# General Mathematics

## Prof. 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. Besides the use of mathematical computation, the aim of the course is to enable students to adopt a rigorous and logically consistent approach to economic and financial problems, allowing them to have a quantitative study, also 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, 2014.

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 an active participation of the 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. Teaching also uses the Blackboard platform, where a more detailed course syllabus and additional teaching material will be made available.

***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, during the course two homework assignments will be made individually or in pairs, one in the middle of the course and the other at the end of the lectures. These works will contribute to 33% of the final evaluation and will be intended to test the skills to formalise, solve, generalise a problem and discuss the outcomes. 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. 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/>.