



COURSE DESCRIPTION QUANTITATIVE METHODS

**SSD: METODI MATEMATICI DELL'ECONOMIA E DELLE SCIENZE
ATTUARIALI E FINANZIARIE (SECS-S/06)**

DEGREE PROGRAMME: HOSPITALITY MANAGEMENT (DB5)
ACADEMIC YEAR 2025/2026

COURSE DESCRIPTION

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: NOT APPLICABLE
MODULE: NOT APPLICABLE
TEACHING LANGUAGE: ITALIANO
CHANNEL:
YEAR OF THE DEGREE PROGRAMME: I
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER I
CFU: 6

REQUIRED PRELIMINARY COURSES

Nothing.

PREREQUISITES

Elementary operations between real numbers: sum, difference, product, quotient.

LEARNING GOALS

The course is aimed at providing students with the most appropriate mathematical notions and the basic calculation techniques to analyze simple models regarding economic, financial and management areas, and at guiding them towards the abstract formalization of such models.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The course provides students with the mathematical notions and the basic quantitative tools that are needed to analyze standard situations that arise in economic, financial and management contexts. Such a knowledge and tools will allow students to effectively understand what is needed to make aware economic decisions, to identify the synthesis in mathematical terms of basic economic examples, and to capture the implications in economic terms of the solutions to mathematical problems linked to standard economic models.

Applying knowledge and understanding

The student needs to: show ability to build mathematical models for simple economic situations, starting from managing given information, apply the acquired notions and tools to solve problems that are related to the model, analyze the obtained mathematical solutions and read them in the right economic context. For this purpose, the course is aimed at teaching the skills and methodological tools to synthesize and paraphrase the discursive description of a situation in order to move towards its mathematical formalization; this includes the ability to sketch and read graphs, to prepare tables, and to correctly use quantitative information.

COURSE CONTENT/SYLLABUS

- 1. Basic notions.** Natural, integer, rational, irrational and real numbers. Integer, rational and real exponents. Radicals. Absolute value. Logarithms. Percentages. Elements of set theory. Intervals. Cartesian coordinate system.
- 2. Real functions of one real variable.** Functions from the numerical, algebraic and graphical viewpoints, piecewise-defined functions. Graph of a function. Elementary functions.
- 3. Linear functions and models.** Linear functions from the numerical and algebraic point of view, linear equality and inequality, graph of a linear function, slope of the line. Finding the analytical expression of a linear function. Linear models involving cost, revenue and profit, linear demand and supply models, models for variations over time.
- 4. Nonlinear functions and models.** Quadratic functions from the algebraic point of view, graph and features of a parabola, quadratic equalities and inequalities, quadratic models involving cost, revenue and profit. Exponential functions from the numerical and algebraic point of view, graph of an exponential function, exponential equalities and inequalities, exponential models for epidemics, compound interest and continuous compounding. Napier's number. Logarithmic functions from the algebraic point of view, logarithmic equalities and inequalities, logarithmic models for the analysis of investments time.
- 5. Monotonicity analysis.** Average rate of change, instantaneous rate of change, percentage rate of change. Geometric meaning of the rates of change and approximation. Increasing and decreasing functions. Maximizer, minimizer, maximum and minimum of a function. Applications: cost minimization, revenue and profit maximization, elasticity of the demand.
- 6. Systems of linear equations.** Systems of two linear equations in two unknowns, algebraic and graphical solution methods. Models involving linear systems. Elements on the use of matrices to represent and solve a linear system.

READINGS/BIBLIOGRAPHY

Textbooks:

Finite mathematics and applied calculus. Authors: S. Waner, S.R. Costenoble. Publisher: Brooks/Cole, Cengage Learning. 2011.

Essential mathematics for economic analysis. Authors: K. Sydsaeter, P. Hammond, A. Strøm, A. Carvajal. Publisher: Pearson. 2016.

Further material:

Notes of the lectures in pdf format.

Problems and past written exams in pdf format.

TEACHING METHODS OF THE COURSE (OR MODULE)

Teacher will use:

- a) Lectures for approximately 75% of total hours,
- b) Exercises for approximately 25% of total hours.

EXAMINATION/EVALUATION CRITERIA

a) Exam type

- Written
- Oral
- Project discussion
- Other

In case of a written exam, questions refer to

- Multiple choice answers
- Open answers
- Numerical exercises

b) Evaluation pattern

The written exam is considered passed if it is assigned a grade no less than 18.

To pass the written exam, the correct resolution of both numerical exercises and mathematical modelling problems is required.