Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Data Semantics
Code der Lehrveranstaltung	73070
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	INFO-01/A
Sprache	Englisch
Studiengang	Master in Computing for Data Science
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. Enrico Franconi, franconi@inf.unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/943
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	1
KP	6
Vorlesungsstunden	40
Laboratoriumsstunden	^20
Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	
Inhaltsangabe	Data Modelling in the data science pipeline Constraints, Normal Forms, Elementary Facts Lossless Transformations Object-oriented Data Modelling RDF and Semantic Metadata Conceptual Modelling

Themen der Lehrveranstaltung	This course examines the essential role of data semantics and modelling in the data science pipeline. It covers key topics in relational databases such as data normalisation, and both object-oriented and conceptual modelling approaches. Special focus is given to integrity constraints, lossless data transformations, and how advanced normal forms help represent fundamental data units accurately. The course also introduces semantic modelling with RDF, ontologies, and metadata, demonstrating how data structures can be aligned with business meaning. Finally, it explores the relationship between relational algebra and SQL to deepen students' understanding of query formulation, data integrity, and the management of database views.
Stichwörter	Data Modelling Semantic Technologies Conceptual Modelling
Empfohlene Voraussetzungen	
Propädeutische Lehrveranstaltungen	
Unterrichtsform	Frontal lectures plus exercises and a project in small groups that will allow the students to gain practical experience with the technologies introduced during the lectures.
Anwesenheitspflicht	Attendance is not compulsory, but non-attending students have to contact the lecturer at the start of the course to agree on the modalities of the independent study.
Spezifische Bildungsziele und erwartete Lernergebnisse	The course belongs to the type "caratterizzanti – discipline informatiche". This course examines the essential role of data semantics and modelling in the data science pipeline. Knowledge and understanding: • D1.1 - Knowledge of the key concepts and technologies of data science disciplines • D1.5 - Knowledge of principles and models for the representation, management and processing of complex and heterogeneous data Applying knowledge and understanding:

	• D2.1 - Practical application and evaluation of tools and techniques in the field of data science Making judgments • D3.2 - Ability to autonomously select the documentation (in the form of books, web, magazines, etc.) needed to keep up to date in a given sector Communication skills • D4.1 - Ability to use English at an advanced level with particular reference to disciplinary terminology Learning skills • D5.2 - Ability to autonomously keep oneself up to date with the developments of the most important areas of data science
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	- A compulsory written report on a software project solving a given problem done in small groups handed in after the end of the course and before the final written exam; - a final oral exam with exercises, and verification and transfer of knowledge questions. The assessment for non-attending students is the same as above.
Bewertungskriterien	- Compulsory written project report (counting 30% of the final mark): ability to work in a team, creativity, skills in critical thinking, ability to summarize in own words, correctness of solutions, clarity of answers. - Oral final exam: correctness of answers, clarity of answers, ability to summarize, evaluate, and establish relationships between topics, skills in critical thinking, ability to summarize in own words. The criteria for non-attending students are the same as above.
Pflichtliteratur	The reading material for the course will be provided during the lectures; one important textbook is the following: Hogan, Aidan: The Web of Data. Springer, 2020. ISBN 978-3-030-51579-9

	Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it
Weiterführende Literatur	The course page provides plenty of additional material. More sources will be announced during the course.
Weitere Informationen	Software used: Students will use the following software on their computers; installation instructions are provided in the course webpage. Additional software to be installed may be pointed out during the course. Python RDFLib Protégé DLV Ontop
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung