Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Basics in Data Management
Code der Lehrveranstaltung	27359
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	IINF-05/A
Sprache	Englisch
Studiengang	Bachelor in Wirtschaftswissenschaften und Betriebsführung
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Ing. Fabio Persia, Fabio.Persia@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/35741
Wissensch. Mitarbeiter/Mitarbeiterin	Dr. Riccardo Billero
Semester	Zweites Semester
Studienjahr/e	1
KP	5
Vorlesungsstunden	36
Laboratoriumsstunden	36
Stunden für individuelles Studium	
Vorgesehene Sprechzeiten	
Inhaltsangabe	The course is designed to acquire basic knowledge on data formats, organization and data extraction techniques as well as basic skills in data analysis and processing. The course also introduces the software R and provides a bootcamp on Access. Specifically, it provides an overview of data management and an introduction to programming with R. It then

	covers file management, extraction, archiving, and data cleaning with R, the use of different data formats, including CSV and JSON, and the management, analysis, and visualization of numerical data. Finally, it covers the creation and use of relational databases with SQL and shows applications on economic and business data.
Themen der Lehrveranstaltung	- Information Systems: Data and Information, Complex Information, Complex Data and Information, interactions with databases, Database, Database to support an organization's activities, Database description, Definition of DBMS, the importance of the DBMS, Managing a phone book, Definition of database system, ANSI-SPARC Three-Level Architecture, Example of conceptual/logical schema, Example of external schema. Application data independence, External Schema, History of DBMSs: the different data models, Functionality of a DBMS, Example of Query, Transactions, Operations in transactions, Example of Transaction ACID properties of transactions, Features of a DBMS, Example of a non-redundant database. ACID properties of transactions, Features of a DBMS, Main components of a DBMS. - Examples of Information Systems: Operational Support Systems, Management of orders and purchases, Monitoring and Control Systems, Environmental monitoring systems, Video Surveillance Systems. - Information Systems in Public Administration: Document Management, Hospital Information Systems, Patient management in a hospital, Transportation Information Systems, Airport. - Introduction to R: Manuals on R, the R environment, FAQ on R, On-line resources on R, Background, Why should I use it?, Some Caveats, Installation and Start, Some useful tidbits, Packages, Installing Packages, Creating Variables, Importing Data, Plotting Data. - Preliminary Concepts about R: How R works, Creating, listing and deleting the objects in memory, the on-line help. - Data with R: Objects, Reading data in a file, Saving data, Generating data, Manipulating objects, Converting objects, Operators, Matrix computation, Matrix Computation in R, Product Row by Column. - Relational Model: Introduction, the factors of success, Relation: definition, Relation: graphic schematization, Relation, Example (Relation), Remarks, Properties of a relation, Representation of a relation, Tables and Relations, Relation Schema, Examples of

	Relation Schemas, Relation on a schema, Important Notation, Example. Relation on a schema, Incomplete Information, Example of Incomplete Information, Databases and Integrity Constraints, Database Schema, Relational Database, Remarks, Types of constraints, Intra-relational constraints, Domain constraint, Tuple constraint, Superkey, Key, Example of Superkeys and Keys, Notes, Integrity of the entity, Example relation schema with primary key. Inter-relational constraints, Example of Inter-relational constraints, Referential integrity, Concept of referential integrity, Referential integrity: syntax, Relational notation of the example, Relational Database Example, Intra-relational constraints, Choice of keys. - SQL as DDL: Data definition in SQL, in SQL, Create Table, Data Types, Constraints, Syntax, Example DB student careers, Example DB Soccer Championship, ALTER TABLE, DROP TABLE, Creating and editing schemas of relations, Changing schemas of relations - Example, CREATE SCHEMA, DROP SCHEMA, Creating a database schema – Example. - SQL as DML: Updating Rows, Deleting Rows, Queries, Syntax, Examples, Operator LIKE, NULL Values, SQL vs. Relation as a Set, Cartesian Product, Ambiguous Names, Cartesian Product - Example, Join - Example, Cartesian Product - Example, Join - Example, Variables used in the FROM, Order by, Aggregate Operators, Aggregate Operators - Examples, Queries with Grouping, Queries with Grouping - Example, Predicates on Groupes, Predicates on Groupes - Example, Set Queries, Set Queries - Example. Exercises on SQL Queries. - JSON: What is JSON, Syntax, Data Types, Usage, Examples.
Stichwörter	Information Systems, Data Management, R, Relational Model, SQL, JSON
Empfohlene Voraussetzungen	
Propädeutische Lehrveranstaltungen	
Unterrichtsform	This course will be delivered through a combination of frontal lectures and labs.
Anwesenheitspflicht	Attendance is strongly recommended but not compulsory
Spezifische Bildungsziele und erwartete	ILO 1 Knowledge and understanding ILO1.1 knowledge of tools for static, dynamic, and comparative

Lernergebnisse	analysis of data on individuals, enterprises and economies ILO 1.2 knowledge of computer tools necessary for reading and analysing economic data and models ILO 1.3 knowledge of the structure of computer networks, their main applications and security techniques as well as techniques for collecting, presenting and analysing data using appropriate software ILO 2 Ability to apply knowledge and understanding ILO 2.1 know how to analyse (unconstrained) optimisation problems and mathematically interpret models of social and economic dynamics ILO 2. 2 know how to formalise economic problems using mathematical models, solve such problems and interpret the results conceptually ILO 2.3 knowing how to derive and interpret economic information taken from the web ILO 2.4 knowing how to use computers and computer networks to analyse large quantities of data in solving complex problems and to write theses and articles ILO 2.5 know how to value fixed-income financial instruments and shares of companies listed on stock markets through the use of spreadsheet programmes ILO 2.6 know how to set up and carry out an empirical project using econometric software and financial or economic databases ILO 2.7 knowing how to analyse economic datasets using spreadsheets or other suitable software ILO 2.8 knowing how to use IT tools for analysing economies ILO 3 Making judgements ILO 3.1 choose the most appropriate quantitative and qualitative methods of analysis ILO 3.2 find the necessary information in databases, legal sources and scientific literature ILO 3.3 use logical reasoning to combine information and analytical methods, also using modern software packages, to arrive at a solution ILO 4 Learning skills ILO 4.1 retrieve information from databases, scientific literature,

	laws and regulations as required in professional life ILO 4.2 analyse, critically process and integrate data, information and future experience, also using advanced software
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	The assessment will be made through a written examination, which includes questions both theoretical and inherent in solving specific problems using the different tools and techniques described during the course. Each question is assigned a maximum score; the student's final grade is calculated by summing the scores obtained on each question. ILOs 1 to 4 assessed
Bewertungskriterien	Grades are distributed as follows: - theoretical questions (60%) and practical questions (40 %).
Pflichtliteratur	Lecture slides are made available on Microsoft Teams.
Weiterführende Literatur	Elmasri, Navathe, “Fundamentals of Database Systems”, Pearson (in English). Atzeni, Ceri, Paraboschi, Riccardo Torlone, “Database Systems”, McGraw-Hill. Chianese, Moscato, Picariello, Sansone, “Sistemi di basi di dati ed applicazioni”, Apogeo Education-Maggioli Editore (in Italian).
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung