Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	**Financial Mathematics**
Course code	**25425 / 27504 (loaned with LM-DATA)**
Scientific sector	STAT-04/A (Former SECS-S/06)
Degree	Master in Accounting and Finance / Master in Data Analytics for Economics and Management
Semester and academic year	1st semester 2025/2026
Year	1
Credits	6
Modular	NO

Total lecturing hours	36
Total lab hours	-
Total exercise hours	-
Attendance	suggested, but not required
Prerequisites	not foreseen
Course page	https://www.unibz.it/en/faculties/economics-management/master-accounting-finance/

Specific educational objectives	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.

Lecturer	**Prof. Peter Alfons Schmid** PeterAlfons.Schmid@unibz.it
Scientific sector of the lecturer	
Teaching language	English
Office hours	Yes, see timetable
Lecturing assistant	-
Teaching assistant	-
Office hours	-
List of topics covered	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.
Learning outcomes	• Knowledge and understanding: 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). • Applying knowledge: Ability to measure financial risks and to hedge them with financial derivatives, to price risky assets by applying the fundamental theorem of asset pricing. • Making judgments: Relevant examples should encourage students to express their own judgments in classroom and to improve their problem-solving skills. • Communication skills: The applied teaching method (mix of theory and applications) should stimulate the participation of students in classroom discussions. Even though the course is given in German, particular attention will be dedicated also to technical English expressions (and English slides are used). • Learning skills: The course should provide the necessary foundations in financial mathematics in order to attend other finance classes in the Master program.

Assessment	Written exams after 50% and at the end of the semester.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Assessment based on mid-term (33%) and final exam (67%, or 100% in case of missed mid-term exam). Threshold (18 out of 30+ points). For exam sessions after February, 100% of the assessment is based on the final exam.

Required readings	John Hull: Optionen, Futures und andere Derivate, Pearson, 11th ed, 2021

Supplementary readings	P. Wilmott, S. Howison and J. Dewynne, The Mathematics of Financial Derivatives: A Student Introduction, Cambridge University Press, 1995 Selected chapters from CFA Institute Curriculum 2025 edition, Level I – III