

# LEARNING GUIDE

## Information for the student

### Descriptive Data

<b>COURSE:</b>	Services and protocols engineering (Ingeniería de servicios y protocolos)
<b>SUBJECT:</b>	Telematics
<b>ECTS:</b>	5
<b>CHARACTER:</b>	Compulsory (professional itinerary) / Optional (research itinerary)
<b>TITLE:</b>	MSc in Systems and Services Engineering for the Information Society (Máster en Ingeniería de Sistemas y Servicios para la Sociedad de la Información)
<b>COURSE:</b>	1 <sup>st</sup> course, 2 <sup>nd</sup> semester
<b>SPECIALIZATION:</b>	-

<b>ACADEMIC YEAR</b>	2011-2012		
<b>TEACHING PERIOD</b>	<b>September-January</b>	<b>February-June</b>	
		X	
<b>LANGUAGE</b>	<b>Spanish</b>	<b>English</b>	<b>Both</b>
			X <sup>Note (1)</sup>

Note (1): The written material, both the bibliography and the written reports produced by the students, will be in English. If there is at least one student in the classroom who cannot speak Spanish, all the oral presentations, made both by the lecturers and the students, will be in English. Otherwise, it is possible that some oral presentations are made in Spanish.

<b>DEPARTMENT:</b>	<b>Departamento de Ingeniería y Arquitecturas Telemáticas</b> (Department of Telematic Engineering and Architectures)	
<b>LECTURERS</b>		
<b>NAME</b> (C = Coordinator)	<b>ROOM</b>	<b>e-mail</b>
José-Fernán Martínez Ortega (C)	4326	jf.martinez@upm.es
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Ana-Belén García Hernando	4323	anabelen.garcia@diatel.upm.es

<b>PREVIOUS REQUIRED BACKGROUND TO FOLLOW THE COURSE</b>	
<b>APPROVED COURSES</b>	<p>Any of the following graduates (or students with demonstrable equivalent knowledge) may access this course:</p> <ul style="list-style-type: none"> <li>• Graduate in Communication Electronics Engineering (Graduado en Ingeniería de Electrónica de Comunicaciones)</li> <li>• Graduate in Telecommunication Systems Engineering (Graduado en Ingeniería de Sistemas de Telecomunicación)</li> <li>• Graduate in Sound and Image Engineering (Graduado en Ingeniería de Sonido e Imagen)</li> <li>• Graduate in Telematic Engineering (Graduado en Ingeniería Telemática)</li> </ul>
<b>OTHER REQUIRED LEARNING RESULTS</b>	

## Learning Objectives

<b>COMPETENCES AND COURSE ASSIGNED LEVEL</b>		
<b>Code</b>	<b>COMPETENCE</b>	<b>LEVEL</b>
CGEN.2	Be capable of performing independent learning during their professional career.	L4
CGEN.8	Be capable of applying and integrating the acquired knowledge to solve problems in new environments, inside broader and multidisciplinary contexts, in the framework of their expertise area.	L5
CGEN.9	Be capable of performing research, development and innovation activities in the context of the Information Society.	L5
CEP.1	Be capable of analyze, perform and apply standards related to ICT.	L4
CESE.3	Be capable of analyze and develop software applications and protocols for advanced telematic systems.	L4
CESE.4	Be capable of specify and design advanced telematic services.	L5
CEI.2	Be capable of critically interpreting and assessing scientific documents in the area of the Information and Communication Technologies.	L5
CEI.3	Be capable of communicating and disseminating their research results.	L4
CEI.4	Public presentation of research results skills and defense of conclusions.	L5

<b>Code</b>	<b>COURSE LEARNING RESULTS</b>
LR14	Apply new technologies with different systems for solving particular problems in the domain of services and protocols engineering.
LR15	Identify researching open areas in the domain of services and protocols engineering.
LR16	Describe new techniques associate with the specification and design of highly complex telematic systems.
LR17	Apply new techniques to solve open research problems in the field of services and protocols engineering.

# Contents and Learning Activities

SPECIFIC CONTENTS		
LECTURE / UNIT	EPIGRAPH	Related indicators
<b>Unit 1</b>	<b>1: Next generation of telematics services</b>	LR14, LR15, LR16, LR17
	1.1: Trends to next generation services and systems	
	1.2: Next generation services a case study	
	1.3: Open issues and challenges	
<b>Unit 2</b>	<b>2: Advanced networking</b>	LR14, LR15, LR16, LR17
	2.1: Networking traditional protocols	
	2.2: New trends in networking	
	2.3: Networking current technical challenges	
<b>Unit 3</b>	<b>3: Network security protocols and services</b>	LR14, LR15, LR16, LR17
	3.1: Network security services	
	3.2: Network security traditional protocols	
	3.3: Security protocols for advanced networks	
<b>Unit 4</b>	<b>4: Open research issues in services and protocols engineering</b>	LR14, LR15, LR16, LR17
	4.1: Study of state of the art on Advanced Engineering Techniques on Systems and Telematics Services Development	
	4.2: Definition of technical reports	
	4.5: Definition of research papers	

## BRIEF DESCRIPTION OF THE ORGANIZATIVE MODALITIES USED AND EMPLOYED LEARNING METHODS

<b>THEORY</b>	For each one of the first tree units (1 to 3) there will be an introductory session made by a teacher, with the objectives of giving a general technological overview of the topic, providing extra recommended bibliography, ensuring that the students get at least a minimum common background and establishing the main vocabulary and concepts.
<b>RESEARCH WORK</b>	Unit 4 consists on the development of a research work. Students will have to perform a research paper presenting it orally. This will require a considerable amount of time, which will be spent on searching scientific information, synthesizing it and analysing it for new solutions.
<b>AUTONOMOUS WORK</b>	Each student will have to spend time on reading documents, searching for information, performing the part of the group work they have been assigned with, and in general, assessing that they have grasped the main concepts, knowledge and abilities that will allow them to demonstrate their competence for passing the course evaluation.
<b>GROUP WORK</b>	There are two main activities that will require group work: i) Students will have to obtain the conclusions of the research work associated to unit 4, it will be proposed by the teachers on specific subjects. ii) Students will have to work in groups for reaching a consensus and a common understanding of the work to perform, by assigning tasks to each of the members, by putting in common their work, by integrating their results and, by preparing the corresponding presentations and reports.
<b>SUPERVISION</b>	Groups of students will be tutored by the lecturers on specific pre-scheduled sessions. This will allow the students to ask questions, raise the problems they have not autonomously been able to solve and receive advice on how to continue or tailor their work for the future.

<b>DIDACTICAL RESOURCES</b>	
<b>BIBLIOGRAPHY</b>	CERP-IoT – Cluster of European Research Projects on the Internet of Things. Vision and Challenges for Realizing the Internet of Things. March 2010. Available from: <a href="http://www.internet-of-things-research.eu">www.internet-of-things-research.eu</a>
	IERC – European Research Cluster on the Internet of Things. Available from: <a href="http://www.internet-of-things-research.eu/documents.htm">http://www.internet-of-things-research.eu/documents.htm</a>
	IETF: Internet Engineering Task Force. RFC pages. Available from: <a href="http://www.ietf.org/rfc.html">www.ietf.org/rfc.html</a>
	Internet of Things – New Security and privacy challenges. Rolf H. Weber. ScienceDirect. Computer Law & Security Review 26 (2010) pg 23-30. Ed. Elsevier. Available from: <a href="http://www.internet-of-things.org/cl-pdf/2.pdf">http://www.internet-of-things.org/cl-pdf/2.pdf</a>
	Broadband Forum. Available from: <a href="http://www.broadband-forum.org/">http://www.broadband-forum.org/</a>
	The Internet of Things council. Available from: <a href="http://www.theinternetofthings.eu/">http://www.theinternetofthings.eu/</a>
	Basic papers: Most of them will be accessible using the international electronic databases to which the UPM is subscribed. Some of them could be also uploaded to the Moodle space of the course.
<b>WEB RESOURCES (Institutional Platform)</b>	Moodle platform space of the course: accessible through the following URL: <a href="https://www.upm.es/politecnica_virtual/">https://www.upm.es/politecnica_virtual/</a> (using your e-mail address and password as a UPM student).

# Course work chronogram

The students will have to complete a total of about 133 hours (5 ECTS) of work for passing the course. This includes all the time that the students have to spend on course-related activities, including not only in-class or in-laboratory time but also all the activities to be done autonomously, either individually or in groups. The autonomous time that the students are foreseen to spend to pass the course is the following:

- Autonomous personal study: 30 hours.
- Autonomous group work: 15 hours.
- Preparatory work for making the oral presentations: 10 hours.
- Preparatory and writing work related to the research reports: 32 hours.
- Critical assessment of technical documents (additional to the time scheduled below): 4 hours.

The following tables summarize the time foreseen in-class work during the course (this time is additional to the items presented above).

<b>Presentation</b>			
<b>Week 01</b>			
Activity	Hours	Place	Methodology
▪ Introduction to the course	2	Classroom	Theory
▪ Supervision session for introducing the group research work topics and methodology	1	Classroom	Supervision

<b>Unit 1</b>			
<b>Week 02</b>			
Activity	Hours	Place	Methodology
▪ Unit 1 session	3	Classroom	Theory

<b>Unit 2</b>			
<b>Week 03</b>			
Activity	Hours	Place	Methodology
▪ Unit 2 session	3	Classroom	Theory

<b>Unit 3</b>			
<b>Week 04</b>			
Activity	Hours	Place	Methodology
▪ Unit 3 session	3	Classroom	Theory

<b>Unit 4 + supervision</b>			
<b>Weeks 05 – 13</b>			
Activity	Hours	Place	Methodology
▪ Work in groups, to coordinate the research work	6	Others	Group work
▪ Supervision sessions related to the groups' research work	12, in different weeks	Classroom	Supervision
▪ Oral presentation (+ questions & answers) of the partial research work done by the groups	6, in different weeks	Classroom	Evaluation

<b>Final evaluation activities</b>			
<b>Weeks 14 – 15</b>			
<b>Activity</b>	<b>Hours</b>	<b>Place</b>	<b>Methodology</b>
▪ Oral presentation (+ questions & answers) of the research work done by the groups throughout the semester	3	Classroom	Evaluation
▪ Critical assessment of research papers.	3	Others	Evaluation

**Timetable:**

Tuesday 18:30 - 19:30

Tuesday 19:30 - 20:30

Tuesday 20:30 - 21:30

**Theory assignment:**

Total: 1 group

Lecturers: José Fernán Martínez (coordinator)  
 Ana Belén García  
 Lourdes López

**Laboratory group distribution:**

Total: 0 groups

# Course assessment and evaluation system

## EVALUATION

The final mark for each student in this course will be a number between 0 and 10 points. The course is passed if the mark is equal or above 5 points.

The course is designed to be passed using continuous evaluation. The research work performed by the students has a very significant weight in the total course mark, since the total students' work necessary to pass this part of the course is foreseen to be high. This is the reason why in the case of there being a final exam, it is mandatory to have previously passed the research work-related part of the course (i.e. to have attended through the semester, performed the activities and passed the evaluation of Unit 4) in order to the student to be able to access such an exam. The students that pass the course by using continuous evaluation (see the deliverables to be produced below) will not be required to do any additional exam.

The following deliverables produced by the students will be subject to evaluation:

- Research work, done in groups, on a subject related to the course. Two deliverables will be assessed:
  - The written report developed by the students group.
  - The oral presentation plus the answers to the questions asked by other students and the lecturers during and after the presentation.
- Critical assessment of scientific and technological papers. In this case, the students will be asked to read the documents by their own classmates, and to produce a critical assessment, in a written form, about their content.

The following table summarizes the weights (out of a total of 10 points) for each evaluated activity.

CUMULATIVE ASSESSMENT				
Evaluated activity	Unit	Week	Place	Assessment weight
▪ Research work: written documents.	1-4	5-14	Others	5.0
▪ Research work: oral presentation.	1-4	5-14	Classroom	4.0
▪ Critical assessment of documents.	4	15	Others	1

## QUALIFICATION CRITERIA

The following criteria will be considered when assessing each of the evaluated activities:

Research work: written document:

- Technical correctness, completeness, originality and accuracy. If a formalization language is used (e.g. in the design phase of the project), it has to be semantically and syntactically well used.
- Presentation: correctness, clarity, grammar, format.

Research work: oral presentation.

- Execution: clarity, conciseness, correctness, fineness of the presentation to the written document, quality of the auxiliary means (power point slides, use of the blackboard, etc.).
- Questions: accuracy and correctness when answering to questions.

Critical assessment of documents.

The student must be able to understand and critically analyze and evaluate technical documentation by establishing connections with other approaches associated to other technical information previously read.