Italian code: STAT-04/A   **Credits: 9**
Course: Mathematics for Economics
Main language of instruction: Italian
Other language of instruction: English

Head instructor
Professor Andrea SCOZZARI - andrea.scozzari@unicusano.it

Objectives

The course aims to provide students with the basic tools of mathematical analysis and linear algebra. In particular, the study of real functions of a real variable, limits, and derivatives of a function will enable students to acquire those fundamental techniques and knowledge useful in the continuation of their studies to analyze economic phenomena that can be modeled through mathematical functions. In summary, the course "Mathematics for Economics" has the following objectives:

1. Deepen the basics of mathematical analysis

2. Introduce some concepts of linear algebra

3. Introduce some concepts of differential analysis

Course structure

- Numbers
- Real-valued functions
- Limits
- Derivatives
- Maxima and Minima
- Integrals
- Linear Algebra

Competencies

A. Knowledge and understanding:

By the end of the course, the student will have demonstrated knowledge of the topics and tools necessary for the study of a real function of a real variable. In particular, they will have acquired knowledge of function limits, continuity, differentiability, and integration. Additionally, the student will gain an understanding of the basic concepts of linear algebra, such as determinants and matrix characteristics, eigenvalues, and eigenvectors of square matrices. Finally, through E-tivities, which consist of exam simulations, students will have the opportunity to deepen their understanding of the topics covered during the course and assess their own preparation.

B. Applying knowledge and understanding:

The student will be able to apply the knowledge in typical microeconomic applications and for the analysis of economic and financial phenomena. The topics related to the study of maxima and minima of a real function also aim to introduce the notions necessary for discussing and solving optimization problems.

C. Learning skills:

The knowledge and the key methodological tools that will be useful in subsequent advanced professional training in the Economics area, will be provided.

Syllabus

Subject 1 – Numbers

Subject 2 – Real-valued functions

Subject 3 – Some specific classes of real-valued functions and their properties

Subject 4 – Limits

Subject 5 – Derivatives

Subject 6 – Maxima and minima of real-valued- functions

Subject 7 – Integrals

Subject 8 – Linear Algebra

Evaluation system and criteria

For Mathematics for Economics, the in-person examination is in Rome at Niccolò Cusano University and it will be organized in written form. On-line examination is not allowed.

The written test consists of 4 exercises. The exercises cover the entire course program and it is aimed at verifying the skills acquired. The first exercise concerns the study of a real function of a real variable (max 16 points); the second exercise concerns a topic from the Linear Algebra subject (max 3 points); the third exercise concerns the calculation of a limit or of the first derivative or of the domain of a real function of a real variable (max 4 points); the fourth exercise consists of solving an integral (max 7 points).
The duration of the test is 90 minutes.

Bibliography and resources

1. *Materials to consult*

The complete course in English is available (video-lessons and slides). Written Notes are also available in Italian.

2. *Recommended bibliography*

1. C.P. Simon and L. Blume: Mathematics for economists, W.W. Norton and Company, Inc, London, 1994.

2. S. Waner and S.R. Costenoble: Finite mathematics and applied calculus, Brooks/Cole, a division of Thomson Learning, 2001.