SUBJECT TEACHING GUIDE

G684 - Representation of Knowledge

Degree in Computer Systems Engineering

Academic year 2016-2017

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Optional. Year 4
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computing Mention in Computing				
Course unit title and code	G684 - Representation of Knowledge				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	https://aulavirtual.unican.es				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	INES GONZALEZ RODRIGUEZ
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Office	Facultad de Ciencias. Planta: + 3. DESPACHO PROFESORES (3003A)
Other lecturers	

3.1 LEARNING OUTCOMES
- The student should be acquaintanced with different techniques of knowledge representation and inference and be able to choose and apply the most adequate technique for a given problem, especially when builiding intelligent systems.
- The student should be familiar with different algorithmic learning techniques to elicit knowledge and apply them to build and maintain knowedge-based systems.
- The student should be familiar with rule-based programming and should be able to write simple programs within this paradigm.

4. OBJECTIVES

To know and be able to apply basic concepts and techniques of knowledge representation based on logic: representation models, inference algorithms, elicitation or model learning techniques, limitations of such models and some extensions or alternatives, such as structured or object-based representations.

To know and be able to apply basic concepts and techniques of knowledge representation based on uncertainty, mainly probabilistic graphical models: representation models, inference algoritms, elicitation or model learning techniques, advantages and disadvantages of such models.

To be acquaintaced with real-life applications of different knowledge-representation models, such as business rules, semantic web, OWL language, etc.

Understand the relationships or dependencies between Knowlege Representation and other courses or subjects in the field of Computer Science, in particular, Logic, Intelligent Systems, Machine Learning and Natural Language Processing.

6. COURSE ORGANIZATION

	CONTENTS
1	Logic-based knowledge representation: - Review of predicate logic. - Inference. - Model elicitation and learning. - Limitations and possible extensions (semantic networks, frames, ontologies, non-classical logics...)
2	Knowledge representation based on probabilistic graphical models: - Review of probability. - Inference. - Model elicitation and learning. - Advantages and limitations.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam including theoretical and problem-solving questions.	Written exam	Yes	Yes	40,00
Programming assignments.	Others	No	Yes	40,00
Coursework activities, such as essays, oral presentations, problem solving, etc.	Others	No	Yes	20,00
TOTAL				100,00

Observations

The exact nature of coursework activities will depend on the course progress and the student needs and interests. The goal is to provide feedback to the students as well as coordinating coursework activities with the remaining courses.
Coursework grades can be regained with a written assignment proposed by the lecturer.
For the programming assignments, students must work in groups. The corresponding grades can be regained by resubmitting the assignments with appropriate changes before the written exam.

Observations for part-time students

Part-time students must sit for the written exam with the rest of the students. For the remaining activities, alternative formulae will be agreed between the student and the lecturer, taking into account the student's circumstances. The student will always have the opportunity to regain the grades as the rest of students.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
R. J. Brachman, H. J. Levesque. "Knowledge Representation and Reasoning", Morgan Kaufmann-Elsevier (2004)
D. Koller, N. Friedman. "Probabilistic Graphical Models. Principles and Techniques". The MIT Press (2009)
A. J. Gonzalez and D. D. Dankel. "The Engineering of Knowledge-based Systems." Prentice Hall, USA (1993)