept (the students can refuse).  70-79 points: pass (2).  80-89 points: satisfactory (3).  90-99 points: good (4).  100-120 points: excellent (5).  Examination  In writing.  0%-49%: fail (1).  50%-62%: pass (2).  63%-74%: satisfactory (3).  75%-86%: good (4).  87%-100%: excellent (5). |
| **Form of examination:** |
| written |
| **Requirement(s) to get signature:** |
| Attendance to every lecture and practice is compulsory for the students as the different topics are built upon one another. A catalogue is being made during the lectures for statistical purposes and students should not miss more than five lectures. The semester will be closed by giving each student a grade which will be offered according to the results of the midterm or the final tests. In order to fulfill the subject every student should receive a signature which has a precondition. There should not be more than four uncertified absences from the practices and five uncertified absences from the lectures or 25% should be obtained from the total score of the six midterm tests. |

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| **Exam questions:** |
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