

M.Sc. in Economics

Code:	017 900	Type:	M. Sc. 2011-2013 1 st year, fall 2011
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Title:	Mathematics I
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Lecturer:	Justinas Pelenis
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ECTS:	6	Contact hours (per semester):	30 x 120 min
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Semester:	Fall 2011	Frequency of the lecture:	Three times a week
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Dates:	September 26, 2011 until December 21, 2011
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Prerequisites:	Basic high school mathematics and knowledge of Math Camp.
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Learning objectives (What are the intended learning outcomes? Which skills will be acquired?):

Introduction to a mathematical way of thinking. Understanding of the basic concepts of real analysis and linear algebra.

Content (Which professional competence and which contents will be imparted?):

- Sets and Functions
 - sets, functions, correspondences,
 - binary relations, maximal elements, lattices
 - cardinality, algebraic structures, construction of real numbers
 - polynomials and complex numbers
- Linear Algebra
 - vector spaces and subspaces, spanning systems, linear independence, basis and dimension
 - systems of linear equations, reduced row-echelon form, Gaussian and Gauss-Jordan elimination
 - determinants, adjoint of a matrix, Cramer's rule
 - linear mappings, kernel, image, matrix representation
 - eigenvalues and eigenvectors, matrix diagonalization (Jordan form)
 - orthonormal bases, QR decomposition, projection, positive (semi) definite matrices, Cholesky decomposition, Singular Value decomposition

Teaching approach (Description of the learning and teaching methods):

Lectures, problem sets and discussion of exercises and problem set solutions in the PS sessions.

Workload (Definition of workload (ECTS), divided in pre-modules (e.g. pre-readings), core-modules (contact hours), post-modules (e.g. case studies)):

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Language of instruction (Information on the language of teaching):

English

Obligatory literature (E.g. scripts, books, articles, cases, papers):

Alós-Ferrer, Carlos: Mathematics for Economic Theorists. Manuscript, University of Konstanz.

Additional literature (E.g. books, articles, cases, papers):

- de la Fuente, Angel (2000): Mathematical Methods and Models for Economists, Cambridge University Press.
- Simon, Carl P. and Lawrence Blume (1994): Mathematics for Economists, W. W. Norton & Company, New York.
- Dhrymes, Pheobus (2000): Mathematics for Econometrics, Springer.
- Horn, Roger A. and Charles R. Johnson (1985): Matrix Analysis, Cambridge University Press.

Mode of examination (Mode of the examinations and tests (e.g. oral or written examination, lecture, homework, papers, class participation):

Weekly problem sets, written midterm and final exams.

Grading:

Homework – 20%, midterm exam – 30%, final exam – 50%.

Special features (E.g. excursion, guest speaker):

Contact information:

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Office hours:

By appointment

Course website:

<https://cecnet.tuwien.ac.at/>