# COURSE DESCRIPTION – ACADEMIC YEAR 2018/2019

<table>
<thead>
<tr>
<th>Course title</th>
<th>Semantic Technologies</th>
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<tbody>
<tr>
<td>Course code</td>
<td>72123</td>
</tr>
<tr>
<td>Scientific sector</td>
<td>INF/01</td>
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<tr>
<td>Degree</td>
<td>Master in Computer Science (LM-18)</td>
</tr>
<tr>
<td>Semester</td>
<td>1</td>
</tr>
<tr>
<td>Year</td>
<td>2</td>
</tr>
<tr>
<td>Credits</td>
<td>8</td>
</tr>
<tr>
<td>Modular</td>
<td>No</td>
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</tbody>
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| Total lecturing hours | 48 |
| Total lab hours       | 24 |
| Attendance            | Not compulsory       |

| Prerequisites         | Knowledge in Java programming                                  |
| Course page           | [https://ole.unibz.it/](https://ole.unibz.it/) |

**Specific educational objectives**

The course belongs to the type "caratterizzanti – discipline informative" 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.

**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

**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.
### 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:
<table>
<thead>
<tr>
<th>Supplementary readings</th>
<th>The course page provides plenty of additional material. More sources will be announced during the course.</th>
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</thead>
<tbody>
<tr>
<td>Software used</td>
<td>Students will use the following software on their computers. Additional software to be installed may be pointed out during the course.</td>
</tr>
<tr>
<td></td>
<td>- Java</td>
</tr>
<tr>
<td></td>
<td>- Apache Jena [<a href="http://jena.apache.org">http://jena.apache.org</a>]</td>
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<tr>
<td></td>
<td>- Pellet [<a href="http://clarkparsia.com">http://clarkparsia.com</a>]</td>
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<tr>
<td></td>
<td>- Protégé [<a href="http://protege.stanford.edu">http://protege.stanford.edu</a>]</td>
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