TEACHING UNIT OF QUANTITATIVE METHODS

BA course in Hospitality Management | X | **Teaching unit** | X | **Undergraduate** **A.A. 2020/2021**

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SSD | SECS-S/06 | **CFU** | 6 | **Year (I, II o III)** | I | **Semester (I o II)** | I |

Eventual pre-requisite (specify the teaching unit): none

Lessons timetable (to click on)

LEARNING OUTCOMES

Knowledge and understanding
The course requires students to learn the quantitative tools needed to understand and effectively communicate what is necessary to make informed economic decisions. The presentation of these tools is organized as follows: first, discussion of realistic examples; then, explanation of the abstract mathematical notions that arise from the discussion; and finally, analysis of applications in economics and business management frameworks.
Applying knowledge and understanding
Students must be able to construct mathematical models of situations: to this end, they must develop the skills to move from the description of a situation to its mathematical formalization. This includes the ability to read graphs, understand tables and correctly interpret quantitative information.
Any other learning outcomes, considering: **Communication skills.** Students must be able to clearly and rigorously explain the conceptual links between the theoretical contents of the course (in both oral and written form), and to explain the meaning and interpretation of the mathematical notions acquired to non-experts in the field.

SYLLABUS

Basic notions. Natural, integer, rational, irrational, real numbers, elements of set theory, subsets of R.   **Real functions in a single real variable.** Functions defined via tables, algebraic fourmulas and graphs, piecewise functions, graphs of elementary functions.   **Linear models.** Linear functions defined via tables and algebraic formulas, linear equations and inequalities, graph of linear functions, slope, linear models for cost, return and profit, linear models for demand and supply, models of time variation.   **Systems of linear equations and matrices.** Systems of two linear equations in two unknowns, methods to find solutions, systems of m linear equations in n unknowns, Gauss method, matrix algebra (sum and difference of matrices, scalar multiplication, matrix multiplication), rank, determinat of square matrices, inverse of square matrices, Rouché-Capelli theorem, Cramer rule, models with linear systems.   **Non-linear models.** Quadratic functions, quadratic equations and inequalities, quadratic models, exponential functions, exponential equations and inequalities, exponential models, logarithmic functions, logarithmic equations and inequalities, logarithmic models.   **Limits and continuity.** Numeric and graphic estimation of limits, computation of limits, continuous functions.   **Derivative.** Average rate of change, instantaneous rate of change, geometric approach to the derivative, derivative as a function, derivatives of elementary functions, applications to marginal analysis, derivative rules (derivative of the sum, the product and the quotient of functions), chain rule.   **Maxima and minima.** Definitions of maximizer, minimizer, maximum and minimum of a function, finding extreme values of a function, applications.

REFERENCE BOOKS AND ARTICLES

L. Peccati, S. Salsa, A. Squellati, *Matematica per l'economia e l'azienda*, Egea. S. Waner, S.R. Costenoble, *Strumenti quantitativi per la gestione aziendale*, Maggioli Editore. V. Aversa, *Metodi quantitativi delle decisioni*, Liguori Editore.	

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ASSESSMENT METHODS AND CRITERIA

The exam aims to verify the aptitude for reasoning and the ability to apply the skills acquired to the development of mathematical models of real situations. The exam consists of a written test and an oral test.
- In the written test the student must mathematically model a proposed situation (i.e., constructing the model, solving it via the acquired mathematical tools and interpreting the results obtained) and solve numerical exercises.
- The oral exam is an interview about the topics examined in the course.

EXAM'S STRUCTURE

The final exam is based on	Written and oral	X	Only written		Only oral	
Project work and relative discussion						
Other (specify)						

In case of written exam	Multiple choice		Open ended (no more than one page)	X	Numerical exercises	X

NOTES