

Syllabus Winter Term 2022-23

Prof. Dr. Michael Feucht

Subject: Advanced Risk Management
 Study Group: IBF3
 Language: English
 Lecture hours: Tuesdays, 8.00 am to 11.20 pm (in some weeks we will need all 4 hours for lecture, in some weeks you will have time to work on your project)
 Room #: W4.04

Grade: Final Exam (50%)/IT Project Documentation (30%)/Presentation (20%)
 Bonus Points: With DataCamp courses, you may earn up to 20% (10 percentage points) towards the final exam.
 Courses count 2 percentage points each - excluding assignments from first semester, these should only help you remember.

Reading (selected chapters): Hull, Risk Management and Financial Institutions, 4th ed. Wiley Finance, 2015
 Danielsson, Financial risk forecasting, Wiley Finance 2011
 Shumway/Stoffer, Time Series Analysis and Its Applications, 4th ed., Springer 2017

Date	Topic	Lecture	Project	DataCamp Assignment (recommended weeks to work on these)	Semester Project
4-Oct-2022	Introduction to the Course Organisation of Semester Project Recap: Risk and Return in Modern Portfolio Theory	2	2	Course "Introduction to Portfolio Analysis in R" Course "Intermediate Portfolio Analysis in R" Course "Importing and Managing Financial Data in R" Course "Manipulating Time Series Data with xts and zoo in R" xts Cheat Sheet	Retrieve data from Yahoo!Finance and other sources to MS Excel and R Calculate individual asset returns Build equally weighted portfolio Calculate portfolio returns
11-Oct-2022	Return: Discrete and Continuous Return, Portfolio Return	2	2	Course "Time Series Analysis in R" Course "Visualizing Time Series Data in R" Course "Case Studies: Manipulating Time Series Data in R"	
18-Oct-2022	Intro to Time Series Analysis: AR, MA, ARMA and ARIMA Models	4		Course "ARIMA Models in R"	Static volatility estimator - unbiased; Variance-Covariance-Matrix; Markowitz-Portfolio VaR of the two portfolios (variance-covariance-approach with static covariance matrix)
25-Oct-2022	Fat Tails and Normal Distribution: Visual Analysis and Power Law	4		Course "Forecasting in R" (this will automatically finish the skill track "Time Series with R")	VaR: Simulation of the two portfolios
1-Nov-2022	No class				
8-Nov-2022	Normal Distribution assumption	2	2	Course "GARCH Models in R"	Volatilities with sliding time windows
15-Nov-2022	Dynamic Volatility Estimation: The Basics	4			
22-Nov-2022	Advanced Dynamic Volatility Estimation: EWMA and GARCH	2	2	Course "Quantitative Risk Management in R"	EWMA volatility estimation (with given lambda)
29-Nov-2022	No class				
6-Dec-2022	Calibrating the Parameters: Maximum Likelihood Estimation Midterm Project Presentations	4			EWMA volatility estimation (with maximum-likelihood lambda)
13-Dec-2022	Value-at-Risk: Variance-Covariance Approach, Historical Simulation and Monte-Carlo Simulation	4		Course "Multivariate Probability Distributions in R"	GARCH(1,1) volatility estimation in R (either "hands-on" with maximum likelihood estimators for alpha, beta and omega or using rugarch-package)
20-Dec-2022	Joint Stochastic Behavior: Covariance, Correlation and Copulas	4			
27-Dec-2022	Christmas Break				
3-Jan-2023	Christmas Break				
10-Jan-2023	Final Project Presentations		4		Backtesting
		32	12		

Due date for semester papers, presentations slides and DataCamp Assignments
 January 15, 2023

Teaching Load 2 SWS
 Student Workload 4 ECTS corresponds to 120 hours of work