

Valid for 2023.HS

Module Name: Applied Data Science: Exploratory Data Analysis with Python	
Module Code	w.MA.XX.DSEDA.19HS
Module Description	This module deals with the handling and evaluation of structured data in Python. It offers guidelines for parts of the Python programming language and its data-oriented library ecosystem to conduct effective (explorative) data analysis. The focus is on "Pandas", a data analysis library which relies on and has expanded data structures from R and thus offers the perfect introduction/transition to data analysis with Python. The module uses concrete cases to show how a variety of typical (explorative) data analysis problems can be solved using Python.
Program and Specialization	Accounting and Controlling
Legal Framework	Academic Regulations MSc in Accounting and Controlling dated 10.12.2015, Appendix to the Academic Regulations for the degree program in Accounting and Controlling, first adopted on 26.01.2016
Module Category	Module Type: Compulsory Elective
ECTS	3
Organizational Unit	W Institut für Financial Management (IFI)
Module Coordinator	Armin Bänziger-Aiba (banz)
Deputy Module Coordinator	Thomas Gramespacher (grat)
Prerequisite Knowledge	Applied Statistics with R (w.MA.XX.ASR-M4.21HS) or a similar course on statistics
Contribution to Program Learning Goals (Affected by Module)	<ul style="list-style-type: none"> § Professional Competence § Methodological Competence § Social Competence § Self-Competence
Contribution to Program Learning Objectives	Professional Competence <ul style="list-style-type: none"> § 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 <ul style="list-style-type: none"> § Problem-Solving & Critical Thinking § Scientific Methodology § Work Methods, Techniques, and Procedures § Information Literacy § Creativity & Innovation Social Competence <ul style="list-style-type: none"> § Written Communication § Oral Communication Self-Competence <ul style="list-style-type: none"> § Self-Management & Self-Reflection § Ethical & Social Responsibility § Learning & Change
Module Learning Objectives	Students... <ul style="list-style-type: none"> § write, comment on, and execute Python code in a Jupyter notebook. § know the main principles of the Python programming language necessary for data analysis, especially dealing with lists, branches, loops, and functions. § know the key libraries for data analysis and what library can be used in what context. § are able to import and export data in different formats. § are able to clean, combine (join), and transform data in Pandas. § visualize data using Pandas, Matplotlib, and Seaborn. § are able to aggregate data, apply group operations while also employing their own functions. § manipulate time series and panel data. § analyze (large) data sets using Pandas. § acquire the skills they need in this context to a considerable extent in supervised self-study.

Module Content	§ Basic knowledge of Python and Jupyter notebooks § Data structures and functions in Python § Basics of NumPy § Introduction to Pandas § Load and store data; data formats § Data wrangling - cleaning and transforming data § Data wrangling- combining and reshaping § Plotting and visualizing § Data aggregation and group operations § Time series § Extensive data analysis examples		
Links to other modules	The content of this module is linked to the following modules: w.MA.XX.AOR-M9.21HS w.MA.XX.ASR-M4.21HS		
Methods of Instruction	§ Interactive Instruction § Application Tasks § Exercises	Social Settings Used: Individual Work	
Digital Resources	§ Practice and Application Exercises (with Key) § Multiple Choice Tests		
Type of Instruction	Classroom Instruction	Guided Self-Study	Autonomous Self-Study
Lecture	12 h	58 h	
Excercise	-	-	
Project Work	-	-	
Seminar	-	-	
Total	12 h	58 h	20 h
Performance Assessment			
End-of-module exam	Form	Length (min.)	Weighting
Written exam	Closed book	45	100.00 %
Permitted Resources	Approved calculator according to "Guidelines on Supplementary Materials"		
Others	Assessment	Length (min.)	Weighting
-	-	-	-
Students are not allowed to revise and resubmit performance assessment tasks.			
Classroom Attendance Requirement	Mandatory Attendance: None		
Language of Instruction/Examination	German		
Compulsory Reading	-		
Recommended Reading	McKinney, W. (2022). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter. 3rd edition. Sebastopol, CA [u. a.]: O'Reilly. ISBN 978-1098104030. The module follows the structure of this textbook. The scripts are self-explanatory (and shortened), so that the textbook is not compulsory reading. The 3rd edition (Open Edition) is freely available at https://wesmckinney.com/book/ .		
Comments	This module is taught in the FLEX mode. Face-to-face classes are held every three weeks (in Semester Weeks 1, 4, 7, 10, 13, and 14). In the intervals, content is explained using Jupyter notebooks with comments (one notebook with each new set of Python functionalities to be studied as well as an exercise, with solutions, to practice them).		