



COURSE DETAILS

"QUANTITATIVE METHODS"

SSD SECS-S/06 *

* In case of an integrated course, the SSD (scientific disciplinary sector) should be written above only if all modules of the course belong to the same SSD, otherwise the SSD is to be written alongside the MODULE (see below).

DEGREE PROGRAMME: HOSPITALITY MANAGEMENT

ACADEMIC YEAR 2021-2022

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE (IF APPLICABLE):

MODULE (IF APPLICABLE):

CHANNEL (IF APPLICABLE):

YEAR OF THE DEGREE PROGRAMME (I, II, III): I

SEMESTER (I, II): I

CFU: 6

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE “ORDINAMENTO”)

Nothing.

PREREQUISITES (IF APPLICABLE)

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 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. Elements of set theory. Intervals.
- 2. Real functions of one real variable.** Functions from the numerical, algebraic and graphical viewpoints, piecewise-defined functions. Cartesian coordinate system and 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: epidemics, compound interest and continuous compounding. Napier’s number. Logarithmic functions from the algebraic point of view, logarithmic equalities and inequalities, logarithmic models: time for investments.
- 5. Limits and continuity.** Numerical and graphical evaluation of limits, definition of limit, algebraic approach to the calculus of limits. Rules for limits at infinity. Limits of elementary functions. Applications to economic models. Definition of continuous function.
- 6. Derivative.** Average rate of change, instantaneous rate of change, geometric meaning of the derivative. Derivative function, derivatives of the elementary functions. Differentiation rules (derivative of the sum, the product and the quotient of functions), the chain rule. Marginal analysis applications.

7. Applications of the derivative. Definitions of maximizer, minimizer, maximum and minimum of a function. Finding the extreme values of a function. Models involving the cost minimization, revenue and profit maximization. Elasticity of demand.

8. Systems of linear equations. Systems of two linear equations in two unknowns, algebraic and graphical solution methods. Systems of m linear equations in n unknowns, Gauss algorithm. Notes on the use of matrices to represent and solve a linear system. Models involving linear systems.

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:

Solved problems and past written exams in pdf format, available on the teacher's website.

TEACHING METHODS

Teacher will use:

- a) Lectures for approx. 75% of total hours,
- b) Practical exercises for approx. 25% of total hours.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	X
only written	
only oral	
project discussion	
other	

In case of a written exam, questions refer to: (*)	Multiple choice answers	
	Open answers	X
	Numerical exercises	X

(*) multiple options are possible

The exam consists of two types of test:

- an individual written test that intends to verify the acquired abilities in constructing a mathematical model that describes a given situation, and in solving numerical exercises connected to it;
- an oral test, organized in groups, that is aimed at verifying the ability to clearly explain the conceptual links between the theoretical contents of the course and the economic, financial and management situations that have been analyzed, and to explain the meaning and interpretation of the acquired mathematical notions to non-experts. This test requires to prepare and discuss a presentation, in groups of up to 5 students, regarding a specific topic of the course, previously agreed with the teacher.

Both written and oral tests will take place after the end of the course.
There are not intermediate exams during the course.

b) Evaluation pattern:

Weights of written and oral test on the final evaluation:

- Weight of written test: 85%.
- Weight of oral test: 15%.

The written exam performance is not binding to have access to the oral test.