Tárgytematika / Course Description
Mathematics 1 for Economists

GKNB_MSTA012

Tárgyfelelős neve /
Teacher's name: Pestiné dr. Rácz Éva Veronika   **Félév / Semester:**   2024/25/1
Beszámolási forma /
Assesment: Vizsga
Tárgy heti óraszáma /   **Tárgy féléves óraszáma /**
Teaching hours(week):   2/2/0   **Teaching hours(sem.):**   0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

Mathematics is essential for understanding economics, financial calculations and predictions. Mathematics 1 and 2 for Economists provide all the basic mathematical background economist students need for they technical courses. Mathematics 1 for Economists improves students' knowledge about sets and single variable functions, practices calculations with percentages, taxes and compound interest. At the end of the first semester students will not only be able to calculate limits of sequences and functions, derivative of functions, definite and indefinite integral of elementary functions, but apply these techniques to some practical problems such as curve sketching or calculation of areas.

TANTÁRGY TARTALMA / DESCRIPTION

Schedule

Week 1	Sets, determination of sets, operations on sets (union, intersection, complement and difference), Venn diagram
Week 2	Calculations with percentages, net, gross prices and VAT. Simple and compound interest
Week 3	Functions of a single variable. Domain and range of a function. Inverse function. Monotonicity of functions. Extremal values.
Week 4	Elementary functions (linear, power, rational, exponential, and logarithmic), their basic features, graphs and linear transformations.
Week 5	Composition of functions. Structure, domain and inverse of composite functions.

Week 6	Sequences and series. Definition of sequences, bounds and monotonicity. The geometric series.
Week 7	Limit of sequences. The number e. *Test 1.*
Week 8	Limits and continuity of functions. Reading limits from the graph of the function. Calculating of limits. One-sided limits. Limit at infinity.
Week 9	Definition of derivative of a function. Geometric meaning of derivation and the equation of the tangent of a function at a given point. Linear approximation.
Week 10.	Derivatives of elementary functions. Calculation of derivative of different functions (product, fraction and composite of functions).
Week 11.	Applications of the derivative. Determination of intervals, where the function is increasing or decreasing, finding local extrema. Application of derivative in maximum-minimum problems.
Week 12.	Definition of indefinite and definite integrals. Fundamental theorem of calculus (The Newton–Leibniz formula). Integral of elementary functions.
Week 13.	Basic techniques of integration. Integration of linearly transformed functions. *Test 2.*
Week 14.	Summary and repetition. *Repetition test.*

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Requirements and Assessment

Attendance of lectures and practicals are highly recommended.

The *signature* is the prerequisite of participation in exams. For the signature, students are required to satisfy the following conditions:

getting at least 6 points from the tests (First test (max 6. points) + Second test (max. 6 points), or 6 points from the

Repetition test (max. 12)

Those students, who got signature are allowed to take the exam during the exam period. Final mark will be given based on the result of this written test:

100-86 points: 5

85-71 points: 4

70- 61 points: 3

60-51 points: 2

0-50 points: 1.

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.

Akihito Asno (2013): An Introduction to Mathematics for Economics. Cambridge University Press

AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL