

Valid for 2022.HS

Module Name: Data Analytics	
Module Code	w.BA.XX.3DA-WIN.XX
Module Description	This module provides students with the foundations and basic concepts of data analytics. Students will learn to create e2e data analytics workflows and perform their own practice-oriented data analytics projects. They become familiar with the necessary tools and programming languages for data analytics. The module builds on the content of the "Statistik" module and provides the basis for "KI-Anwendungen" and "Business Intelligence".
Program and Specialization	§ Business Information Technology § Business Information Technology - Specialization in Business Information Systems
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, Business Law and Applied Law, first adopted on 12.05.2009
Module Category	Module Type: Compulsory
	Program Phase: Main Study Period
ECTS	6
Organizational Unit	W Institut für Wirtschaftsinformatik
Module Coordinator	Mario Gellrich (gell)
Deputy Module Coordinator	Elena Gavagnin (gava)
Prerequisite Knowledge	Basic programming experience using the Python programming language Previous knowledge of statistics
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 § Intercultural Insight & Ability to Change Perspective Self-Competence § Self-Management & Self-Reflection § Ethical & Social Responsibility § Learning & Change
Module Learning Objectives	Students... § can recognize the potential and benefits of data in a business context. § know common tools and programming languages for data analytics and can apply them in practice-oriented projects. § can create e2e data analytics workflows for practice-oriented projects. § know common data sources and can apply methods for data collection including web scraping and web APIs. § know and can work with different data types, data structures, and file formats in Python. § can import and export data in different file formats and read, query, and write SQL databases from Python. § can clean, organize, enrich, and create new data and simulate data in Python. § can analyze data using non-graphical and graphical exploratory data analysis (EDA) methods. § can graphically represent and analyze geographical data. § can perform univariate data analysis using frequency tables and measures of central tendency and variability.

	§ can perform bivariate data analysis using cross tables, correlation analysis, and statistical tests for the comparison of central tendencies. § can perform multivariate data analysis using regression models (OLS, RT), classification models (CT, RF), and clustering (k-means). § can perform sentiment analysis based on social media and other textual data. § can prepare, present, and explain data analysis results in a professional and comprehensible way.		
Module Content	§ Introduction to data analytics: Basic concepts, methods, and applications § Data sources and data collection methods: OpenData, web scraping, and web APIs § Data types and structures in Python and common file formats § Import and export of data in Python and working with SQL databases § Clean, organize, enrich, and create new data and simulate data in Python § Graphically and non-graphically exploratory data analysis (EDA) § Graphical representation and analysis of geographical data § Statistical hypothesis testing (I): Paired & unpaired sample tests, analysis of contingency tables § Statistical hypothesis testing (II): Correlation analysis, analysis of variance (ANOVA) § Multivariate data analysis and predictive modeling: regression (linear regression, regression trees) § Multivariate data analysis and predictive modeling: classification (classification trees, random forests) § Multivariate data analysis and predictive modeling: clustering (k-means) § Text mining and sentiment analysis § Presenting and sharing data analysis results		
Links to other modules	The content of this module is linked to the following modules: w.BA.XX.3BI-WIN.XX w.BA.XX.3KIA-WIN.XX w.BA.XX.3Stat-WIN.XX		
Methods of Instruction	§ Lecture § Application Tasks § Exercises § Project Work § Literature Review	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	28 h	-	
Small Class	28 h	56 h	
Group Instruction	-	-	
Practical Work	-	-	
Seminar	-	-	
Total	56 h	56 h	
Performance Assessment			
End-of-module exam	Form	Length (min.)	Weighting
Written exam	Open book	75	70,00 %
Permitted Resources	Approved calculator according to "Guidelines on Supplementary Materials"	With dictionary	
Others			
Project work		Assessment	Length (min.)
Project work		Grade	20
Submission of the solutions of weekly exercises (to pass this assessment, all solutions must have the predicate 'pass')		Pass/Fail	-
Classroom Attendance Requirement	Mandatory Attendance: None		
Language of Instruction/Examination	English		
Compulsory Reading	The literature issued in class or made available on the Moodle teaching platform is compulsory reading.		
Recommended Reading	-		
Comments	-		