Requirements. Mathematics EP1 (BMETE90AX33)

Lecturer: *Dr. Peter Moson* (www.math.bme.hu, +3614632690, +36300138718).
Office: H. building 41. Office hours: face-to-face: H. 41. Wednesday 10:30-11:30 a.m.

Method of education. In person.
Detailed program (planned):
Week 1. Numbers (natural, integer, rational, real, complex) numbers. Real numbers, axioms. Operations with complex numbers. / Vectors. Vector algebra, dot product (planar case).
Week 2. Vectors. Vector algebra, dot product (spatial case). Matrices. Sum, product. Determinants. Linear systems. Rang of matrices. Cross product of vectors.
Week 3. Elementary functions of 1 real variable. Definition of derivative of functions of 1 real variable. Power series. Development of elementary functions into Maclaurin series.
Week 4. Derivation rules. Table of derivatives. Applications of derivation. Tangent lines. Maximum, minimum.
Week 5. Conditions for roots, maximum-minimum, inflection points. L'Hospital's rule. Asymptotes. Sketching the graphs of functions.
Week 6. Sample Test 1. / Test 1.
Week 7. Indefinite integral. Definition, elementary methods.
Week 8. Indefinite integral (rational expressions, substitution). Definite integral. Definition. Newton-Leibniz formula. Rules of definite integration.
Week 9. Definite integration by parts, by substitution. / Retake 1.
Week 10. Applications of integration (area, volume, center of gravity, etc.). Development of elementary functions into Maclaurin series.
Week 11. Calculation of values, limits, and integrals of functions by power series. / Application of integration (separable differential equations of the 1st order).
Week 12. Sample Test 2. / Test 2.
Week 13. Application of integration (linear differential equations of the 1st order).
Week 14. Retake 2. / Summary.
(4 hours/4 credits)

*Literature:***Thomas' Calculus** by Thomas, G.B. et al. Several editions, e.g. Addison-Wesley, 2005. (ISBN0321185587)

Up-to-date information (sample tests, exams, summary of the lectures, etc.): TEAMS and / or homepage (see e.g., Google: Moson Peter, or direct address: http://tutor.nok.bme.hu/sandwich/general/moremoson/mo.htm).

Grading system:
There will be 2 mid-term tests and an exam. The mark will be calculated: 2*20% from the tests and 60% from the exam.

Midterm tests. The planned dates of the midterm tests: Test 1. October 11, 2024 (Friday), 8:15. a.m., Test 2. November 22, 2024 (Friday), 8:15. a.m.

For the *signature* the minimal score of the midterm tests is 6-6%. Retakes. Test 1, October 30, 2024 (Wednesday). 12:15. Test 2. December 4, 2024 (Wednesday), 12:15. One test can be repeated in the week right after the semester (for extra fee, registration in NEPTUN is necessary): December 10, 2024 (Tuesday).
Written exam. 60%= 10% theory + 50% exercises (this part is open book). Dates: December 17, 2024. January 7, 21, 2025.

Final marks (sum of midterm tests and written exam): 0-39 fail (1), 40-54 pass (2), 55-69 satisfactory (3), 70- … good (4). If the sum is greater than 78% then the student can take part at an oral exam for the mark excellent (5).

Budapest. August 31, 2024.

Good Luck, Have a Nice Semester!