Syllabus
Course description

Course title	**Preparatory Course in Mathematics**
Course code	99999
Scientific sector	SECS-S/06
Degree	Economics and Management, Economics Politics and Ethics
Period	25.09.2023 – 29.09.2023, 2 groups: 8-12/14-18 same content
Year	1st year
Credits	-
Modular	No

Total lecturing hours	20 hours per group
Total lab hours	-
Total exercise hours	-
Attendance	Highly recommended (OFA)
Prerequisites	not required

Specific educational objectives	The course refers to the educational activities chosen by the student and belongs to the scientific area of Statistics-Mathematics. The course gives a general overview of scientific contents. Precalculus Mathematics is reviewed which prepares for the Mathematics for Economists course. **Educational objectives:** (1) Refresh mathematical knowledge taught in high school, fill gaps and add a few new insights. (2) Motivate to experience and communicate (about) Mathematics. (3) Introduce mathematical vocabulary in English which is the language of the Mathematics for Economists course.

Lecturer	Dr. Paolo Maraner
Scientific sector of the lecturer	SECS-S/06
Teaching language	English
List of topics covered	• Sets: explanation, representation/notation, elements/subsets, unions, intersections, a few rules, Cartesian product • Functions: general definition as subset of Cartesian products, examples for non-numerical functions, real functions as important special case • Very brief re-introduction of natural numbers,

	integers, rational and real numbers with basic arithmetic rules, in particular the distributivity law, percentages. Manipulating algebraic expressions: the binomial theorem as a consequence of arithmetic rules, factoring out and expanding, manipulating fractions, polynomials
	• Absolute values, powers and roots, exponentials, logarithms: definition, computation, rules
	• Real functions: tables of values and graphical representation, absolute value function, polynomial (linear, higher degrees) and power functions, exponential and logarithmic functions
	• Solving linear equations with one variable, a complete case study of quadratic equations including graphs, equations which can be solved via taking logarithms.
	• Solving two linear equations with two variables simultaneously, cases with none, one and infinitely many solutions, graphical interpretation as intersection of lines
	• Solving inequalities (optional): linear inequalities in one and two variables and their graphical interpretation, inequalities involving absolute values in one variable
	• Definition of factorials and permutations, binomial coefficients, Pascal's triangle and combinations
Teaching format	Lectures and exercises.

Learning outcomes	**Knowledge and understanding** Basic mathematical knowledge will be revised and consolidated, familiarity with elementary solution procedures (e.g. for quadratic equations) will be generated. **Applying knowledge and understanding** By elementary examples from economic theory, a basic understanding for the necessity of mathematical modeling in economics is aimed for. **Making judgments** The ability to make fundamental distinctions in Mathematics (linear vs. nonlinear, first order vs. higher order etc.) is aimed for. **Communication skills** Basic abilities to apply a mathematical language in an economical framework will be aimed for. The students will be challenged to talk to the professor and to each other about mathematical constructions. Mathematical vocabulary in English is introduced and/or reviewed.

	Learning skills Prepares for the Mathematics for Economists and Mathematics for EPE courses which require a solid understanding of mathematical concepts.

Assessment and evaluation	Written final test – evaluation to be announced by the professor
Assessment language	English

Required readings	Will be announced at the beginning of the course.
Supplementary readings	Will be announced at the beginning of the course.