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| **1. Course title:** Calculus I | | | | | |
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| **2. Code:** | | **3. Type (lecture, practice etc.):** lecture + seminar | | | |
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| **4. Contact hours:** 2+2 hoursper week | | **5. Number of credits (ECTS):** 5 | | | |
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| **6. Preliminary conditions (max. 3):** | | | | | |
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| **7. Announced:** ☒fall semester, ☐spring semester, ☐both | | | | | |
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| **8. Limit for participants:** | | | | | |
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| **10. Responsible teacher (faculty, institute and department):**  Dr. Pap Margit (Faculty of Science, Institute of Mathematics and Informatics, Department of Applied Mathematics) | | | | | |
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| **11. Teacher(s) and percentage:** | | András B. Frigyik, PhD | | 100 % | |
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| **12. Language:** English | | | | | |
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| **13. Course objectives and/or learning outcomes:**  **Objectives:** The lecture intends to introduce students to the world of calculus. The purpose of the course is to provide the students with the basic tools necessary to start comprehending the foundation underlying modern science and technology.  **Learning outcomes:** students completing the course will have familiarity with questions and methods related to that segment of the calculus that they are likely to encounter in their professional life. | | | | | |
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| **14. Course outline**   1. Boundedness, convergence and divergence of numerical sequences. Relation between boundedness and convergence. 2. Working with convergent sequences: sum, difference, product and ratio of convergent sequences. 3. Monotone sequences. Methods of finding limits. Estimating the speed of convergence. 4. Convergence and divergence of infinite series. Working with convergent series. 5. A necessary condition of convergence, and a necessary and sufficient condition of convergence. A simple criterium for convergence in case of series with positive terms: comparison test. 6. Simple criterion for convergence: the nth root and the ratio test, and their consequences. Absolute convergence and conditional convergence. Alternating series. 7. Series of functions. Polynomials and rational functions. Power series. Elementary functions. 8. Working with functions: sum, difference, product and ratio of functions. Composition of functions. Limits of functions at a given point and at infinity. 9. Working with limits of functions. Definition of irrational power. Useful function limits and methods of computing limits. 10. Continuity of functions. Working with continuous functions. 11. Definition of difference and difference ratio. Interpretation and application of the difference ratio in geometry, physics and chemistry. Operational rules of differentiation. 12. Working with differentiable functions: sum, difference, product and ratio of differentiable functions. Differentiation of composite functions. Derivative of elementary functions. 13. Review of the material | | | | | |
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| **15. Mid-semester works**  There are two midterms: one in the 7th week and one in the 13th week. | | | | | |
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| **16. Course requirements and grading**  The semester ends with an 80 point written exam. The two midterms are worth 40-40 points, 80 points altogether. Depending on the average of these two scores, the grades are the following:  0%–33% fail (F)  34%–49% satisfactory (D)  50%–65% average (C)  66%–81% good (B)  82%–100% excellent (A) | | | | | |
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| **17. List of readings**   1. Stewart, J., Calculus, Cengage Learning, 2015. | | | | | |
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| **18. Recommended texts, further readings** | | | | | |
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| **Date** | 4 May, 2017 | **Prepared by** |  | | |
| András B. Frigyik, PhD  responsible teacher | | |
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| **Endorsed by** | | |  | | |
| program supervisor | | |