



POLITÉCNICA

INTERNATIONAL
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COORDINATION PROCESS OF
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PR/CL/001



E.T.S. de Ingenieros
Informaticos

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000899 - Open Data And Knowledge Graphs

DEGREE PROGRAMME

10BA - Master en Ciencia de Datos

ACADEMIC YEAR & SEMESTER

2019/20 - Semester 1

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1. Description

1.1. Subject details

Name of the subject	103000899 - Open Data And Knowledge Graphs
No of credits	4.5 ECTS
Type	Compulsory
Academic year of the programme	First year
Semester of tuition	Semester 1
Tuition period	September-January
Tuition languages	English
Degree programme	10BA - Master en Ciencia de Datos
Centre	10 - Escuela Tecnica Superior de Ingenieros Informaticos
Academic year	2019-20

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Oscar Corcho Garcia (Subject coordinator)	2209	oscar.corcho@upm.es	Sin horario.
Raul Garcia Castro	2110	r.garcia@upm.es	Sin horario.

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- Basic knowledge about Web technologies
- Basic knowledge about database modelling
- Basic knowledge about knowledge representation techniques

4. Skills and learning outcomes *

4.1. Skills to be learned

CB06 - Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación

CB07 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio

CECD01 - Conocer los procesos de captura, extracción, manipulación y conversión de datos en diferentes entornos.

CG14 - Capacidad de trabajar y comunicarse también en contextos internacionales

4.2. Learning outcomes

RA4 - Manage bibliographic sources in the domain, including manuals, online documentation and scientific papers

RA5 - Identify and solve those types of real-world problems in which Open Data and Knowledge Graph technologies can be successfully applied

RA6 - Use different languages, techniques, methods and methodologies that enable the development of ontologies and data for Knowledge Graphs

RA8 - Generate data in the format used for Open Data and Knowledge Graphs, and to publish them for the use of third parties

RA7 - Develop ontologies that serve as vocabularies for the data available on Knowledge Graphs

RA9 - Develop applications that exploit the (open) data available on Knowledge Graphs

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

During this course you will learn about the main foundations for Knowledge Graphs, including the W3C recommendations that are applicable in this area (RDF, RDF Schema, SPARQL, OWL, CSV on the Web) and methodologies for the generation and publication of Knowledge Graphs from multiple heterogeneous data sources and formats, using Linked Data. You will also learn about how to create shared agreed vocabularies and ontologies that can give support to Knowledge Graph generation and publication, and will understand how these principles and approaches have been applied to several domains. You will work on a practical hands-on exercise that will be the basis for your participation in hackatons and other similar events.

5.2. Syllabus

1. Introduction to Knowledge Graphs
2. Data and knowledge representation and access for Knowledge Graphs
 - 2.1. RDF and RDF Schema
 - 2.2. SPARQL
 - 2.3. OWL
3. Knowledge Graph generation, linking and publication from heterogeneous data sources
 - 3.1. Methodological guidelines for Knowledge Graph generation
 - 3.2. RDF generation from relational databases
 - 3.3. RDF generation from semi-structured data sources
 - 3.4. RDF generation for statistical data
 - 3.5. Data linking
 - 3.6. Knowledge Graph publication as Linked Data
4. Vocabulary selection and development for Knowledge Graphs
 - 4.1. Methodologies for building vocabularies
 - 4.2. Existing vocabularies
5. Knowledge Graph-based applications
 - 5.1. Knowledge Graphs in Government
 - 5.2. Knowledge Graphs in Science
 - 5.3. Knowledge Graphs in Journalism

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Other face-to-face activities	Assessment activities
1	Unit 1 Duration: 00:30	Unit 1 Duration: 03:30		
2	Unit 2 Duration: 00:30	Unit 2 Duration: 03:30		
3	Unit 2 Duration: 00:30	Unit 2 Duration: 03:30		
4	Unit 2 Duration: 00:30	Unit 2 Duration: 03:30		
5	Unit 2 Duration: 00:30	Unit 2 Duration: 03:30		
6	Unit 3 Duration: 00:30	Unit 3 Duration: 03:30		
7	Unit 3 Duration: 00:30	Unit 3 Duration: 03:30		
8	Unit 3 Duration: 00:30	Unit 3 Duration: 03:30		
9	Unit 3 Duration: 00:30	Unit 3 Duration: 03:30		
10	Unit 3 Duration: 00:30	Unit 3 Duration: 03:30		
11	Unit 4 Duration: 00:30	Unit 4 Duration: 03:30		
12	Unit 4 Duration: 00:30	Unit 4 Duration: 03:30		
13	Unit 5 Duration: 00:30	Unit 5 Duration: 03:30		
14	Unit 5 Duration: 00:30	Unit 5 Duration: 03:30		

15	Unit 5 Duration: 00:30	Unit 5 Duration: 03:30		
16		Final project Duration: 04:00		
17				Final project presentation Continuous assessment and final examination Duration: 02:00

The independent study hours are training activities during which students should spend time on individual study or individual assignments.

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The subject schedule is based on a previous theoretical planning of the subject plan and might go through experience some unexpected changes along throughout the academic year.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Final project presentation		Face-to-face	02:00	100%	5 / 10	CECD01 CB07 CG14 CB06

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Final project presentation		Face-to-face	02:00	100%	5 / 10	CECD01 CB07 CG14 CB06

7.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

7.2. Assessment criteria

The final grade will be based on the evaluation of:

1. The material provided by the student and the interaction on the repository of the course in relation with the work proposed in unit 3. This work will have the weight of 35%.
2. The material provided by the student and the interaction on the repository of the course in relation with the work proposed in unit 4. This work will have the weight of 15%.
3. The material provided by the student and the interaction on the repository of the course in relation with the work proposed in unit 5. This work will have the weight of 25%.
4. The material provided by the student and the interaction on the repository of the course in relation with the complete work. This work will have the weight of 25%.

All this will be evaluated continuously and in the final evaluation activity on the last week of the course.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Ontological Engineering	Bibliography	Ontological Engineering. Gómez-Pérez A, Fernández-López M, Corcho O (2004). Springer-Verlag http://www.springer.com/gp/book/9781852335519
Linked Data applications in Spain	Web resource	http://www.linkeddata.es/