COURSE DATA

DATA SUBJECT

Code: 36405
Name: Semantic web technologies
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1400 - Degree in Computer Engineering	Escola Tècnica Superior d'Enginyeria	4	First quarter
1403 - Degree in Telematics Engineering	Escola Tècnica Superior d'Enginyeria	4	First quarter
1407 - Degree in Multimedia Engineering	Escola Tècnica Superior d'Enginyeria	4	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1400 - Degree in Computer Engineering	Optional subject	ELECTIVES
1403 - Degree in Telematics Engineering	Optional subjects	ELECTIVES
1407 - Degree in Multimedia Engineering	Optatividad	ELECTIVES

COORDINATION

SAMPER ZAPATER JOSE JAVIER

SUMMARY

Semantic Web Technologies is part of the optional module. It aims to be the continuation of the contents that the student has acquired in previous courses, especially in courses related to programming and Web application development. Its main objective is to provide an in depth view of the various technologies related to the Web environment that have emerged in this area: Blogs, Wikis, Social Networks, Content Managers, etc. It is intended that the student is capable of handling them, including those related to Web 3.0, as well as design-oriented web applications in different areas or domains. At the same time, we want the student can understand the concept of semantic annotation and information extraction using technologies such as RDFa and GRDDL, tools that enable better management and knowledge recovering.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

It is recommended to have completed the courses (taught to the previous year) related to programming and Web application development: Specifically, DAW, Web Applications Development in Degrees in Computer and Telematics Engineering, and Web Programming in Multimedia Engineering

COMPETENCES / LEARNING OUTCOMES

1400 - Degree in Computer Engineering

SI1 - Ability to integrate ICT solutions into business processes in order to meet the information needs of organisations, thus enabling them to achieve their goals effectively and efficiently and providing them with competitive advantage.

SI3 - Ability to actively participate in the specification, design, implementation and maintenance of information and communication systems.

TI6 - Ability to design systems, applications and services based on network technologies, including the Internet, the web, e-commerce, multimedia, interactive services and mobile computing.

1405 -

MM3 - Be able to implement methodologies, technologies, processes and tools for the professional development of multimedia products in a real context of use by applying the appropriate solutions for each environment.

DESCRIPTION OF CONTENTS

1. Web Evolution

From Web 1.0 to Web 4.0: The Evolution of the Web

2. Technology and Web 2.0 tools

RSS
Mash upBlogs
Wikis
Social Networks
Other Web 2.0 tools

3. Web 3.0 Technologies

XML reminder. Structured Web Documents
RDF. Description of web resources
Metadata Vocabularies
OWL
Microdata and Microformats
RDFa: Semantic Annotations in XHTML documents.
JSON-DL
GRDDL: Getting RDF from XML, XHTML documents.

4. SWRL and SQWRL Rule Languages

Introduction to SWRL (Semantic Web Rule Language)
Types of atoms and expressions
SWRLTab
Introduction to SQWRL (Semantic Query-enhanced Web Rule Language) and SQWRLTab
Execution of Rules through the PELLET reasoner and RULE Engine.

5. Query Language SPARQL

Introduction to SPARQL
Modifiers
Filters and operators
Using Regex
Graph Patterns
Using From
Using Graph
Construct, Describe and Ask
Federated queries
Examples (DBpedia)

6. GeoSparql

Introduction to GeoSparql
GeoSparql Vocabulary
Geometric objects and representations
Relations and Functions. Specifics in environments.
Use cases.

7. Open Data Publication

Introduction to the Linked Open Data (LOD)
Regulation at European and Spanish level: Technical Interoperability Standard (NTI-RISP). European Open Data Directive.
Life cycle in open data modeling. Tools.
Guide for the publication of OpenData CKAN (Aporta.es)

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	20,00
Classroom practices	10,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	25,00
Independent study and work	25,00
Preparation of lessons	0,00
Preparation for assessment activities	40,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

During the on-site basis theoretical activities, the main topics of the course will be shown by providing a

global and inclusive vision, analyzing in detail the key and more complex issues, encouraging at all times the students participation. These activities are complemented by practical activities in order to apply the basic concepts and to expand the knowledge and experience that is acquired during the performance of the proposed work. The on-site activities comprise the following:

- Problem-based lectures and questions in the classroom

- Sessions devoted to moderated discussions, and the resolution of problems and exercises that the students have previously worked

- Laboratory-based practical exercises

In addition to on-site activities, students must perform personal tasks (outside the classroom), including: monographs, guided literature research, questions and problems as well as the preparation of classes and exams (study). These tasks will be primarily conducted on an individual basis, thus enabling to enhance self-employment. Additionally, works requiring the participation of small groups of students (2-4) will be proposed to promote the students capacity for integration into working groups.

The University of Valencia e-learning platform (*Aula Virtual*) will be used to support the communication with students. Through this platform the students will have access to course materials used in class as well as the problems and exercises to solve.

EVALUATION

Students can choose between two different assessments:
- Continuous assessment system
- Overall system.

Continuous assessment system
The evaluation of the course is conducted by the aggregation of the following elements:
- Continuous assessment (N_Continua), based on the students participation and their degree of involvement in the teaching-learning process, taking into account the regular attendance to onsite activities and the resolution of questions and problems, and the development of the works proposed to be delivered.
- Individual objective test (N_Examenes), consisting of several exams, or knowledge tests, which consist of both theoretical/practical questions and problems.
- Assessment of practical activities (N_Practicas,) from the achievement of objectives in the laboratory and problems sessions, and the preparation of reports. Oral presentations (individually and/ or in groups) can be also part of this evaluation elements in order to evaluate the students capacity for creating documents and transfering knowledge.
N_Examenes Score = 50% Score Control + 50% Score Official Examination
Control with note> = 5 eliminate matter, but only your note is saved to the 1st call. In 2nd call exam it will be unique and correspond to the whole subject. The 1st call exam consists of two parts. Those who have the approved control only submitted to the 2nd part and all the rest. The realization of the first part in the 1st Call void the note of the first part obtained in control.
Final Score = 20% × N_Continua + 45%(1) × N_Examenes + 35%(1)(2)× N_Practicas

Continuous assessment is distributed among the following items:
- Attendance 5%
- Participation 5%
- Activities throughout the course: 10%

(1) It will be necessary to, at least, obtain obtain a minimum grade 4 in the different exams and N_Practicas to have the possibility to pass the course

(2) Attendance to laboratory sessions is mandatory. A minimum of 80% of classes must be attended and adequately justify the impossibility of attending the remaining sessions.

Those students who do not pass Laboratory in 1st call must submit and present (not necessarily identical to those required during the course) for the second call and defend them before their practice teacher. This delivery and presentation must be carried out according previously with the professor and the totality of the works must be presented before the day of the final exam of the 2nd call.
Applying flexibility in the criteria, if a student approves the part of THEORY or the part of LABORATORY in 1st call, the approved part (Theory or Laboratory) will be saved, and only must be submitted to the suspended part (Theory or Laboratory) in 2nd Call.
The part of THEORY (1st call) , may be approved only in the case where the average of the parts is> = 5 and the minimum grade of 4 is reached in each one of them.

Single Evaluation System
This method will apply to any student who, for a reason reasoned and admitted by the teacher, can not attend classes regularly. In this sense, the grade will be obtained from 70% of the grade obtained in a single global exam of the subject and 30% of the practical activity..
The completion of this global examination will coincide with the final Theory examinations of students who have pursued the continuous assessment system. The global examination will include the contents of both theory sessions and problems.
In the first call, the same works (and deadlines for delivering) that attendance students, will be carried out and the works will be delivered through the corresponding tasks through the virtual classroom. In addition, after the delivery of each work, the student and teacher will schedule an appointment to defend in person the work delivered.
In the second call, the procedure will be the same that for the attendance students.

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

The evaluation will be conducted in accordance with the University of Valencia Qualifications Legislation. At the time of writing this teaching guide, the current legislation is the one approved by the Governing Council of the UVEG in January 27, 2004, adjusted as provided for that purpose by the Royal Decrees 1044/2003 and 1125 / 2003. It states basically that the qualifications will be numbered from 0 to 10 with a decimal element and they must be accompanied with the qualitative rating in accordance with the following scale:
From 0 to 4.9: Failed
From 5 to 6.9: Approved

From 7 to 8.9: Notable
9 to 10: Outstanding or Outstanding with honors

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