
Academic Year: (2024 / 2025)**Review date: 16-05-2024**

Department assigned to the subject: Computer Science and Engineering Department**Coordinating teacher: TOLEDO HERAS, MARIA PAULA DE****Type: Electives ECTS Credits : 3.0****Year : 1 Semester : 2**

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Data analysis and Big data

OBJECTIVES

The objective of the course is for students to understand and use various methods for decision-making in the business context. These methods include data analytics, data mining, search and optimization, and artificial intelligence and expert systems.

DESCRIPTION OF CONTENTS: PROGRAMME

Unit 1. Introduction to Decision support systems and business intelligence

- Decision support systems
- Phases of the Decision-Making Process
- Models in decision making
- Computerized systems for decision making
- Business Intelligence
- Analytics: Descriptive Analytics, Predictive Analytics, Prescriptive Analytics

Unit 2. Descriptive analytics and visual analytics

- Data preparation: Data warehousing; ETL process: extract, transform and load
- Data description: OLAP Online Analytical Processing ; visual analytics; Business reporting; - KPI and Dashboards
- Business Performance Management: (Balanced scorecards); BPM Technologies and Applications
- Performance Dashboards and Scorecards

Unit 3. Predictive analytics and data mining

- Introduction: predictive analytics; data mining; knowledge acquisition; methodologies (Crisp-DM, Knowledge Discovery in databases)
- Modeling and evaluation
- Association rule mining
- Text mining and sentiment analytics
- Web analytics, web y mining social analytics

Unit 4. Decision support using models

- Prescriptive analytics in DSS
- Model-Based decision making
- Certainty, Uncertainty, and Risk
- Mathematical models for Decision support
- Lineal Programming (Optimization)
- Uncertainty: Sensitivity Analysis, What-If Analysis, and Goal Seeking
- Support Systems Modeling with Spreadsheets
- Decision Analysis
- Problem-Solving Search Methods
- Simulation

Unit 5. Intelligent systems

- Artificial Intelligence
- Expert systems
- Structure of Expert Systems
- Knowledge Engineering
- Rule based expert systems
- Inference with uncertainty
- Expert systems in the financial sector
- Development of Expert Systems

Unit 6. Knowledge management systems and collaborative systems

Tema 7. DSS in the financial sector

LEARNING ACTIVITIES AND METHODOLOGY

The design of the course is adapted to the blended nature of the master's degree: in person + remote

Learning activities are summarized as follows:

AF1: Lectures: Theoretical presentations accompanied by digital presentations

AF3: Theoretical and practical classes: Combination of lectures accompanied by the resolution of practical exercises

AF5: Tutorials: Personalized on-site or remote tutorials

AF2: E-learning activities: Remote activities that the student develops independently. These activities include: Participation in forums, viewing pre-recorded contents, and guided exercises

AF7: Individual work of students: Individual student activities that complement the other activities (both classroom and non-classroom) and exam preparation

AF6: Work in groups

Teaching methodology

MD1: Teachers give lectures with support of digital presentations, in which they develop the subject.

MD3: Practical cases that are solved with a guided provided by the teacher.

MD5: Individual or group preparation of practices and reports

MD6: Specific e-learning activities including visualization pre-recorded content, self-review activities, participation in forums, etc.

ASSESSMENT SYSTEM

% end-of-term-examination: 60

% of continuous assessment (assignments, laboratory, practicals...): 40

Individual assignments 40% = 30% assignments, 10% participation in class

Final case study (workgroup) 30% (evaluation: presentation at the end of the term)

End of term exam 30%

The end of term exam (60%) consists of a written exam (30%) and a final project /case study (30%). The final project is workgroup but the assessment is individual and includes the presentation.

A minimum mark of 4 out of 10 in the final exam is required to pass the course in the first call.

Convocatoria extraordinaria: 100% of the final grade is the end of term exam grade

BASIC BIBLIOGRAPHY

- Ramesh Sharda, Dursun Delen, Efraim Turban Business Intelligence and Analytics. Systems for Decision Support, Pearson, 2014

- Ramesh Sharda, Dursun Delen, Efraim Turban Analytics, Data Science, & Artificial Intelligence: Systems for Decision Support. 11th edition, Pearson, 2019