Centre	**University College of Engineering of Vitoria-Gasteiz**
Name of subject	**26027 – Decision Support Systems**
Qualification	**Degree in Computer Management and Information Systems Engineering**
Type	**Compulsory**
Credits	**6 ECTS**
Year	**3**
Term(s)	**2nd**
Department	**Systems and Automatics Engineering**
Language	**Spanish**

Outcomes / Objectives

1.-Understand the fundamentals of decision support.

2.-Apply the different decision making strategies under uncertainty.

3.-Discuss the nature of the different ways to approach the decision making problem in a variety of contexts and applications.

Syllabus

0.-Introduction to the decision making problem and general presentation of the techniques to use

1.-Bayesian networks

- 1.1.-Naive Bayesian method
- 1.2.-Notion of graph and its application to Bayesian networks
- 1.3.-Inference with Bayesian networks
- 1.4.-Need for machine learning for the construction of a Bayesian network

2.-Influence diagrams and decision trees

- 2.1.-Definition and construction of influence diagrams and decision trees
- 2.1.-Cost-utility analysis
- 2.2.-Sensitivity analysis

3.-Machine learning

- 3.1.-Supervised neural networks
- 3.2.-Unsupervised neural networks
- 3.3.-Optimisation algorithms and genetic algorithms
- 3.4.-Classifiers and meta-classifiers: ID3, AdaBoost.

Methodology

Teaching Method

Face-to-Face Teaching Hours								
Lectures	**Seminars**	**Classroom practice**	**Lab. practice**	**Computer sessions**	**Clinical practice**	**Workshops**	**Industrial workshops**	**Field practice**
40			20					
Student Hours of Non Face-To-Face Activities								
Lectures	**Seminars**	**Classroom practice**	**Lab. practice**	**Computer sessions**	**Clinical practice**	**Workshops**	**Industrial workshops**	**Field practice**
60			30					

Assessment System

General criteria

→ Written essay exam

→ Practical tasks (exercises, case studies or problems)

Clarification regarding assessment

1.-Written exam on the first 2 units. 3.5 points over total points. Halfway through the course.
2.-Written exam on the last unit. 3.5 points over total points. At the end of the course.
3.-Laboratory practice. 3 points over total points. Throughout the course.

If in the first exam the student achieves half the points allocated to that exam, the score achieved will be kept and added to the other scores. Otherwise, the student must sit the second exam, which in that case will be over 7 points and the student will be assessed on all the units. Therefore, students who pass the first exam do not need to take an exam on those units again.

The final score will be the sum of the 3 assessment scores. The passing grade for the subject is a final score of 5, and the sum of the 2 exam scores must be at least 3.5.

Bibliography

Basic Bibliography

- 1.-S. Ríos, C. Bielza, A. Mateos. Fundamentos de los sistemas de ayuda a la decisión. Ra-Ma, 2002.
- 2.-Francisco Javier Díez Vegas, Teoría probabilista de la decisión en medicina. Informe Técnico CISIAD-07-01 UNED, Madrid 2007.
- 3.-Francisco Javier, Díez, Introducción a los modelos gráficos probabilistas, Departamento de Inteligencia Artificial, Uned, Octubre de 2007
- 4.-REDES NEURONALES Y SISTEMAS BORROSOS.
- MARTIN DEL BRIO, BONIFACIO / SANZ MOLINA, ALFREDO
- 2006, ISBN978-84-7897-743-7, RA-MA

In-depth Bibliography

- Alex Berson and Stephen J. Smith. Data Warehousing, Data Mining & OLAP. McGraw-Hill, 2001
- -.S. Silver. Systems that support decision makers: description and analysis. Wiley, 1991.
- George Marakas. Decision Support Systems. Prentice Hall, 2001.
- Sistemas Expertos y Modelos de Redes Probabilisticas, Enrique Castillo y otros, Universidad de Cantabria.
- Business intelligence: Técnicas de análisis para la toma de decisiones. Elizabeth Vitt, Michael Luckevich, Stacia Misner. McGraw-Hill 2003.

Journals

- Decision Support Systems
- IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE
- International Journal of Neural Systems
- IEEE Computational Intelligence Magazine
- JOURNAL OF MACHINE LEARNING RESEARCH

Websites

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- http://www.hindawi.com/journals/cin/aims/
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