**Mathematics**

Gr. A-K: Prof. Enrico Miglierina; Prof. Łukasz Piasecki; Gr. L-Z: Prof. to be defined; 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 fundamental mathematical tools for dealing with economic-financial.

2. Be able to apply the mathematical methods described in the program in order to solve problems and exercises.

3. Be able to understand the translation of a real world situation into a mathematical model.

4. be able to deal with complex problems by using the mathematical tools.

5. Have learned a rigorous and essential language that allows them to communicate the knowledge clearly and effectively.

6. 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[[1]](#footnote-1)***

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. [*Acquista da VP*](https://librerie.unicatt.it/scheda-libro/gianni-bosi-chiara-corsato-ernestine-zuanon-magali/essential-mathematics-for-economics-9788891629883-670817.html)

***TEACHING METHOD***

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

***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.

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. The knowledge of theoretical aspects and methods of application to specific exercises are necessary to solve the proposed question.

To pass a *preliminary test* (or Additional Training Obligations – Test OFA) about preliminary notions (see section *NOTES* below) is compulsory to attend partial tests and/or exams. The students that achieved at least 7 correct answers in the mathematical section of the admission test are exempted from taking the preliminary test. The preliminary test has 12 multiple choice questions (without penalty). In order to pass this test, it is necessary to answer correctly at least 7 questions.

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

***NOTES AND PREREQUISITES***

All the students are strongly recommended to attend partial tests.

*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.

The preliminary notions are strictly needed to attend the course and they are tested in the preliminary test. The preliminary notions are reviewed in the Additional Training Obligation course (the calendar of this course will be published on the web site of the university and on Blackboard) All the students that should satisfy an Additional Training Obligations must attend this course (at least 70% of lectures of the Additional Training Obligation Course) and pass the preliminary test. Additional information about Additional Training Obligations course and test will be available on the e- learning platform Blackboard (see the dedicated course in Blackboard)

To review all the preliminary notions is also available the online ambient TEOREMA ([http://teorema.cilea.it](http://teorema.cilea.it/)).

*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 XXXXXX.

IMPORTANT REMARK:

If the health situation related to the Covid-19 pandemic should not allow face-to-face teaching, distance teaching will be guaranteed in ways that will be communicated to students in the due time. The exams may change accordingly.

1. I testi indicati nella bibliografia sono acquistabili presso le librerie di Ateneo; è possibile acquistarli anche presso altri rivenditori. [↑](#footnote-ref-1)