



## ANEXO I

	<b>Escuela Técnica Superior de Ingeniería</b> GENERAL SPECIFICATIONS		
<h3 style="margin: 0;">COURSE 23/24</h3>			
<b>Subject data</b>			
<b>Name</b>			
Representación del Conocimiento			
<b>English name</b>			
Knowledge representation			
<b>Code</b>		<b>Type</b>	
606010236		Mandatory	
<b>Hours</b>			
	<b>Total</b>	<b>In class</b>	<b>Out class</b>
Time distribution	150	60	90
<b>ECTS: 6</b>			
<b>Standard group</b>	<b>Small groups</b>		
	<b>Classroom</b>	<b>Lab</b>	<b>Practices</b>
<b>3</b>		<b>0</b>	<b>0</b>
			<b>Computer classroom</b>
			<b>3</b>
<b>Departments</b>		<b>Knowledge areas</b>	
Information Technology		Computer Science and Artificial Intelligence	
<b>Year</b>		<b>Semester</b>	
3º		2º	

TEACHING STAFF			
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SPECIFIC INFORMATION OF THE COURSE
1. Contents description
1.1. In English:
Being able to represent information in an appropriate way is essential to solve a multitude of problems. Logical programming as a method of representing knowledge is a challenge for computer science students. Logical programming, as a paradigm different from imperative programming, requires an additional effort on the part of the student. This process of understandin this method of representing

knowledge will take us the greater part of the study of this subject, because a new paradigm of programming can not be understood until after a long period of practice.

Topic 1. Introduction

Topic 2: First order logic.

Topic 3: Rules to represent knowledge.

UNIT 4: Vagueness and Uncertainty.

Topic 5. Representation of actions and planning.

#### 1.2. In Spanish

Ser capaz de representar la información de manera apropiada es esencial para resolver una multitud de problemas. La programación lógica como un método para representar el conocimiento es un desafío para los estudiantes de informática. La programación lógica, como un paradigma diferente de la programación imperativa, requiere un esfuerzo adicional por parte del estudiante. Este proceso de comprensión en este método de representar el conocimiento nos llevará a la mayor parte del estudio de este tema, porque un nuevo paradigma de programación no puede ser comprendido hasta después de un largo período de práctica.

Tema 1. Introducción

Tema 2: Lógica de primer orden.

Tema 3: Reglas para representar conocimiento.

Tema 4: Vaguedad e Incertidumbre.

Tema 5. Representación de acciones y planificación.

### 2. Background

#### 2.1. Situation within the Degree:

Being able to represent information in an appropriate way is essential to solve a multitude of problems. This subject is related to those others that need to handle information such as those related to Artificial Intelligence, Databases or Software Engineering.

#### 2.2. Recommendations:

Be familiar with the basic concepts of data structures and algorithm design techniques and analysis.

### 3. Objectives (as result of teaching):

- Represent knowledge symbolically in a form suitable for automated reasoning, and methods associates of reasoning.
- Combine formal algorithmic analysis with a description of the most recent applications.
- Acquire basic knowledge about computational logic.
- Acquire programming knowledge in Prolog.

### 4. Skills to be acquired

#### 4.1. Specific Skills:

CE5-C: Ability to acquire, obtain, formalize and represent human knowledge in a computable form for the resolution of problems through a computer system in any field of application, particularly those related to aspects of computing, perception and performance in intelligent environments or environments.

#### 4.2. General Skills:

CB4: That the students can transmit information, ideas, problems and solutions to an audience as much specialized as non-specialized

CG0: Capacity for analysis and synthesis: Finding, analyzing, criticizing (critical reasoning), relating, structuring and

synthesize information from various sources, as well as integrate ideas and knowledge.

G03: Ability to solve problems

G04: Ability to make decisions based on objective criteria (experimental, scientific or simulation data) available) as well as the ability to logically argue and justify said decisions, knowing how to accept others points of view

G06: Capacity for autonomous learning as well as initiative and entrepreneurial spirit

G07: Motivation for quality and continuous improvement, acting with rigor, responsibility and professional ethics.

G08: Ability to adapt to technologies and future environments updating professional skills.

G09: Ability to innovate and generate new ideas.

CT2: Development of a critical attitude in relation to the capacity of analysis and synthesis.  
 CT3: Development of an attitude of inquiry that allows the revision and permanent advancement of knowledge.  
 CT4: Ability to use Computer and Information Competencies (CI2) in professional practice.

## 5. Training Activities and Teaching Methods

### 5.1. Training Activities:

- Theory sessions on the contents of the Program.
- Problem Solving sessions.
- Practical sessions in specialized laboratories or computer rooms.
- Activities Academically Directed by the Faculty: seminars, conferences, development of works, debates,
- collective tutorials, evaluation activities and self-evaluation.

### 5.2. Teaching Methods:

- Participatory Master Class.
- Development of Practices in Specialized Laboratories or Computer Classrooms in small groups.
- Problem solving and practical exercises.
- Individual or Collective Tutorials. Direct interaction teachers-students.
- Approach, Realization, Tutoring and Presentation of Works.
- Conferences and Seminars.
- Evaluations and Exams.

### 5.3. Development and Justification:

To develop the skills to acquire in this subject will be used the following groups of teaching activities formative: - Theoretical / practical classes and problems: 70% - Laboratory / computer practices: 25% - AAD (Collective tutorials, cross-cutting activities ...): 5%

## 6. Detailed Contents:

Topic 1. Introduction

1.1 Basic concepts.

1.2 Systems based on knowledge.

1.3 Reasoning.

Topic 2: Introduction to logic programming with Prolog.

Topic 3: Knowledge representation techniques with logical programming and lists.

Topic 4: Knowledge representation techniques with logical programming and trees.

Topic 5: Knowledge representation techniques with logical programming and graphs.

Topic 6: Other knowledge representation techniques.

## 7. Bibliography

### 7.1. Basic Bibliography

- Programación declarativa. Manual para la docencia [95]. José Carpio Cañada, Gonzalo Antonio Aranda Corral, José, Marco de la Rosa. Servicio de Publicaciones, Universidad de Huelva, 2010
- Prolog Programming for Artificial Intelligence, Ivan Bratko, Addison Wesley; 3rd edition (2000)

<ul style="list-style-type: none"> <li>- Representación del conocimiento en sistemas inteligentes, Gregorio Fernández Fernández</li> <li>- <a href="http://www.gsi.dit.upm.es/~gfer/ssii/rcsi/">http://www.gsi.dit.upm.es/~gfer/ssii/rcsi/</a></li> <li>- Real World, Haskell, Bryan O'Sullivan, John Goerzen y Don Stewart, Ed. O'Reilly (2008) <a href="http://book.realworldhaskell.org/">http://book.realworldhaskell.org/</a></li> </ul>
<b>7.2. Additional Bibliography:</b>
<ul style="list-style-type: none"> <li>- Knowledge Representation and Reasoning, Ron Brachman and Hector Levesque <a href="http://www.sciencedirect.com/science/book/9781558609327">http://www.sciencedirect.com/science/book/9781558609327</a></li> </ul>

<b>8. Systems and Assessment Criteria</b>
<b>8.1. System for Assessment:</b>
<ul style="list-style-type: none"> <li>• Theory / problems exam</li> <li>• Defense of Written Works and Reports</li> <li>• Exam of practices</li> </ul>
<b>8.2. Assessment Criteria and Marks:</b>
<p>The principles of evaluation of the subject follow criteria of preferably continuous evaluation, understanding for this reason, the diversified evaluation that is carried out at different moments of the current academic year. The subject evaluation consists of a theoretical part and a practical part. This evaluation is carried out, for all calls ordinary, through the following evaluation systems and weightings:</p> <p>Theory / Problems Exam (TE): 50%. Practice exam (PE): 30%. Defense of papers and Written Reports (DP): 20%.</p> <p>The evaluation of the subject consists of a theoretical part and a practical part. The theoretical part is evaluated by means of the TE evaluation system. The practical part is evaluated by means of the PE and DP evaluation systems. Through the part Theoretical skills CE5-C, CG0, G03, G09 and CT02 will be evaluated, while through the practical part They will evaluate the G03, G04, G07 and G08 skills.</p> <p>The final global grade will be the average of the final theoretical grade (TE) and the final practical grade (PE + DP), being a minimum grade of 4.0 points (out of 10.0) is required in the theoretical exam (TE) and 4.0 points (out of 10.0) in the practical part (PE + DP).</p> <p>Those students who consider this to be the case are eligible for a single final evaluation. In this case you must submit an application in the GENERAL REGISTRY of the University, in any of its RECORDS AUXILIARIES or in the TELEMATIC REGISTRY, addressed to the department management and the subject coordinator.</p> <p>The final single evaluation will consist, for all the calls, in a single academic act that will be formed by the following tests:</p> <p>Test 1: Written exam about the contents explained in the theory and problems sessions. It will have a character face-to-face and individual, with a maximum duration of up to 1.5 hours. It covers the TE evaluation system and has a percentage of 50% on the final grade.</p> <p>Test 2: Practical exam in which several exercises to be solved will be proposed. It will have two parts that will cover PE and DP evaluation systems. Your percentage in the final grade will be 50%. The exam will take place in a classroom computers and their maximum duration will be 1 hour and a half.</p> <p>To pass the subject, they must be passed with more than a 5.0 independently both tests. When the number of students who choose to be evaluated with the Honor Roll, exceeds the number of possibilities, will discriminate taking into account the following requirements, in the order indicated: First, students will be ordered in function of the final note in minutes. If the equity continues, they will be ordered only by the note of the theoretical part. If equity continues a raffle will be held.</p>