**General Mathematics**

Professor Anna Agliari

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to teach students the formalism, terminology and logical tools of mathematics, essential prerequisites for correctly learning many degree programme subjects with economic, statistical and financial content. In addition to the use of mathematical computation, the aim of teaching is to initiate students into a rigorous and logically coherent approach to economic-financial problems, enabling their quantitative study, including through the construction and/or analysis of models.

***Learning OUTCOMES***

Upon completion of this module, students should be able to:

* Analyse both qualitatively and quantitatively the behaviour of economic variables represented by functions.
* Discuss and solve problems of choice expressed in terms of optimisation.
* Discuss and solve simple equilibrium problems using matrix algebra.

***COURSE CONTENT***

*Linear algebra*: Vectors, matrices and linear systems.

*Real functions of a real variable*: Differential calculus and graph of a function.

*Real functions of two real variables*: Constrained and unconstrained optimization.

*Elements of integral calculus*

***READING LIST***

Textbook:

A. Guerraggio, *Matematica,* Pearson Education Italia, Milan, 2020.

Further suggested reading:

A. Torriero- M. Scovenna - L. Scaglianti , *Manuale di matematica,* CEDAM, Padua, 2009.

M. Scovenna-R. Grassi, *Matematica. Esercizi e temi d’esame completamente risolti,* CEDAM, Padua, 2000.

F. Brega-G. Messineo, *Esercizi di Matematica Generale*, Giappichelli Editore, Turin, 2006.

***TEACHING METHOD***

Theoretical lectures and exercises.

During lectures, active participation of students is expected. Students may be asked to discuss and solve, individually or in small groups, some of the exercises that are the subject of the lecture and then share them, providing a uniform reading key.

In addition, in order to stimulate interaction and discussion, working groups will be organized to analyze and solve a problem of an economic-financial nature that requires the application of the mathematical tools covered in the course. The result of the work done will be presented collegially by the students and will contribute to the final assessment.

Teaching makes use of the Blackboard platform where a more detailed syllabus of the course will be made available, as well as additional teaching materials and all necessary information for organizing working groups.

***ASSESSMENT METHOD AND CRITERIA***

The exam is designed to assess both reasoning skills and analytical rigour on the topics covered by the course. For a sufficient evaluation, the student must show knowledge of concepts and theorems and know how to apply them, as well as a basic understanding of mathematical reasoning.

To this end, the final exposition of the group work will allow the assessment of the skills in understanding the mathematical procedure applied to a particular problem, in solving it, and the expository ability achieved. Such work will contribute 33% on the overall assessment (i.e., up to 10 points). The remaining 67% of the evaluation is based on a final exam, consisting of 3 exercises related to the different parts of the course. These exercises will be equally weighted, scored from 0 (in case of no answer) to 7 (in case of a perfect answer).

In case of non-delivery of the homework, the evaluation will be based 100% on the final exam, composed of 4 exercises related to the different parts of the course. The fourth exercise will be scored from 0 (in case of no answer) to 10 (in case of a perfect answer).

***NOTES AND PREREQUISITES***

The course is accompanied by 18 hours of Pre-Course, in which participation is strongly recommended. During the General Mathematics Pre-Course the following *Preliminary Topics* will be recalled, as fundamental requirements for a successful attendance of the course and for passing the exam: rational and irrational equations and inequalities; overview of set theory and logic; numerical sets: from natural to real numbers; plane analytic geometry: straight lines, circle, hyperbola and parabola; exponential and logarithmic functions.

Information on office hours available on the teacher's personal page at <http://docenti.unicatt.it/>.