COURSE DESCRIPTION – ACADEMIC YEAR 2018/2019

Course title	**Semantic Technologies**
Course code	72123
Scientific sector	INF/01
Degree	Master in Computer Science (LM-18)
Semester	1
Year	2
Credits	8
Modular	No

Total lecturing hours	48
Total lab hours	24
Total exercise hours	--
Attendance	Not compulsory
Prerequisites	Knowledge in Java programming
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type "caratterizzanti – discipline informatiche" in the curriculum "Data and Knowledge Engineering". 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 such as Jena and of ontology engineering methodologies.

Lecturer	Enrico Franconi
Contact	Piazza Domenicani 3, Room 3.06, franconi@inf.unibz.it, 0471-016120
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	Anytime, by previous appointment by email to the lecturer.
Lecturing Assistant (if any)	Benjamin Cogrel
Contact LA	Piazza Domenicani 3, Room 2.05, benjamin.cogrel@unibz.it
Office hours LA	By previous appointment via email.
List of topics	• Adding semantic metadata to data • Metadata representation in RDF and RDFS • Querying the metadata with SPARQL • Applicative frameworks and protocols • Rich modelling languages • Metadata modelling issues • Architectures for semantic applications • Linked open data and information integration

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 • Know the latest techniques and methodologies for knowledge representation and reasoning about knowledge bases. Applying knowledge and understanding • Be able to identify new application requirements and business opportunities in the field of systems based on data and knowledge. • Be able to define an algorithmic solution to a computational problem and to estimate its complexity. Making judgments • Be able to independently select the documentation required to keep abreast of the frequent technological innovations in the field by using a wide variety of documentary sources: books, web, magazines. • Be able to plan and re-plan a technical project activity aimed at building an information system and to bring it to completion by meeting the defined deadlines and objectives. Communication skills • Be able to structure and prepare scientific and technical documentation describing project activities. Ability to learn • Be able to autonomously extend the knowledge acquired during the study course by reading and understanding scientific and technical documentation in Italian, German and English.

Assessment	• A compulsory written report on a software project solving a given problem done in small groups handed in at the end of the course; • A final written exam with exercises, and verification and transfer of knowledge questions.
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.

Required readings	The course will use material from the following books: • Grigoris Antoniou, Paul Groth, Frank van Harmelen, and Rinke Hoekstra. 2012. A Semantic Web Primer (3rd ed.). The MIT Press.

	• Dean Allemang and James Hendler. 2011. Semantic Web for the Working Ontologist (2nd ed.). Morgan Kaufmann. • Liyang Yu. 2014. A Developer's Guide to the Semantic Web (2nd ed.). Springer.
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. Additional software to be installed may be pointed out during the course. • Java • Apache Jena (http://jena.apache.org) • Pellet (http://clarkparsia.com) • Protégé (http://protege.stanford.edul)