Anno Accademico 2021/2022

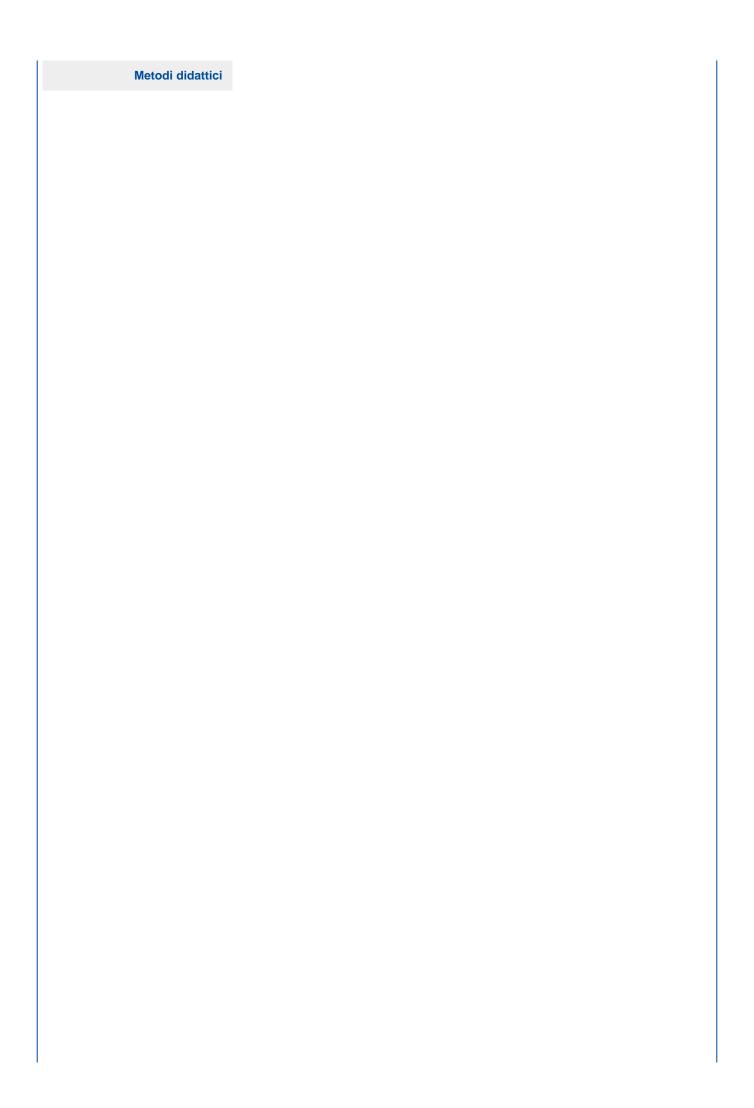| KNOWLEDGE REPRESENTATION AND REASONING - MOD. 2	
Anno immatricolazione	2021/2022
Anno offerta	2021/2022
Normativa	DM270
SSD	INF/01 (INFORMATICA)
Dipartimento	DIPARTIMENTO DI MATEMATICA 'FELICE CASORATI'
Corso di studio	ARTIFICIAL INTELLIGENCE
Curriculum	PERCORSO COMUNE
Anno di corso	1°
Periodo didattico	Annualità Singola (04/10/2021 - 17/06/2022)
Crediti	6
Ore	56 ore di attività frontale
Lingua insegnamento	INGLESE
Tipo esame	SCRITTO E ORALE CONGIUNTI
Docente	MILANESE GIAN CARLO - 2 CFU PALMONARI MATTEO LUIGI - 4 CFU
Prerequisiti	In this module we assume that the student is familiar with the topics discussed in the first module. No other prerequisite is required.
Obiettivi formativi	The objective of this course is to provide students with sufficient knowledge and skills to design, debug, implement and use knowledge bases based on two main paradigms, that is, semantic technologies and logic programming. We expect to cover not only logical aspects of reasoning systems but also data management for graph-based knowledge bases. Also, we aim at covering foundational aspects of knowledge base development but also pragmatic ones with exercises based on existing software systems. As a result, we expect that the students learn theoretical aspects of knowledge base design, but they also develop skills related to model knowledge bases with relevant knowledge-based frameworks.

Programma e contenuti

Introduction - AI and KRR: the many facets of intelligence, reasoning and inference, AI challenges and KRR.

Knowledge Graphs & Data Management: The KG abstraction, RDF, SPARQL. Exercises: modeling knowledge in RDF, querying data in RDF.
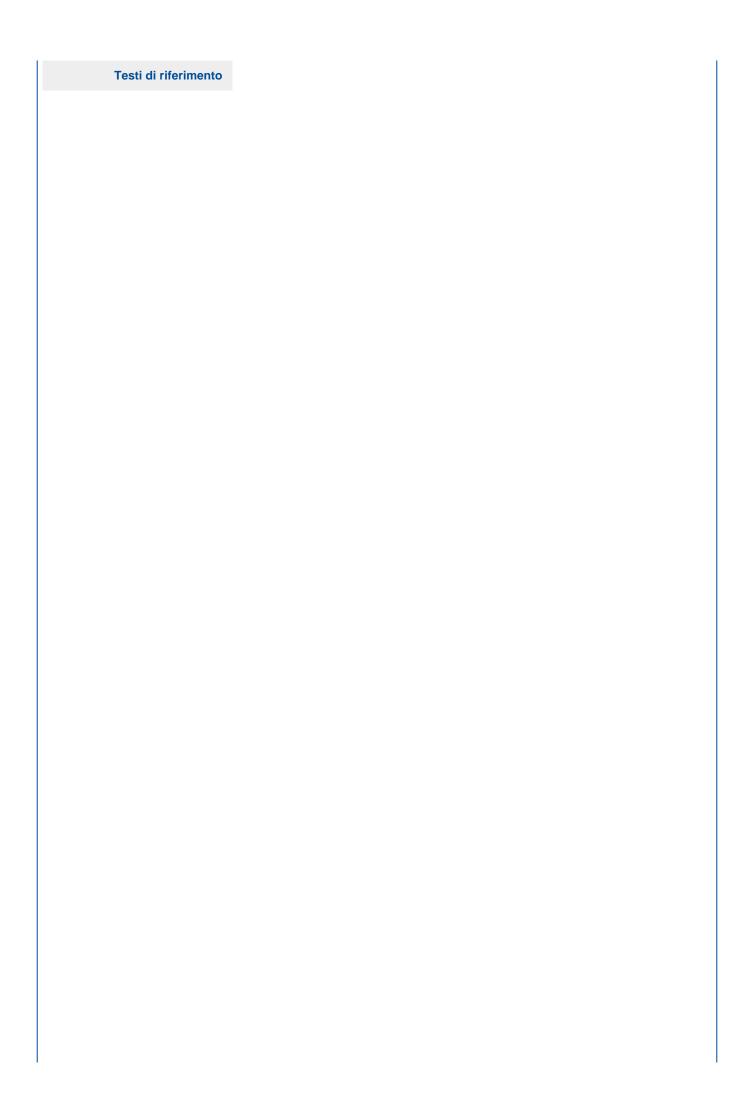
Knowledge Graphs & Reasoning: from vocabularies to ontologies; RDFS, OWL 2. Exercises: modeling knowledge in RDFS, modeling knowledge in OWL.

Declarative Problem Solving, Logic Programming & Nonmonotonic Reasoning: Logic Programming and Non-monotonic Reasoning, Datalog, Non-monotonic Reasoning, Answer Set Prolog (ASP). Exercises: Datalog with DLV; ASP, disjunction and Negation As Failure with DLV.

More on KRR for AI: how to build a knowledge base, KRR and AI challenges (reprise).

Metodi didattici

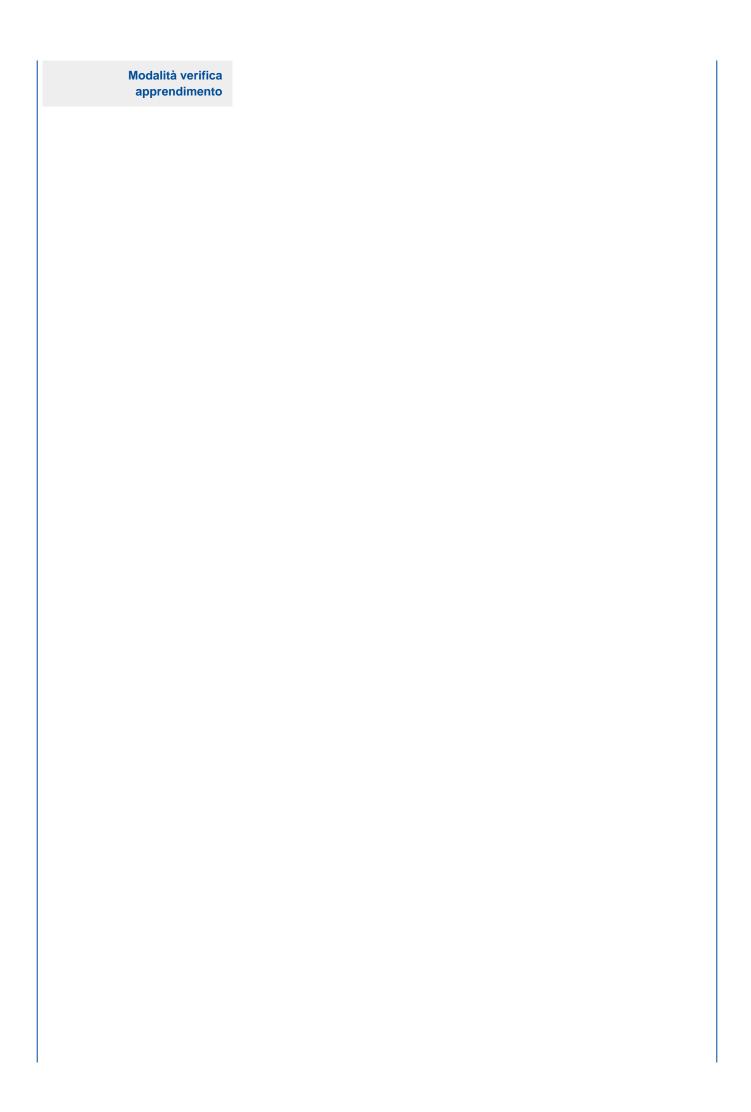Lectures (4/6) + hands-on lessons with exercises and tools (2/6)

Testi di riferimento
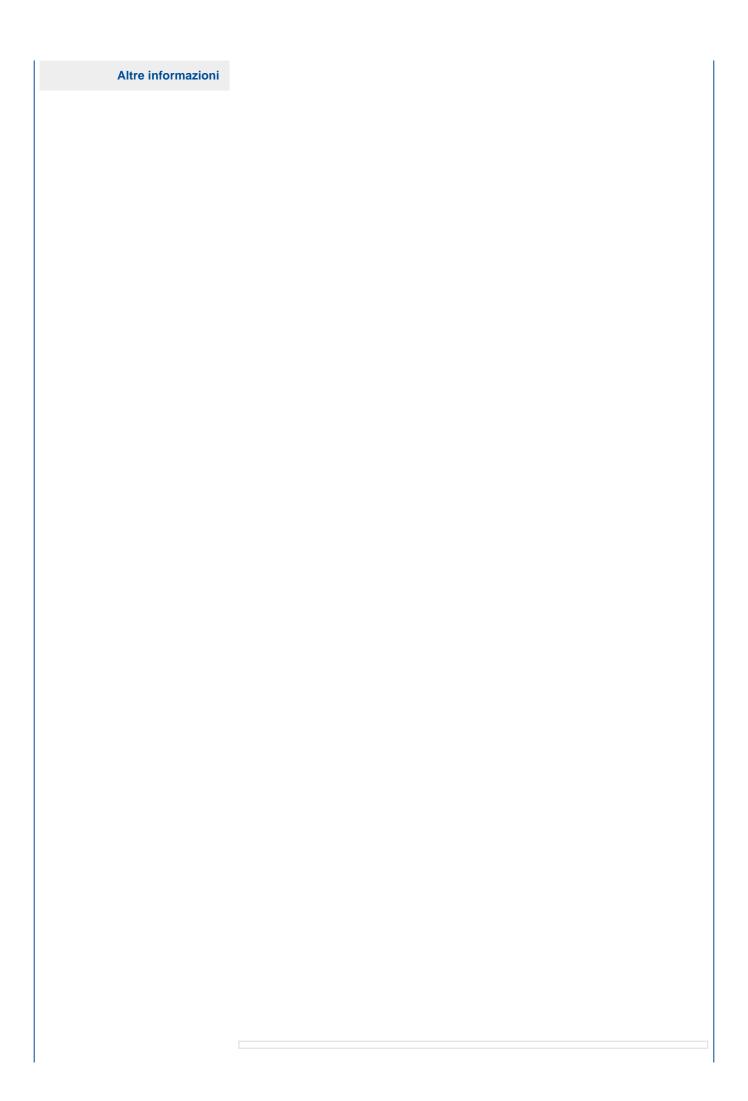
Additional material:

Knowledge Graphs. Aidan Hogan, Eva Blomqvist, Michael Cochez, Claudia d'Amato, Gerard de Melo, Claudio Gutierrez, Sabrina Kirrane, Jose? Emilio Labra Gayo, Roberto Navigli, Sebastian Neumaier, Axel-Cyrille Ngonga Ngomo, Axel Polleres, Sabbir M. Rashid, Anisa Rula, Lukas Schmelzeisen, Juan Sequeda, Steffen Staab, and Antoine Zimmermann. Synthesis Lectures on Data, Semantics, and Knowledge, November 2021, Vol. 12, No. 2 , Pages 1-257

The knowledge graph cookbook. Blumauer, Andreas, Helmut Nagy.

Knowledge Graphs: Fundamentals, Techniques, and Applications. Kejriwal, Mayank, Craig A. Knoblock, and Pedro Szekely. MIT Press, 2021

**Modalità verifica
apprendimento**

Written test at the end of the course covering all the course topics (theory). Optional assignments based on the tools introduced in the course (practice).

Altre informazioni

Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile