Zurich University
of Applied Sciences

School of
Management and Law

Valid for 2022.FS

Module Name: Smart Data Analytics for Stochastic Processes		
Module Code	w.BA.XX.2SDASP.XX	
Module Description	Smart Data Analytics for Stochastic Processes helps you to analyse stock prices (i.e., stochastic processes) and improves your trading abilities over time. Using real data sets with asset prices and asset returns, we learn to identify trends and detect cycles and seasonality with statistical time series methods. Vast amounts of data are collected across the globe on a daily basis over time: traders use real-time stock price information to forecast stock prices and their returns; banks gather information on the income, wealth, creditworthiness, and transactions of their clients, and tech giants (e.g., Apple, Google) harvest data on essentially any dimension of our personal life from consumption patterns to social interactions to customer solvency information via email, social media, or mobile devices. One key advantage of the improved data availability is that it allows banks, companies, financial analysts, and scientists alike to answer a series of highly relevant real-world questions. How does a stock price or a stock market index move over time? How can I predict a stock return and price tomorrow? Answering such questions requires solid statistical knowledge on how to properly analyze the newly available data. This module introduces students to the most important quantitative methods used in the forecasting of financial products (e.g., stock price, asset, return and debt) and provides an introduction to the statistical software R. Students learn how to carry out an empirical project predicting returns on financial assets (i.e., stock price and return), in which they will apply the techniques taught in class based on real stock data (e.g., Bloomberg and Refinitiv, which will be provided in class to all participants). Topics include linear regression analysis, the analysis of stochastic processes (time series) and causal analysis. Examples from the literature and computer tutorials offer hands-on experience in utilizing the methods. The distinctive feature of the module is a learning-by-doing approach with a strong emphasis on the application of methods to real data and the correct interpretation of results. In addition, the module introduces students to time series econometrics using real-time financial data.	
Program and Specialization	§ Business Administration - Accounting, Controlling, Auditing § Business Administration - Banking and Finance § Business Administration - Economics and Politics § Business Administration - General Management § Business Administration - General Management (Flex) § International Management	
Legal Framework	Academic Regulations BSc dated 29.01.2009, Appendix to the Academic Regulations for the degree programs in Business Administration, Business Information Technology, and Business Law, first adopted on 12.05.2009	
Module Category	**Module Type:** Compulsory Elective	**Program Phase:** Main Study Period
ECTS	3	
Organizational Unit	W Fachstelle für Wirtschaftspolitik	
Module Coordinator	Nicole Bellert (bell)	
Deputy Module Coordinator	Andrea Maria Günster (gues)	
Prerequisite Knowledge	The module is aimed at BSc students with a solid knowledge of (basic) statistics and a strong preference for working with data and statistical software.	
Contribution to Program Learning Goals (Affected by Module)	§ Professional Competence § Methodological Competence § Social Competence § Self-Competence	
Contribution to Program Learning Objectives	Professional Competence § Knowing and Understanding Content of Theoretical and Practical Relevance § Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance § Evaluate Content of Theoretical and Practical Relevance Methodological Competence § Problem-Solving & Critical Thinking § Scientific Methodology § Work Methods, Techniques, and Procedures § Information Literacy § Creativity & Innovation Social Competence § Written Communication § Oral Communication § Teamwork & Conflict Management	

	Self-Competence § Learning & Change
Module Learning Objectives	Students... § are able to explain the basic principles of modern empirical finance. § are able to interpret empirical results and conduct statistical significance tests using financial data. § are able to explain the obstacles in the causal interpretation of empirical results. § are able to work with the statistical software R. § are able to plan and apply the methods discussed in class in their own work (e.g., module project, Bachelor's thesis). § are able to summarize their empirical findings and present them to their peers. § are able to explain the basic principles of stochastic processes and time series econometrics.
Module Content	§ Introduction to key empirical methods in financial data over time (linear regression and time series models). § Introduction to the statistical software R. § Working with real-world data (on asset prices). § Methods are illustrated using simulated and real-world data on financial markets over time.
Links to other modules	The content of this module is linked to the following modules: w.BA.XX.1QMeth.XX
	w.BA.XX.1Stat.XX
	w.BA.XX.1Stat-PiE.XX
	w.BA.XX.2QMeth.XX

Methods of Instruction	§ Lecture § Exercises § Problem-Oriented Teaching § Project Work	**Social Settings Used:** § Individual Work § Group Work
Digital Resources	§ Teaching Materials § Practice and Application Exercises (with Key)	

Type of Instruction	**Classroom Instruction**	**Guided Self-Study**	**Autonomous Self-Study**
Large Class	20 h	-	
Small Class	-	-	
Group Instruction	-	-	
Practical Work	8 h	-	
Seminar	-	-	
Total	**28 h**	**0 h**	**62 h**

Performance Assessment

End-of-module exam	**Form**	**Length (min.)**	**Weighting**
-	-	-	-
Permitted Resources	-		

Others	**Assessment**	**Length (min.)**	**Weighting**
Written assignment (presentation of small exercises in class: 10 extra bonus points)	Grade	-	100,00 %

Classroom Attendance Requirement	Mandatory Attendance: None
Language of Instruction/Examination	English
Compulsory Reading	Wooldridge, J. (2008). Introductory Econometrics: A Modern Approach. 4th edition. New York: Nelson Education. ISBN 978-133755886.
Recommended Reading	-
Comments	-