COURSE DESCRIPTION – ACADEMIC YEAR 2021/2022

Course title	**Semantic Technologies**
Course code	73063
Scientific sector	INF/01
Degree	Master in Computational Data Science (LM-18)
Semester	2
Year	1
Credits	6
Modular	No

Total lecturing hours	40
Total lab hours	20
Attendance	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.
Prerequisites	
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type "caratterizzanti – discipline informatiche". The aim of the course is to provide a good understanding of the general vision of Semantic Technologies (with particular focus on Linked data, Knowledge Graphs, and Semantic Web Technologies), its foundations and applications and the tools and frameworks that can be used today to exploit Semantic Technologies resources. The course introduces the core of Semantic Web technologies, from the theory and tools behind the RDF data format, the RDFS schema language, and the SPARQL query language, to the basic use of semantic technologies frameworks in Python and their connection to databases, and to ontology engineering methodologies.

Lecturer	Enrico Franconi
Contact	POS 3.06, franconi@inf.unibz.it, +39 0471 016120
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	Immediately after the lecture, or by previous appointment by email to the lecturer.
Lecturing Assistant (if any)	Tiago Prince Sales
Contact LA	POS 3.05, tiago.princesales@unibz.it
Office hours LA	On Tuesdays, from 16:00 to 18:00, by prior email appointment.
List of topics	• Semantic metadata and linked data • The RDF and RDF Schema (RDFS) standards • The formal semantics of RDF • Querying with SPARQL • Adding semantics to relational databases • Extending the expressivity of semantic data models

Teaching format	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.

Learning outcomes	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

Assessment	• 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 written exam with exercises, and verification and transfer of knowledge questions. The assessment for non-attending students is the same as above.
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	• Compulsory written project report (counting 40% 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. • Written 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.

Required readings	The course 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
Supplementary readings	The course page provides plenty of additional material. More sources will be announced during the course.
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