Instructor's name	Sabrina Diomede
BA	- **MARKETING & BUSINESS COMMUNICATION** - **BUSINESS ECONOMICS**
Academic year	2015/2016
Term	First
Credits	10
Subject area	SECS-S/06

Course of Math for economics (a.a. 2015/2016)

(Prof. Diomede Sabrina)

Università degli Studi di Bari Aldo Moro

BA Marketing and Business Communication, Business Economics

Admission criteria

The numerical sets N, Z, Q ed R; powers and roots, operations and factoring of polynomials. First and second order inequalities in one unknown. 1 riga vuota

Aims of the course

To equip the students with a basic knowledge of calculus, together with some hints about applications

Course outline

1. The notion of a set, element of a set, inclusion and equality between sets. Union, intersection and complement of sets. The cartesian product between sets.

2. The concept of a function. Injective, surjective, bijective functions. The inverse of a function. Restrictions and extensions of functions. Composite functions.

3. Cartesian coordinate system. Equation of a line. Parallelism and perpendicularity between lines

. 4. Real intervals. Characterization of a real interval. Maxima and minima for sets of real numbers. Below and above bounded sets. Infimum and supremum. The completeness axiom. Insiemi separati ed insiemi contigui.

5. 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. Domains of functions..

6. The extended real number system R. Neighborhoods of elements of. R. Limit points and isolated points. Open and closed sets. Interior of a set. The concept of limit. Th. on the uniqueness of limits. Th. On limits of inequalities. The sandwiching theorem. Th. On limits of a sum, a product, a quotient of two functions. Th. on the limit of the restriction of a regular function. Th. on the limit of equal functions Th. on the limit of a composite function. Right- and left-hand limits. Th. on one – and two-sided limits. Th on the limit of a monotone function. Limits of the elementary functions. Limits of sequences.

7. Continuous functions. Continuity of the elementary functions. Arithmetic operations in the set of continuous functions. Th on the continuity of a composite function. The extreme-values theorem. Intermediate value theorem. Discontinuities..

8.. 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. Derivatives of elementary functions.

9. Local maximum and minimum points. First derivative tests 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;, the logistic curves.

10 .The mean-value theorem. Rolle's theorem. Consequences of the mean-value theorem : a condition for the existence of the derivative at a point, test for constant functions, test for increasing and decreasing functions. De l'Hopital's rule. Geometrical interpretation of the derivative. Cuspidal points. Tangents to graphs of functions. Asymptotes.. Differentiable convex functions. Second derivative test for convex functions. Inflection points. Tests for inflection points (necessary and sufficient conditions.) Sketch of graphs of real-valued functions of a real variable.

11. Antiderivatives of a function. Properties of the antiderivatives. Indefinite integrals. Table of antiderivatives. Hints on the integration of rational functions. Integration by parts.Integration by substitution. □ Hints on measure theory in R2 according to Peano-Jordan. Definition of Riemann-integrable functions and of the integral of a function. Main properties of the Riemann integral. Some criteria to integrability. Teorema della media integrale Th on the existence of antiderivatives. Mean-value theorem for integrals. Fundamental theorem of integral calculus. Applications to the consumer's surplus.

13. 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

Textbook

Bramanti, Pagani e Salsa. *Matematica. Calcolo infinitesimale e algebra lineare*. Zanichelli

Castellani, Gozzi. *Matematica di base per l'economia e l'azienda.* Soc. ed. Esculapio.

Assessment methods
Written and successive oral examination

Teaching methods
- lectures