Syllabus

Course Description

Course Title	OFA-Mathematics
Course Code	27361
Course Title Additional	
Scientific-Disciplinary Sector	NN
Language	English
Degree Course	Bachelor in Economics and Management
Other Degree Courses (Loaned)	
Lecturers	Dott. Thi Khanh Linh Ha, ThiKhanhLinh.Ha@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/46385
Teaching Assistant	
Semester	First semester
Course Year/s	1
CP	0
Teaching Hours	20
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	-
Contents Summary	OFA (obblighi formativi aggiuntivi) - ADDITIONAL STUDY ACHIEVEMENTS: Before the start of the first semester, the faculty offers a preparatory course in mathematics. The test at the end of the preparatory course serves to assess students' initial knowledge in mathematics. If the assessment is negative, the student will be assigned additional educational requirements (OFA) to be fulfilled within the first study year. The additional achievments (OFA) can also be completed:

	by passing the test at the end of the OFA exercises or by passing the exam at the end of the first teaching module of the 'Mathematics' course (teaching module 1) or by passing the whole Mathematics exam (teaching module 1 + teaching module 2) within the first academic year. If these requirements are not met, students will not be allowed to take the examinations in the quantitative subjects of the second and third years of study.
Course Topics	• Sets: explanation, representation/notation, elements/subsets, unions, intersections, a few rules, Cartesian product. • Functions: general definitions, examples, real functions as important special case. • Very brief re-introduction of natural numbers, integers, rational and real numbers with basic arithmetic rules, percentages. Manipulating algebraic expressions, 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, inequalities involving absolute values in one variable. • Definition of factorials and permutations, binomial coefficients, Pascal's triangle and combinations.
Keywords	Precalculus, sets, functions, absolute values
Recommended Prerequisites	none
Propaedeutic Courses	none
Teaching Format	Lectures and exercises

Mandatory Attendance	Attendance not compulsory, but recommended
Specific Educational Objectives and Learning Outcomes	ILO 1 Knowledge and understanding ILO 1.1 Knowledge of basic and intermediate mathematical tools for ILO ILO 1.2 Understanding and analysis of economic mechanisms through theoretical models and empirical applications ILO 1.3 Knowledge of tools for static, dynamic, and comparative analysis for the analysis of data on individuals, businesses, and economies ILO 1.4 Knowledge and understanding of descriptive statistics, the fundamentals of probability theory and sampling methods, standard distributions and their application to economic analysis, as well as linear and non-linear regression Understanding of parametric estimation and hypothesis testing ILO 1.5 knowledge of the IT tools needed to read and analyse economic data and models ILO 1.6 knowledge of the structure of IT networks, their main applications and security techniques, as well as techniques for collecting, presenting and analysing data with the aid of appropriate software ILO 1.7 knowledge of international accounting systems and the double-entry method for recording and evaluating business management operations ILO 1.8 Understanding of financial statements ILO 1.9 In-depth knowledge of accounting data recording or management control ILO 1.10 Knowledge of the analysis method for estimating present values and discount factors to estimate the cost of capital and the valuation of bonds and shares ILO 1.11 Knowledge of medium- and long-term financial forecasting methodologies and sensitivity analysis with simulation under conditions of uncertainty to manage corporate and international finance risks ILO 1.12 Knowledge and understanding of the international financial environment, techniques for defending against multinational risks, and competitive strategies adopted by global banks ILO 1.13 Knowledge of the mechanisms underlying effective communication of quantitative topics in three languages: Italian, German and English

	ILO 2 Quantitative methods for decision-making ILO 2.1 Ability to analyse (unconstrained) optimisation problems and mathematically interpret models of social and economic dynamics ILO 2.2 Ability to formalise economic problems through mathematical models, solve such problems and interpret the results conceptually ILO 2.3 Ability to analyse economic data using descriptive, parametric and non-parametric statistical methods as well as linear and non-linear regression and interpret the results ILO 2.4 Ability to apply international accounting standards to different business contexts ILO 2.5 Ability to extract and interpret economic information from the web ILO 2.6 Ability to use computers and computer networks to analyse large amounts of data in solving complex problems and to write theses and articles ILO 2.7 Ability to evaluate fixed-income financial instruments and shares of companies listed on stock markets using spreadsheet programmes ILO 2.8 Ability to analyse financial statements using balance sheet ratios and communicate the results in accordance with international professional standards ILO 2.9 Ability to apply the main theories on the capital, foreign exchange and commodity markets to actual data, including at international level ILO 2.10 be able to establish the structure and implementation of an empirical project using econometric software and financial or economic databases ILO 2.11 be able to use financial investment performance evaluation techniques and understand the mechanisms of pricing risky financial assets and spot and forward interest rates ILO 2.12 Ability to work with basic and intermediate mathematical tools and basic statistical tools to study the behaviour of economic agents from a theoretical and empirical perspective ILO 2.13 Ability to analyse economic datasets using spreadsheets or other appropriate software ILO 2.14 Ability to use IT tools for economic analysis ILO 2.15 Ability to communicate the results of quantitative analyses prepared in accordance with international professional

	standards in three languages: Italian, German and English
Specific Educational Objectives and Learning Outcomes (additional info.)	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.
Assessment	The test at the end of the preparatory course serves to assess students' initial knowledge in mathematics. If the assessment is negative, the student will be assigned additional educational requirements (OFA) to be fulfilled within the first study year. (ILO 1-2)
Evaluation Criteria	Correctness of solutions.
Required Readings	Will be announced at the beginning of the course.
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	