Syllabus

Course Description

Course Title	Financial Mathematics
Course Code	25425
Course Title Additional	
Scientific-Disciplinary Sector	SECS-S/06
Language	English
Degree Course	Master in Accounting and Finance
Other Degree Courses (Loaned)	
Lecturers	Prof. Dr. Peter Alfons Schmid, PeterAlfons.Schmid@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/44766
Teaching Assistant	
Semester	First semester
Course Year/s	1
CP	6
Teaching Hours	36
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	18
Contents Summary	• Purpose: Provision of mathematical concepts and techniques used in the financial industry • Main contents: Pricing of bonds, term structure determination, mechanics and pricing of derivatives (forwards, futures, swaps and options), use of derivatives • Overall: Necessary foundations in order to attend other finance classes in the Master program
Course Topics	Time value of money, interest rate markets and conventions, pricing of bonds, duration and convexity, interest rate term structure determination and yield

	spreads, mechanics of forward and future markets; determination of forward and future prices; interest rate and currency swaps; credit default swaps; mechanics of option markets; trading strategies involving options; binomial trees; Wiener processes; Black-Scholes-Merton model; options on stock indices, currencies, and futures; the Greek letters; volatility smile
Keywords	interest rates, term structure, duration, convexity, forwards, futures, swaps, options, risk-neutral valuation, binomial trees, Black-Scholes-Merton model, Greek letters, volatility smile
Recommended Prerequisites	
Propaedeutic Courses	
Teaching Format	Frontal lectures and mini cases
Mandatory Attendance	Suggested, but not required
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding: Master's graduates should be able to acquire knowledge of economic-quantitative models that enable them to address management issues of companies, financial intermediaries, financial institutions and markets. These learning outcomes are achieved through an advanced knowledge and understanding - of the theories and tools for the economic analysis of the company and the market; - of the basic forecasting models for carrying out integrated economic and financial analyses, also making use of econometric time series and multivariate analysis methodologies - of Big Data analysis techniques in order to support and integrate business decision-making processes. Applying knowledge and understanding: Ability to apply knowledge in the area of Finance to be able to carry out an analysis of complex problems in a national and international interdisciplinary context Ability to apply knowledge in the area of Finance for the design and implementation of corporate restructuring and other extraordinary transactions Ability to apply knowledge in the area of Finance for the identification, evaluation and management of investments in financial markets

	Ability to apply knowledge in the area of Finance for the design of coherent financial management strategies in companies or financial intermediaries, competently applying acquired knowledge in risk management techniques, asset valuation, handling of derivatives Ability to apply knowledge in the area of Economic Analysis for understanding the evolution of financial markets and changes in the international macroeconomic environment Ability to apply knowledge in the area of Economic Analysis for the analysis of economic, managerial and financial variables to support the decisions of companies and financial intermediaries Ability to apply knowledge in the area of Economic Analysis to be able to frame and evaluate situations and problems in a critical manner and based on scientific methods in a multidisciplinary perspective, thanks to a training that integrates business, economic, legal, financial and statistical-mathematical disciplines Making judgements: Ability to apply the knowledge acquired to make managerial and operational decisions and to solve problems in the administration and finance of companies, intermediaries and financial markets, jointly taking into account multiple perspectives of analysis, from the economic to the legal, financial, strategic, managerial. Ability to select data and use appropriate information to describe a problem concerning the management of companies, intermediaries and financial markets. Ability to relate models and empirical evidence in the study of companies, intermediaries and financial markets. Communication skills: Ability to communicate effectively in oral and written form the specialised contents of the individual disciplines, using different registers according to the recipients and the communicative and didactic purposes, and to evaluate the formative effects of its communication Learning skills: a) ability to use information technology autonomously to carry out bibliographic research and investigations and for one's own training and updating b) ability to identify thematic links and establish relationships

	between different cases and contexts of analysis c) ability to frame a new problem systematically and to generate appropriate taxonomies d) ability to develop general models from the phenomena studied.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Written exams after 50% and at the end of the semester
Evaluation Criteria	1st session: assessment based on mid-term (33%) and final exam (67%) or final exam (100%) 2nd and 3rd session: final exam (100%)
Required Readings	John Hull: Optionen, Futures und andere Derivate, Pearson, 11th ed, 2021
Supplementary Readings	Selected chapters from CFA Institute Curriculum 2025 edition, Level I – III
Further Information	
Sustainable Development Goals (SDGs)	Decent work and economic growth, Responsible consumption and production, Industry, innovation and infrastructure