

## Syllabus

### Course description

<b>Course title</b>	<b>Financial Mathematics</b>
<b>Course code</b>	<b>25425/27504</b>
<b>Scientific sector</b>	SECS-S/06
<b>Degree</b>	Master in Accounting and Finance/ Master in Data Analytics for Economics and Management LM-Data (curriculum Data Analytics for Economics)
<b>Semester and academic year</b>	1st semester 2023/2024
<b>Year</b>	1
<b>Credits</b>	6
<b>Modular</b>	NO

<b>Total lecturing hours</b>	36
<b>Total lab hours</b>	-
<b>Total exercise hours</b>	-
<b>Attendance</b>	suggested, but not required
<b>Prerequisites</b>	not foreseen
<b>Course page</b>	<a href="https://www.unibz.it/en/faculties/economics-management/master-accounting-finance/">https://www.unibz.it/en/faculties/economics-management/master-accounting-finance/</a>  <a href="https://www.unibz.it/en/faculties/economics-management/master-data-analytics-economics-management/">https://www.unibz.it/en/faculties/economics-management/master-data-analytics-economics-management/</a>

<b>Specific educational objectives</b>	The purpose of the class is to expose students to the mathematical concepts and techniques used in the financial industry. Students will learn basic concepts as "time-value of money", interest rate conventions, pricing interest-sensitive securities, portfolio theory, sensitivity measures (e.g. duration, beta), the structure, mechanics and the pricing of derivatives (forwards, futures, swaps and options) using the no-arbitrage principle, the use of derivatives.
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<b>Lecturer</b>	Alex Weissensteiner Office E206 e-mail: <a href="mailto:Alex.Weissensteiner@unibz.it">Alex.Weissensteiner@unibz.it</a> Tel: 0471/013496 <a href="http://www.unibz.it/en/economics/people/StaffDetails.html?personid=1080&amp;hs_tf=1080">http://www.unibz.it/en/economics/people/StaffDetails.html?personid=1080&amp;hs_tf=1080</a>
<b>Scientific sector of the lecturer</b>	SECS-S/06
<b>Teaching language</b>	English

<b>Office hours</b>	please refer to the lecturer's web page
<b>Lecturing assistant</b>	-
<b>Teaching assistant</b>	-
<b>Office hours</b>	-
<b>List of topics covered</b>	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; 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>Learning outcomes</b>	<ol style="list-style-type: none"> <li>1. <u>Knowledge and understanding</u>: Knowledge of the major financial instruments and how to price them. Understand the principle of diversification and portfolio theory. Understanding of the no-arbitrage pricing principle (fundamental theorem of asset pricing).</li> <li>2. <u>Applying knowledge</u>: Ability to measure financial risks and to hedge them with financial derivatives, to price risky assets by applying the fundamental theorem of asset pricing.</li> <li>3. <u>Making judgments</u>: Relevant examples should encourage students to express their own judgments in classroom and to improve their problem-solving skills.</li> <li>4. <u>Communication skills</u>: The applied teaching method (mix of theory and applications) should stimulate the participation of students in classroom discussions.</li> <li>5. <u>Learning skills</u>: The course should provide the necessary foundations in financial mathematics in order to attend other finance classes in the Master program.</li> </ol>
<b>Assessment</b>	<p>Written exams: one mid-term and a final exam at the end of the semester.</p> <p>The mid-term and final exams are aimed at verifying skill 1 (Knowledge and understanding). Specific questions concerning interpretation of results and calculation in real applications during the exams will be aimed at verifying skills 2, 3 and 4 (Applying knowledge and understanding, Making judgements, Communication skills). Such questions will be largely based on practical in class activities carried out in groups as well as individually. Autonomous study (5, Learning skills) is also assessed since passing the mid-term and final exams possible by the autonomous execution of exercises suggested by the teacher for homework.</p>
<b>Assessment language</b>	English
<b>Evaluation criteria and criteria for</b>	Assessment based on mid-term (33%, counts for the January exam session only) and final exam (67%, or 100% in case of missed mid-term exam). Threshold (18 out of 30+ points). For exam sessions after January, 100% of the assessment is based on the final exam.

<b>awarding marks</b>	
<b>Required readings</b>	John Hull: Optionen, Futures und andere Derivate, Pearson, 9th ed, 2017
<b>Supplementary readings</b>	<p>P. Wilmott, S. Howison and J. Dewynne, The Mathematics of Financial Derivatives: A Student Introduction, Cambridge University Press, 1995</p> <p>Selected chapters from CFA Institute Curriculum 2018 edition, Level I – III</p>