Mathematics

GR. A-K: Prof. Enrico Miglierina; Prof. Łukasz Piasecki; Gr. L-Z: Prof. Fausto Cavalli; Prof. Fabio Tramontana

Course aims and intended learning outcomes

The course has two objectives: to present several fundamental mathematical tools for dealing with economic-financial problems, and to help students to acquire a precise and essential language. The course will emphasize how to develop a view toward critically re-examining mathematical concepts, which students will find in their academic pursuits, and how to stimulate the capacity to use mathematical methods, tools and models in a wide array of applications.

At the end of the course students should:
1. have acquired the knowledge and understanding of the main parts of the program and be able to apply the mathematical methods described in the program in order to solve problems and exercises.
2. be able to understand the translation of a real world situation into a mathematical model.
3. be able to deal with complex problems by using the mathematical tools.
4. have learned a rigorous and essential language that allows them to communicate the knowledge clearly and effectively.
5. have developed good learning skills that allow them to continue their plan of studies.

Course content

FIRST TERM - REAL FUNCTIONS OF ONE VARIABLE
Unit 1: Preliminary concepts (the set of real numbers, the notion of function and its basic properties)
Unit 2: Limits and continuity.
Unit 3: Differential calculus and its applications.
Unit 4: Integral calculus.

SECOND TERM
Unit 5: Linear Algebra: vectors, matrices and systems of linear equations.
Unit 6: Real functions of two variables: preliminary notions, differential calculus, unconstrained and constrained optimization.

Reading list

Lecture Notes, Exercise Sets and additional materials are available on the e-learning platform Blackboard.

The material on Blackboard is self-contained and covers all the topics of the course. For further reading the following book is suggested:

> G. Bosi-C. Corsato-M.E. Zuanon, Essential Mathematics for Economics, Apogeo Education – Maggioli Editore, 2018.

Teaching method

Lectures, exercises groups, preliminary course (see also below: NOTES).

Assessment method and criteria

Three written partial tests are planned during the course: the first one at the middle of the first term, the second at the end of the first term and the third at the end of the second term.

The maximum score of each test is 11, the final mark of the whole exam will be given by the sum of the marks of the three partial tests.

All the students are strongly recommended to attend these tests.

Alternatively, written exams concerning the whole program of the course are set accordingly to the Faculty calendar.

Partial tests and exams contain multiple choices questions and open exercises.

A preliminary test about preliminary notions (see section NOTES below) is planned on the same day of each partial test and exam. To pass the test is compulsory to attend respectively the partial test or the exam. The students that achieved at least 8 correct answers in the mathematical section of the admission test are exempted to take the preliminary test.

Detailed information about the assesment process are available on the e-learning platform Blackboard.

Notes and prerequisites

Preliminary Notions:

The following arguments are assumed to be known in advance:

Natural, integer, rational and real numbers. Basic elements of logic and set theory. Elementary algebra. Powers, logarithmic and exponential functions. Equations and inequalities (polynomial, fractional, irrational, logarithmic and exponential). Systems of equations and inequalities. Plane analytical geometry. Basic notions of trigonometry.

A preliminary course is organized immediately before the course.

Group A-K: Units 1-2 and 5-6 will be taught by Enrico Miglierina whereas Units 3-4 will be taught by Łukasz Piasecki (visiting professor from Maria Curie-Skłodowska University – Lublin, Poland)

Group L-Z: Units 1-4 will be taught by Fabio Tramontana whereas Units 5-6 will be taught by Fausto Cavalli.