Syllabus

Course Description

Course Title	Financial Engineering and quantitative investment strategies
Course Code	25424
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 https://www.unibz.it/en/faculties/economics-management/academic-staff/person/44766
Teaching Assistant	
Semester	First semester
Course Year/s	2
CP	6
Teaching Hours	36
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	18
Contents Summary	• Purpose: Introduction to a broad array of topics from financial engineering and provision of tools and methodologies for implementing quantitative investment strategies • Main contents: quantitative methods, credit risk transfer, structured products, alternative investments, especially real assets, private equity & hedge funds, active management and investment strategies (theoretical foundations and empirical testing) • Overall: Knowledge and skills to solve real world quantitative finance problems
Course Topics	• Quantitative methods: Review of financial mathematics

	and modelling. • Credit risk transfer: Determination of credit risk and usage of instruments like credit default swaps, total return swaps, asset backed securities, etc. • Structured products: Development and pricing of products - based on equities and fixed income securities - that exhibit specific return, risk or other attributes. • Alternative investments: Fundamentals of the alternative investment space, especially real assets, private equity & hedge funds. Adding value through active management (absolute & relative returns, risk reduction through diversification). • Investment strategies: Theoretical foundation and empirical testing of trend following, and momentum strategies, fixed-income strategies and relative value & event driven strategies
Keywords	credit risk transfer, structured products, alternative investments, investment strategies
Recommended Prerequisites	
Propaedeutic Courses	
Teaching Format	lectures and empirical applications
Mandatory Attendance	Highly recommended
Specific Educational Objectives and Learning Outcomes	ILO (Intended Learning Outcomes) ILO 1 – Knowledge and Understanding: ILO 1.1 Knowledge 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 ILO 1.2 Understanding of management models and cost-effectiveness of different types of intermediaries, market microstructure, operational efficiency of financial markets, and the impact of financial markets on the economic conditions of intermediaries. ILO 1.3 Knowledge of a wide range of investment, financing, and risk management tools, starting from the fundamentals of portfolio diversification and the classical models for asset pricing and risk measurement

	ILO 1.4 Understanding of specific Finance topics that characterise the roles of Financial Analyst, Portfolio Manager, Chief Financial Officer (CFO), Administrative Manager, Controller, Internal Auditor, and Business Consultant ILO 2 – Applying Knowledge and Understanding: ILO 2.1 Ability to identify, evaluate, and manage investments in financial markets. ILO 2.2 Ability to design coherent financial management strategies in companies or financial intermediaries, applying acquired knowledge in risk management techniques, asset valuation, and derivative handling ILO 3 – Making Judgements: ILO 3.1 Ability to relate models and empirical evidence in the study of companies, intermediaries, and financial markets 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 ILO 5 – Learning Skills: ILO 5.1 Ability to frame a new problem systematically and to generate appropriate taxonomies
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Students may opt between two different types of assessment: 1) Standard assessment for the course is an obligatory final written examination (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 (50% of the final grade) and the

	obligatory final examination (50% 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 9thlecture. The optional course project can be done in groups of 2 students. (ILOs assessed 1-5)
Evaluation Criteria	Theoretical knowledge of models and concepts covered in the class as well as knowledge of their empirical applications.
Required Readings	Selected chapters from: • Financial Engineering and Computation: Principles, Mathematics, Algorithms by Y.-D. Lyuu, 2002, Cambridge University Press. • Principles of Financial Engineering by R. Kosowski and S.N. Neftci, 2015, Academic Press. • Alternative Investments: CAIA Level I, 4th edition, by D.R. Chambers, M.J.P. Anson, K.H. Black, H.B. Kazemi, 2020, Wiley Finance Editions.
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Quality education, Responsible consumption and production, Industry, innovation and infrastructure, Decent work and economic growth