

# Syllabus

## *Course Description*

Course Title	Financial Mathematics
Course Code	25425
Course Title Additional	
Scientific-Disciplinary Sector	STAT-04/A
Language	English
Degree Course	Master in Accounting and Finance
Other Degree Courses (Loaned)	Loaned to LM-DATA Data Analytics for Economics and Management
Lecturers	Prof. Dr. Peter Alfons Schmid, PeterAlfons.Schmid@unibz.it <a href="https://www.unibz.it/en/faculties/economics-management/academic-staff/person/44766">https://www.unibz.it/en/faculties/economics-management/academic-staff/person/44766</a>
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	<ul style="list-style-type: none"> <li>• Purpose: Provision of mathematical concepts and techniques used in the financial industry</li> <li>• Main contents: Pricing of bonds, term structure determination, mechanics and pricing of derivatives (forwards, futures, swaps and options), use of derivatives</li> <li>• Overall: Necessary foundations in order to attend other finance classes in the Master program</li> </ul>
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
<b>Keywords</b>	interest rates, term structure, duration, convexity, forwards, futures, swaps, options, risk-neutral valuation, binomial trees, Black-Scholes-Merton model, Greek letters, volatility smile
<b>Recommended Prerequisites</b>	
<b>Propaedeutic Courses</b>	
<b>Teaching Format</b>	Frontal lectures and mini cases
<b>Mandatory Attendance</b>	Suggested, but not required
<b>Specific Educational Objectives and Learning Outcomes</b>	<p>ILO (Intended Learning Outcomes)</p> <p>ILO 1 – Knowledge and Understanding:</p> <p>ILO 1.1 Knowledge of economic and financial planning and evaluation of new investments</p> <p>ILO 1.2 Understanding of the fundamentals of corporate finance for the correct application, for example, of decision-making models and the management of financial data and risks in treasury management</p> <p>ILO 1.3 Knowledge of theories and tools for the economic analysis of firms and markets</p> <p>ILO 1.4 Understanding of basic forecasting models for conducting integrated economic and financial analyses, also using econometric methods for time series and multivariate analysis</p> <p>ILO 2 – Applying Knowledge and Understanding:</p> <p>ILO 2.1 Ability to develop and integrate the results of economic-financial communication into corporate decision-making models</p> <p>ILO 2.2 Ability to design and manage corporate restructuring and other extraordinary operations</p> <p>ILO 2.3 Ability to identify, evaluate, and manage investments in financial markets.</p> <p>ILO 2.4 Ability to design coherent financial management strategies in companies or financial intermediaries, applying acquired</p>

	<p>knowledge in risk management techniques, asset valuation, and derivative handling</p> <p>ILO 3 – Making Judgements: ILO 3.1 Ability to relate models and empirical evidence in the study of companies, intermediaries, and financial markets</p> <p>ILO 4 – Communication Skills: ILO 4 Ability to communicate effectively, both orally and in writing, the specialised content of individual disciplines, using different registers depending on the audience and the communicative and educational purposes, and to assess the educational impact of such communication</p> <p>ILO 5 – Learning Skills: ILO 5.1 Ability to develop general models based on the phenomena studied</p>
<b>Specific Educational Objectives and Learning Outcomes (additional info.)</b>	
<b>Assessment</b>	<p>Written exams after 50% and at the end of the semester</p> <p>(ILOs assessed 1-5)</p>
<b>Evaluation Criteria</b>	<p>1st session: assessment based on mid-term (33%) and final exam (67%) or final exam (100%)</p> <p>2nd and 3rd session: final exam (100%)</p>
<b>Required Readings</b>	<p>John Hull: Optionen, Futures und andere Derivate, Pearson, 11th ed, 2021</p>
<b>Supplementary Readings</b>	<p>Selected chapters from CFA Institute Curriculum 2025 edition, Level I – III</p>
<b>Further Information</b>	
<b>Sustainable Development Goals (SDGs)</b>	<p>Decent work and economic growth, Responsible consumption and production, Industry, innovation and infrastructure</p>