

# MATHEMATICS IN ECONOMICS – Syllabus and General Information

5 CREDITS, WINTER SEMESTER

## Aim of the course:

The course Mathematics in economics in master's study programme follows the course Quantitative methods in bachelor's study programme. It makes the participants acquainted with further knowledge and methods of differential and integral calculus, and the introduction to differential equations including their application in economics. The aim of the course is to cultivate approach to problem solution particularly in a variety of economic branches and to enable insight into their essence.

## Requirements

- 1) 70% attendance at the seminars (or calculating a mathematical problem or writing a seminar paper)
- 2) Two tests
  - a) for 30 points=TEST (on the 7<sup>th</sup> of November) and
  - b) for 70 points= FINAL EXAM (on the 12<sup>th</sup> of December).

Form of the exam: written. You can gain extra points for tasks and homework.

Evaluation: A (100-90 points), B (89-80), C (79-70), D (69-65), E (64-60), F (59-0).

## Content

1. Function of one variable
2. Introduction to differential calculus of one real variable
3. Course of a function of one real variable
4. Function of two variables
5. Local and bounded extremes of a function of two variables
6. Indefinite integral of one real variable
7. Special substitutions in the indefinite integral
8. Definite integral of one real variable
9. Applications of the definite integral
10. Infinite number series
11. Infinite function series
12. Introduction into ordinary differential equations
13. Linear differential equations

## Literature:

- BRADLEY, T., PATTON, P. *Essentials Mathematics for Economics and Business*. West Sussex: John Wiley & Sons Ltd, 1998. ISBN 0-471-97511-7.
- CHIANG, C.C. *Fundamental Methods of Mathematical Economics*. New York: McGraw-Hill, Inc., 2000. ISBN 0-12-417890-1.

## LECTURE SCHEDULE

- 1) (26.9.2024) Entrance test and general information
- 2) (3.10.2024) INDIVIDUAL WORK (topic: Using the function in economy)
- 3) (10.10.2024) Function (linear, quadratic, logarithm, exponential). Domain of function
- 4) (17.10.2024) Derivate of function  $f(x)$
- 5) (24.10.2024) Extremes of function  $f(x)$
- 6) (31.10.2024) Differential calculus of two real variables  $f(x,y)$
- 7) (7.11.2024) **TEST** (content = 1 – 6 lecture)
- 8) (14.11.2024) INDIVIDUAL WORK (topic: Using differential calculus in economy)
- 9) (21.11.2024) Extremes of function of two real variables  $f(x,y)$
- 10) (28.11.2024) Indefinite Integral
- 11) (5.12.2024) Definite Integral
- 12) (12.12.2024) **Final exam the 1<sup>st</sup> term**
- 13) (19.12.2024)