Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	**Quantitative Finance**
Course code	27205
Scientific sector	SECS-P/11
Degree	Bachelor in Economics and Management
Semester and academic year	2nd semester, ay 2023/2024
Year	Optional
Credits	6
Modular	No

Total lecturing hours	36
Total lab hours	-
Total exercise hours	-
Attendance	Recommended, but not mandatory. The lectures will be recorded and available in TEAMS in case you cannot attend regularly.
Prerequisites	A basic understanding of statistics is necessary. There are no general prerequisites.
Course page	

Specific educational objectives	The course refers to the complementary educational activities chosen by the student and belongs to the scientific area of Economics. The course provides coverage of important topics in modern Quantitative Finance at the advanced undergraduate level. Special interest is given to asset pricing theory and its empirical applications. Factor models and option pricing are core elements of the course. All concepts and models are applied in R with real world data. Thus, students learn to implement financial models from start to finish. As a result, students develop the theoretical knowledge and practical skills required for coping with various problems encountered in finance. Trading strategies can be developed and applied in real-world settings.

Lecturer	Peter Alfons Schmid e-mail: peteralfons.schmid@unibz.it Tel: 049 176 207 35606 https://www.unibz.it/it/faculties/economics-management/academic-staff/
Scientific sector of the lecturer	SECS-P/09
Teaching language	English

Lecturing assistant	Not foreseen
Teaching assistant	Not foreseen
Office hours	18 office hours
List of topics covered	**Theory** • Risk-Return Trade-Off • Risk measures (Value-at-Risk & Expected Shortfall) • Factor Models (CAPM, Fama & French) • Options (Black Scholes, Binomial option pricing) • Credit risk (Merton model) • Trading strategies **Applications** • Introduction to R • Data exploration, estimation and simulation • Implementation of trading strategies
Teaching format	Lectures and applications in R

Learning outcomes	Knowledge and understanding: • Students shall excel at modern finance topics. They are able to use advanced quantitative methods. • Based on the risk-return trade-off students understand asset pricing based on factor models. • Students are able to apply the Black-Scholes-formula and binomial models for option pricing. • Students understand equity as a call option and are able to evaluate credit risk. • Students are able to use the Monte Carlo simulation. Applying knowledge and understanding: • Students learn to apply the theoretical concepts and models to real world data. • Students can develop and apply trading strategies. • Therefore, students learn to apply R. The course covers all topics from the import of data to various applications and statistical challenges. Making judgments • Students are able to choose the appropriate methods and techniques. • As a result, students are able to make financial decisions under uncertainty. Communication skills • Students are able to communicate their financial decisions based on empirical evidence. Learning skills • Students understand financial problems and find solutions to these problems. • Students apply analytical reasoning and empirical asset pricing.

Assessment	Students may **opt between two different types of assessment**:

	1) **Standard assessment** for the course is an obligatory final examination which is a closed book written exam (100% of the final grade). 2) Moreover, there is the possibility of an **optional assessment**, where students write a project paper and have their performance assessed by both the project paper (40% of the final grade) and the obligatory final examination (60% of the final grade). The optional assessment is only available for attending students having notified the lecturer of their choice at the latest on the date of the 9th lecture. The optional course project can be done in groups of 2 students.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Theoretical knowledge of models and concepts covered in the class as well as knowledge of their empirical applications.

Required readings	• Ang, C. S., Analyzing Financial Data and Implementing Financial Models Using R, 2nd edition, Springer, 2021.
Supplementary readings	• Benninga, S., Financial Modeling, MIT Press, 4th edition, 2014. • Research papers are provided during the course.