

Program	59TL – Telematics Engineering B. Eng.
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Course number and name	
Number	595000232
Name	Information Processing in Telematic Applications
Semester	S6 [(February-June)]

Credits and contact hours	
ECTS Credits	4,5
Contact hours	45

Coordinator's name	Rubio Cifuentes, Gregorio [gregorio.rubio@upm.es]
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Specific course information

Description of course content

The exchange of information between telematic applications is one of the fields of ICT with a faster evolution and significant changes, both in operation and in the capabilities of telematic applications. The use of meta-information is the main element that has caused this alteration.

This course is developed in 6 hours per week of student work (on average for a 20-week term). This work includes: the active attendance in face-to-face lessons and laboratory sessions, the study, the bibliographic searches, the realization of exercises and self-evaluation tests, the resolution of the laboratory practices and the performance of continuous assessment tests.

The main objective of the course is to learn to design data models and develop telematic applications that exchange information according to a data model.

More specifically, the student must:

1. Acquire the knowledge to generate and process meta-information meeting different representations.
2. Acquire the knowledge to define data models in different languages.
3. Acquire the knowledge to process information in the most appropriate way for each application.
4. Know and apply the Java programming language, learned in previous semesters, and standard API specific for the processing of meta-information.

The course is taught in b-learning: face-to-face and remote teaching through the virtual learning environment Moodle.

List of topics to be covered

1. Introduction
 - 1.1. Concept of abstract data representation
 - 1.2. Concept of telematics application
 - 1.3. Evolution of representation languages: from SGML to XML

2. Information Modeling
 - 2.1. Need for modeling the information exchanged by telematics applications
 - 2.2. eXtensible Markup Language (XML)
 - 2.3. XMLSchema
 - 2.4. JavaScript Object Notation (JSON)
 - 2.5. JSONSchema
 - 2.6. Regular expressions
3. Data Manipulation
 - 3.1. Simple API for XML (SAX)
 - 3.2. Document Object Model (DOM)
 - 3.3. Parser JSON
4. Data Representation
 - 4.1. XPATH
 - 4.2. XSLT transformations

Prerequisites or co-requisites

- Programming II
- Telecommunication Networks and Services
- Advanced Application Programming
- Modeling Languages

Specific goals for the course

Specific outcomes of instruction

- RA507 - Ability to use mechanisms of data location in documents generated from an abstract representation of data.
- RA228 - Ability to determine the mechanism of data exchange most suitable for each telematic application.
- RA508 – To learn about the technologies used in the telematic environment.
- RA506 – To learn about the manipulation strategies and mechanisms abstractly specified.
- RA505 - Ability to generate specific data representations from abstract data representations.
- RA504 – To know the paradigms of abstract data representation.
- RA229 – To learn about the functioning of the most common telematics applications.
- RA226 - Ability to analyze and to manipulate the data within the exchanges between telematic applications
- RA225 - Ability to apply the techniques of manipulation to the modeled data.
- RA231 – To know the fundamentals of the semantic web.
- RA224 – Skill to use the standardized data modeling languages in applications.

Further reading and supplementary materials

- NEIL BRADLEY. The XML Companion. Addison-Wesley
- DAVID GULBRANSEN. Using XMLSCHEMAS. Special Edition.
- KHUN YEE FUNG. XSLT Working with XML and HTML. Addison-Wesley.
- TANENBAUM A. S. Redes de Ordenadores. 4th ed. Prentice-Hall.
- MICHAEL MORRISON. XML al descubierto. Prentice-Hall.

- GREGORIO MARTÍN. Curso de XML. Prentice-Hall
- Java How to Program. Deitel&Deitel
- <http://www.w3c.org/XML>
- <http://www.w3.org/XML/1999/XMLin-10-points.es.html>
- <http://www.w3.org/TR/xml-names>
- <http://www.w3.org/TR/xmlschema-0/>
- <http://www.w3.org/TR/xmlschema-1/>
- <http://www.w3.org/TR/xmlschema-2/>
- <https://docs.oracle.com/javase/tutorial/essential/regex/>
- <https://www.json.org/json-es.html>
- <http://www.w3.org/TR/xhtml1/>
- <http://www.w3.org/TR/CSS21/>
- <http://www.w3.org/TR/xpath20/>
- <http://www.w3.org/TR/xslt20/>
- <http://www.librosweb.es/>
- <http://download.oracle.com/javaee/1.4/tutorial/doc/>
- Moodle.