

SUBJECT SYLLABUS

Academic year Degree 144.2 BACHELOR'S DEGREE IN COMPUTER ENGINEERING 2012/13 Subject code and title Duration 44227 **Intelligent Systems** Semester 2 **UD Credits ECTS Credits** Type Language Group/Language **COMPULSORY SPA-ENG** 6 6 01 / Spanish Lecturer Carballedo Morillo, Roberto

DESCRIPTION

Individuals who graduate in Computer Engineering have the capacity to apply their knowledge to problem solving in different areas related to information technology providing the most adequate solution to each case.

The main contribution of the subject Intelligent Systems to the degree on Computer Engineering is in problem solving and application design according to given requirements and applying the specified criteria of effectiveness, efficiency cost and benefit. In particular, the subject Intelligent Systems places especial emphasis on solving problems for which there is no ideal algorithmic solution and therefore require empirical knowlede.

PREREQUISITES

UML notation for the design of class diagrams.

Algorithmics, data structures and object oriented programming notions.

JAVA programming language.

LEARNING OUTCOMES IN TERMS OF GENERIC AND SPECIFIC COMPETENCES

Generic Competency CG9.2 Problem Solving: To identify, analyze and define the significant elements making up a problem in order to solve it with criteria and effectively. Level 2: To use one; sown experience and criteria in the analysis of the causes of a problem and build up a more effective and efficient solution.

Specific Competency CE1: To formulate search problems and to identify and apply an appropriate solving technique.

Specific Competency CE2: To analyze problems whose resolution requires empirical knowledge and to design knowledge based systems.

Specific Competency CE3: To identify and apply machine learning techniques that may improve the performance of an intelligent system.

CONTENTS

Chapter 1. What is Artificial Intelligence?: Definitions of Artificial Intelligence. The Foundations of Artificial Intelligence. Application areas of Artificial Intelligence. Abridged history of Artificial Intelligence.

Chapter 2. Intelligent Systems: The Concept of Rationality. Problem Environment. Properties of problem environments. Problem environment and performance measure. Problem types addressed by Intelligent Systems.

Chapter 3. Search: Solving problems by search techniques. Uninformed, or blind, search. Informed, or heuristic, search. Local search. On-line search. Adversarial Seach. Constraint Satisfaction Problems.

Chapter 4. Knowledge Based Systems: Knowledge representation. Knowledge representation techniques. Inference and reasoning. Development of knowledge based systems, both hybrid and rule based. Forward chaining rule systems. Backward chaining rule systems.

Chapter 5. Machine Learning: The definition of learning within the Artificial Intelligence context. Basic architecture of a learning system. The design of the learning element. Supervised Inductive Learning. Decision Tree Learning. Learning with Artificial Neural Networks.

TEACHING-LEARNING STRATEGY

The course includes the following activities:

- Presentation and debate
- Solving exercises, problems and cases.
- Group projects applying the case solving method.
- Programming tasks
- Personal reading and study

The course requires 150 hours of student work distributed throughout the semester and the examination period. The



expected student work time in and out of the classroom is as follows:

Work in the classroom: 62,5 hoursWork out of the classroom: 87.5 hours

ASSESSMENT SYSTEM

The student; s final mark is the result of adding the following partial marks:

- Evaluation of every group project submission (40% of the final mark)
- Evaluation of the minimum necessary knowledge test. (60% of the final mark)
- Evaluation of optional individual activities. (extra points are awarded)

Following is a summary of the evaluating scheme relating the competencies to be developed with the different activities to be evaluated:

- Generic Competency (20% of the final mark)
 - * Group projects 1 and 2: 5%
 - * Group project 3: 5%
 - * Minimum necessary knowledge test: 10%
- Specific Competency CE1 (35% of the final mark)
 - * Group projects 1 and 2: 15%
 - * Minimum necessary knowledge test: 20%
- Specific Competency CE2 (30% of the final mark)
 - * Group project 3: 15%
 - * Minimum necessary knowledge test: 15%
- Specific Competency CE3 (15% of the final mark)
 - * Minimum necessary knowledge test: 15%

Before adding a student; s partial marks to compute their final mark, the following cutting points will be checked:

- For every evaluated activity, a student must obtain a mark above the specified minimum threshold.
- For the generic competency, a student must obtain a mark above the specified minimum threshold.

There are deadlines for the submission of the different group projects. Late submission is allowed but penalized; nevertheless students submitting their work late may still obtain the specified minimum cutting point mark.

BIBLIOGRAPHY

Russell, S. & Norving, P. Artificial Intelligence: A modern approach. 3ª Ed. Prentice-Hall. 2010.

Learning material accessible on the on-line platform for learning: Course programme and learning guide. Slides. Exercises and solutions. Problem Cases. Exams from previous years. Programming code templates and program samples. Instructions and complementary documentation for the different learning activities and group projects. Forums to answer questions. Links to especialized web pages and recommended reading.