University of Rome
"Tor Vergata"

Mathematics

MSC in Economics – MSC in Finance & Banking

0. Teacher: Paolo Gibilisco

Office: Building "B", Third floor, Centro "Vito Volterra", Room n. 9.

Office hours: Thursday 11:00 – 13:00.

Phone: +39-06-72595956

Email: gibilisco@volterra.uniroma2.it

1. **Website**

http://economia.uniroma2.it/master-science/economics/corso/211/

2. **Textbooks**

The textbooks used in the course are:

- "Mathematics for Economists" by C. Simon and L. Blume, Norton & Company;

- "Statistical Inference" by G. Casella and R.L. Berger, Duxbury.

3. **Entrance qualifications**

It is taken for granted that students have a basic knowledge of calculus and linear algebra. In particular they know: how to study a function in one variable, the fundamental theorem of calculus, how to evaluate a definite integral, how to study a system of linear equations, the basic geometry of three-dimensional space.

As a reference one can use the Appendices A1, A2, A3, A4 and Part I – Part II of the book by Simon-Blume.

4. **Course content**

The course has four parts: Calculus, Linear Algebra, Optimization and Probability.
The main goals of the course are the study of:

- integration in several variables (Fubini, change of variable formula, polar coordinates, …);

- linear transformations, eigenvalues, eigenvectors, projections and the spectral theorem;

- unconstrained and constrained optimization (Taylor formula in several variables, Kuhn-Tucker);

- limit theorems in probability and conditional expectation (weak law of large numbers, central limit theorem, multivariate gaussian).

The detailed program is available in the website of the course.

5. **Learning outcomes**

Upon completion of the course the student will have the mathematic background to understand the notions required in Statistics, Econometrics and in the other parts of Economics and Finance where a quantitative approach is needed.

6. **Teaching material**

In the website of the course you find all the needed teaching material. In particular you have:

- the welcome test;

- the detailed program;

- the arguments of the lectures on a day-by-day basis;

- the practice sessions;

- simulations of the written examination containing all the rules;

- a list of other textbooks and suggested readings;

…

- and much more.

7. **Additional information**

Teaching will be in English throughout the course.