

Mathematics EP2 (BMETE90AX34)

Lecturer: Dr. Peter Moson (www.math.bme.hu, +3614632690, +3630 0138718)

Prerequisites: Mathematics EP1.

Attendance:

Being absent for more than 30% of the classes may result in denial of the final grade.

Detailed program (planned):

Week 1. Separable, linear ordinary differential equations (ODE) of the first order. Integral curves.

Week 2. Orthogonal trajectories. One dimensional autonomous equation Trajectories-phase portrait, typical integral curves with inflection points.

Week 3. One dimensional autonomous equation Trajectories-phase portrait.

Homogeneous linear ordinary differential equations of the second order with constant coefficients.

Week 4 Nonhomogeneous linear ordinary differential equations of the second order with constant coefficients.

2 dimensional linear systems with constant coefficients. Matrices. Eigenvalues, eigenvectors. Phase portraits in case of real eigenvalues.

Week 5. 2 dimensional linear systems with constant coefficients. Matrices. Eigenvalues, eigenvectors. Phase portraits in case of complex eigenvalues.

Week 6. Sample Test 1.

Week 7. Test 1. (March 26, 2025)

Week 8. Functions of several variables. Partial derivatives. Tangent plane. Local extrema of functions of 2 real variables.

Week10. Double integral (Cartesian, polar coordinates).

Week 11. Functions of several real variables. Applications.

Week 12. Sample Test 2.

Week 13. Test 2. ((May 14, 2025)

Week 14. Retake 1. Retake 2. (May 21, 2025)

(2 hours/2 credits)

Literature:

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

Grading system:

There will be 2 mid-term tests. The mark will be calculated: $2 \cdot 50\%$ from the tests. The planned dates of the midterm tests: *Test 1.* March 26, 2025. 08:15. *Test 2.* May 14, 2025. 08:15. *Retakes* (for students whose sum of the midterm tests is less than 40%,) / *Improvement* either Test 1, or Test 2: May 22, 2024. 8:15. One test can be repeated in the week right after the semester (for extra fee, registration in NEPTUN is necessary): May 27, 2025.

Final marks (sum of midterm tests): 0-39 fail (1), 40-54 pass (2), 55-69 satisfactory (3), 70-84 good (4), 85- (excellent (5)).

Office hour: Wednesday 10:30-11:30. H. 41.

Good Luck, Have a Nice Semester!

Budapest, February 7, 2025.