General Information	
Academic subject	Mathematics for Economics.
Degree course	Marketing and Business Communication
ECTS credits	10
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Sabrina Diomede	sabrina.diomede@uniba.it	SECS-S/06

ECTS credits details	10		
Basic teaching activities	lectures		

Class schedule	
Period	I sem
Year	1
Type of class	Lectures-

Academic calendar	
Class begins	09/2023
Class ends	01/2024

Syllabus	
Prerequisites/requirements	Basic algebra, powers and roots, operations and factoring of polynomials. First and second order inequalities in one unknown "
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	• Knowledge of the basic notions and results in calculus for real functions of one variable. Capability of interpreting and/or sketching the graph of such functions. • Knowledge of the main results in differential calculus for real functions of one and two variables; ability to apply those results to economic notions and to elementary optimization problems.. • Capability of using basic mathematical tools whose use is most frequently required in quantitative subjects as economics, statistics, finance. • Ability to present and to communicate qualitative and quantitative information in economic-type subjects through mathematical tools.
Contents	•
Course program	1. Set theory.: notion of a set, operations among sets. 2. The concept of a function. Injective, surjective, bijective functions. The inverse of a function. Restrictions and extensions of functions. Composite functions. **3.Numerical sets.** Real intervals. Maxima and minima. Below and above bounded sets. Infimum and supremum. The completeness axiom. 4. Real-valued functions of a real variable. Graph of a real function. The polynomials. The identity principle for polynomials. Sequences of real numbers. Euler number.

	Maxima and minima for functions. Bounded above and/or below functions. Infima and suprema of functions. Monotone functions. Convex functions. Odd and even functions. Periodic functions. Elementary functions.
	5. **Limits** Neighborhoods of elements of. R^. Limit points and isolated points. Open and closed sets. Interior of a set. The concept of limit. <u>Th. on the uniqueness of limits. Th. On limits of inequalities. The sandwiching theorem</u>. Th on limit algebra. Th. on the limit of a composite function. Right- and left-hand limits. Th. on one – and two-sided limits. Limits of the elementary functions. Limits of sequences. 6 Continuity. Arithmetic operations in the set of continuous functions. <u>The extreme-values theorem. Intermediate value theorem.</u> Discontinuities. 7 Differential calculus. The definition of the derivative of a function. Right- and left-hand derivatives. Differentiable functions. Higher order derivatives. Th on the continuity of differentiable functions. Arithmetic operations in the set of differentiable functions The chain rule. 8. Local maximum and minimum points. <u>First derivative tests</u> for local maxima and minima: sufficient and necessary conditions. Second derivative tests for local maxima and minima. Applications of differential calculus to economics: elasticity of demand functions 9 .<u>The mean-value theorem and its corollaries</u> (test for constant functions, test for increasing and decreasing functions). <u>Rolle's theorem</u>. De l'Hopital's rule. Geometrical interpretation of the derivative. Cuspidal points. Tangents to graphs of functions. Asymptotes.. Differentiable convex functions. Inflection points. Tests for convexity and for inflection points Sketch of graphs of real-valued functions of a real variable. 10. Antiderivatives of a function. <u>Properties</u> of the antiderivatives. Indefinite integrals. Definition of Riemann-integrable functions and of the integral of a function. Some criteria to integrability. <u>Theorem on the existence of antiderivatives. Mean-value theorem for integrals. Fundamental theorem of integral calculus.</u> 11. Real-valued functions of two real variables. Basic topology, limits, continuity. Partial derivatives and gradient. Maxima and minima. First order (necessary) condition for local extrema. Applications to economics: cross elasticity, substitute and complementary goods; the profit maximization of a firm. Hints on constrained optimization. The Lagrange multipliers method
Bibliography	Matematica per l'economia e l'azienda .L. Peccati, S. Salsa, A. Squellati, Ed. Egea (Ch. 1,2,3,4,5,7(par 1-5), ch. 10 (par. 5,6,11,12) Matematica di base per l'economia e l'azienda. Esercizi e testi d'esame svolti, Castellani, Gozzi Soc. ed. Esculapio..
Notes	

Teaching methods	Lectures
Assessment methods (indicate at least the type written, oral, other)	Written and successive oral exam. The written exam consists of 4 exercises to be solved in 2 hours . In order to be admitted to the oral exam it is necessary that the written exam has received at least the grade "almost sufficient" As an alternative to the written exam the attending students may take midterms which, if passed, allow them to directly take the oral exam.
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are.	The student is expected to be able to: -correctly individuate and use the required tools and notions; -show and argue by exhaustive and correct mathematical reasoning, -Show command of mathematical language -Apply math tools to some problems deriving from marketing, economics and financial topics.
Further information	