

Tárgytematika / Course Description

Mathematics 1 for Economists

GKNB_MSTA012

Tárgyfelelős neve /**Teacher's name:** Pestiné dr. Rácz Éva Veronika**Félév / Semester:** 2026/27/1**Beszámolási forma /****Assesment:** Folyamatos számonkérés**Tárgy heti óraszám /****Teaching hours(week):** 2/2/0**Tárgy féléves óraszám /****Teaching hours(sem.):** 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

Mathematics provides an essential foundation for the study of economics, including quantitative analysis, financial calculations, modelling, and forecasting. Mathematics 1 for Economists reviews, reinforces, and extends the secondary-school mathematics required for further studies in economics and related quantitative subjects. The course develops students' skills in algebraic manipulation, solving equations and inequalities, and working with elementary functions. It then introduces the fundamentals of differential calculus, with particular emphasis on practical applications such as curve fitting, analysing monotonicity, determining extrema, and solving optimisation problems.

TANTÁRGY TARTALMA / DESCRIPTION

Topics

Topic name: Algebraic operations and equations**Topic description:** Operations on algebraic expressions, including polynomials and rational expressions. Solving linear and quadratic equations.**Keywords:** exponents, polynomials, rational expressions, simplification, linear equation, quadratic equation, balance method**Topic name:** Systems of equations and inequalities**Topic description:** Solving systems of linear and quadratic equations. Linear, quadratic, and rational inequalities, including systems of inequalities.**Keywords:** systems of equations, linear equations, quadratic equations, inequalities, systems of inequalities**Topic name:** Functions

Topic description: Properties and graphical representation of elementary functions, including square root, absolute value, rational, exponential, and logarithmic functions.

Keywords: functions, square root function, absolute value function, rational function, exponential function, logarithmic function

Topic name: Exponential and logarithmic equations

Topic description: The concept and properties of logarithms. Solving exponential and logarithmic equations and inequalities.

Keywords: exponential equation, logarithm, logarithmic equation, logarithmic inequality

Topic name: Arithmetic and geometric sequences

Topic description: Definition, calculation, and applications of arithmetic and geometric sequences.

Keywords: arithmetic sequence, geometric sequence

Topic name: Curve fitting

Topic description: Determining the equation of a line through two given points and a parabola through three given points. Interpreting linear and quadratic functions from their graphs.

Keywords: curve fitting, linear function, quadratic function, line, parabola, graph interpretation

Topic name: Differential calculus

Topic description: Basic derivatives and differentiation rules, including the sum, product, and quotient rules and the chain rule for composite functions.

Keywords: derivative, differentiation, product rule, quotient rule, chain rule

Topic name: Applications of differential calculus

Topic description: Determining the equation of the tangent line at a given point and calculating the elasticity of a function. Analysing monotonicity and sketching function graphs. Determining local extrema and applying differential calculus to optimisation problems in economics.

Keywords: tangent line, elasticity, monotonicity, local maximum, local minimum, optimisation

Activity types

Activity type: Lecture

Extent: 28 class hours

Description: Plenary lectures introducing the fundamental concepts, theoretical principles, and typical problem-solving methods of the course.

Mandatory: Yes

Estimated workload: 28 hours

Activity type: Practical class

Extent: 28 class hours

Description: Guided practice in mathematical calculations, problem solving, and applications of the concepts introduced in the lectures.

Mandatory: Yes

Estimated workload: 28 hours

Activity type: Independent practice

Extent: 4 occasions

Description: Independent problem-solving practice at home in preparation for the four midterm tests.

Mandatory: No

Estimated workload: 28 hours

Activity type: Consultation

Extent: 14 sessions

Description: Small-group consultation sessions focusing on guided practice, problem solving, and clarification of course material.

Mandatory: No

Estimated workload: 14 hours

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Assessment method: Continuous assessment

Mandatory midterm tests (computer-assessed)

Extent: 4 tests

Description: Each test consists of basic and moderately complex calculation problems. Tests are completed on university computers. Students may use only the built-in basic calculator or traditional calculator, pen, and blank paper.

Mandatory: Yes

Estimated workload: 22 hours

Requirements for course signature:

A course signature is awarded if the total score achieved on the four midterm tests is at least 25%. If the course is not completed with a passing grade, the course signature cannot be carried over to subsequent semesters.

Final grade determination:

Attendance at lectures and practical classes is mandatory. All four midterm tests must be completed, as the final grade is determined on the basis of their total score.

The final grade is assigned according to the following scale:

- 0–49.9999%: fail (1)
- 50–62.9999%: pass (2)
- 63–74.9999%: satisfactory (3)
- 75–87.9999%: good (4)
- 88–100%: excellent (5)

During the first week of the examination period (make-up week), students may retake up to two selected midterm tests, either to make up for an absence or to improve a previous result. The score obtained on the most recent attempt is used for the calculation of the final grade.

Students who have obtained the course signature but received a failing in-semester grade may take one comprehensive make-up examination during the examination period. Students who have already obtained a passing in-semester grade may also take one comprehensive examination to improve their grade. In both cases, the grade obtained on the most recent attempt is recorded.

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Course page:

Course page and weekly learning materials and assignments will be published on <https://szelearning.sze.hu/>.

Recommended reading(s):

Selected chapters from:

Briggs et. al. (2013): Calculus for Scientists and Engineers. Pearson.

AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL

Abramson, J. (Ed.): Precalculus 2e (2021), OpenStax. Rice University ISBN: ISBN-13: 978-1-951693-39-8
<https://openstax.org/books/precalculus-2e>

Derek Zweig: A Technical Guide to Mathematical Finance (2024), CRC Press ISBN: ISBN:
978-1-032-68596-0