

Course Unit	Semantic Web			Field of study	Information Systems	
Master in	Informatics			School	School of Technology and Management	
Academic Year	2023/2024	Year of study	2	Level	2-2	ECTS credits 6.0
Туре	Semestral	Semester	1	Code	5060-710-2103-00-23	
Workload (hours)	162	Contact hours	T - TP TP T - Lectures a	60 PL - T	C - S - solving, project or laboratory; TC -	E · OT · O · Fieldwork; S · Seminar; E · Placement; OT · Tutorial; O · Other

Name(s) of lecturer(s)

Paulo Jorge Teixeira Matos

- Learning outcomes and competences
- At the end of the course unit the learner is expected to be able to:
- . Inow the guiding principles of the semantic web; . identify and characterize opportunities to make use of semantic web technologies and principles; 2

- select and apply the web semantic most appropriate technologies to each problem;
   understand the principles and use of graph databases for knowledge representation;
   understand what ontologies are, what they are for and know how to apply RDF, RDFS and OWL in their design;
   understand and be able to apply the concepts and technologies associated with Linked Data;
   use semantic web work tools.

# Prerequisites

Before the course unit the learner is expected to be able to: 1. understand the main concepts of an information system; 2. have basic knowledge of programming and systems design.

## Course contents

Semantic web: general concepts, motivation, objectives, basic technologies and applications. Graph database: general concepts, design, tools, technologies, practical applications and case studies. Ontologies: general concepts, design, tools, technologies (RDF, RDFS, OWL, rules and inference engines), practical applications and case studies. Linked Data and good practices to move towards web 3. 0.

#### Course contents (extended version)

- 1. Introduction to Semantic Web
  - General concepts and motivation.

  - Motivation
     Objectives and potential Base technologies
- Applications
  Graph databases
  General concepts
  - Conception and design
     Tools and technologies.

  - Practical applications and case studies
- 3. Ontologies
- 3. Ontologies

   General concepts
   Conception and design
   Tools and technologies (RDF, RDFS, OWL, rules and inference engines).
   Practical applications and case studies

   4. Extraction, Transformation and Load processes

   General concepts
   General concepts

  - Good practices
     Technologies (JSON-LD and RDFa)

### Recommended reading

- "Demystifying OWL for the enterprise", Michael Uschold, Morgan & Claypool Publishers, 2018 "Graph Algorithms Practical Examples in Apache Spark & Neo4j", Mark Needham, Amy Hodler, O'Reilly, 2019 "Learning Cypher", Onofrio Panzarino, Packt Publishing, 2014 "Semantic Modeling for Data: Avoiding Pitfalls and Breaking Dilemmas 1st Edition", Panos Alexopoulos, O'Reilly, 2020 "Linked Data", David Wood, Marsha Zaidman, Luke Ruth, Manning Publications, 2014

# Teaching and learning methods

This course is composed by theoretical-practical lectures, divided into two kinds of periods: - expository periods during which the theoretical contents are presented and explained based on practical examples; - implementation periods during which the students put in practice the knowledge acquired in the expository periods. Non-presence periods are aimed to study and implement practical works.

#### Assessment methods

- Alternative 1 (Regular, Student Worker) (Final, Supplementary)

   Development Topics 70% (Development of a theme using the technologies taught and elaboration of a scientific publication.)
   Practical Work 5% (Practical work carried out in class.)
   Final Written Exam 25% (The written test has a minimum grade of 7. 0 out of 20)

   Alternative 2 (Regular, Student Worker) (Special)

   Practical Work 60%
   Final Written Exam 40% (The written test has a minimum grade of 7. 0 out of 20)

Language of instruction	}
English	
Electronic validation	

Electronic valuation			
Paulo Jorge Teixeira Matos	Tiago Miguel Ferreira Guimaraes Pedrosa	José Eduardo Moreira Fernandes	José Carlos Rufino Amaro
04-11-2023	06-11-2023	06-11-2023	06-11-2023