

**COURSE DATA****Data Subject**

Code	44865
Name	Informatics
Cycle	Master's degree
ECTS Credits	10.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2237 - M.U. en Planificación y Gestión de Procesos Empresariales	Faculty of Economics	1	First term

Subject-matter

Degree	Subject-matter	Character
2237 - M.U. en Planificación y Gestión de Procesos Empresariales	3 - Informatics	Obligatory

Coordination

Name	Department
CERVERON LLEO, VICENTE	240 - Computer Science

SUMMARY

This module aims to train the student to extract all the relevant information from the existing data in a company or organization. This includes various subjects such as information technology, statistics and databases. The contents of this module are formed from these three subjects.

The first fundamental aspect is the acquisition and treatment of data. The diffusion and availability of information technologies have made it possible to process increasing volumes of information. Currently, any company or institution, regardless of its field of work or activity, acquires and processes huge amounts of information. For this reason, it is essential to know the most effective tools that allow the acquisition, storage and processing of the information with which a company or organization works and that will later help in decision-making.



Every professional with responsibility for the planning and management of business processes must have a basic knowledge of database technology, knowledge that allows them to both evaluate their possibilities and develop small databases and applications that allow them to exploit the information contained therein.

Once the information is acquired, it is necessary to analyze it, through the use of statistical techniques. From Databases, Excel files or flat files with data, it is necessary to be able to carry out a statistical study, both at a descriptive and inferential level. In this module the student will be provided with basic training in these aspects. The statistical analysis of the information is necessary as a step prior to decision making. Once the student is capable of structuring large amounts of data, of making queries about them and of filtering all the relevant information, there is still the work of studying that data to extract useful information. Descriptive measures such as means, variances, frequency tables, histograms and graphical representations represent a very important addition to the results of queries in large databases.

Additionally, from the data, which could be considered sampled variables from a potentially infinite universe of data, the student must be able to make a complete inference from these samples. Statistical inference can allow us to do it. Student must be able to infer the population means, to carry an analysis of variance, to estimate a regression model and to study categorical data. These useful tools allow to get to have a very large understanding of the large data sets with which companies work.

Finally, globalization and evolution of connectivity and ICT technologies have given rise to the so-called Industry 4.0 paradigm. It arises as a new industrial revolution that consists of incorporating new technologies (cloud, cyber-physical systems, sensors, etc ...) to the industry.

This paradigm provides a new approach to industry and represents a qualitative leap in the management and organization of the value chain. Nowadays, terms like IoT, blockchain, AI, ML or Big Data are now common in the ITC vocabulary, hence we need to understand what they mean and how they can support us during our professional life.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

OUTCOMES

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- Be able to integrate knowledge and handle the complexity of formulating judgments based on information that, while being incomplete or limited, includes reflection on social and ethical responsibilities linked to the application of knowledge and judgments.



- Know how to communicate conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audiences, clearly and unambiguously.
- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Know how to work in multidisciplinary teams reproducing real contexts and contributing and coordinating their own knowledge with that of other branches and participants.
- Participate in, lead and coordinate debates and discussions, be able to summarize them and extract the most relevant conclusions accepted by the majority.
- Use different presentation formats (oral, written, slide presentations, boards, etc.) to communicate knowledge, proposals and positions.
- Have a proactive attitude towards possible changes that may occur in their professional and/or investigative work.
- Be able to integrate into teams, both as managers or coordinators and for specific and limited functions and in support of the team or of others.
- To know how to apply acquired knowledge and solve problems in new or unfamiliar situations within wider contexts (or multidisciplinary) related with their field of study.
- Have the learning skills needed to continue studying in a way that will be largely self-directed or autonomous. Be able to approach new problems with new tools throughout their career.
- Develop the ability to manage information, with special emphasis on quantitative information. Adequately design the process of data collection and processing.
- Propose and/or identify new technologies and evaluate their potential impact on current processes.
- Develop a systemic perspective for problem solving and decision making in the business environment. Be able to break the whole down into parts, without losing the global view and taking into account the interrelationships between the parts.
- Be able to actively search for relevant information about the environment and the company, using different sources and procedures.
- Develop the technical and analytical skills needed for decision making based on complex and incomplete information, which is the central element of the managerial activity.



- Show creativity when facing the resolution of complex problems and be able to evaluate the implications that the alternatives designed may have on the different agents involved.
- Manage archives and records management systems by selecting the most appropriate technologies.
- Draw statistically relevant inferences and conclusions from a data source.
- Know the offer of existing ICT tools and solutions and the impact of their implementation in the company.

LEARNING OUTCOMES

Upon completion of the teaching-learning process, the student will have learned to:

1. Collect, analyze, and make decisions about data sets.
2. Understand and utilize the concepts and technologies of databases in their three fundamental aspects: design, utilization, and operation.
3. Use the standard query language for interacting with databases (SQL).
4. Understand the internal functioning of database management systems.
5. Select current database technologies according to their needs.
6. Interact with both personal databases and database management systems used in the business environment.
7. Extract information from databases through basic and advanced queries.
8. Perform a descriptive statistical analysis from a data source.
9. Characterize and statistically model a data source.
10. Understand the methodologies for implementing ICT in companies.
11. Understand the methodologies for using ICT in business.
12. Understand the impact of ICT implementation in companies.
13. Recognize the advantages of implementing ICT in companies.

DESCRIPTION OF CONTENTS

1. Databases

1. Introduction to file technology and file management systems, database management systems and their evolution.
2. Relational model, database design and normalization theory.
3. Query and exploitation of databases
4. Administration, security and legislation of databases.



5. Development of applications on databases.

2. Data analysis

1. Descriptive Statistics
2. Regression
3. One-group t-tests
4. Compare the difference in means for two groups
5. Analysis of variance
6. Categorical Data.

3. ICT in companies

1. ICT strategies in organizations.
2. Support technologies and worker management.
3. Support technologies for the integral management of organizations.
4. Decision support technologies.
5. Internet presence improvement technologies

WORKLOAD

ACTIVITY	Hours	% To be attended
Computer classroom practice	90,00	100
Attendance at events and external activities	6,00	0
Study and independent work	10,00	0
Preparation of evaluation activities	35,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	54,00	0
Resolution of case studies	40,00	0
TOTAL	250,00	

TEACHING METHODOLOGY

The teaching methodology will consist of theoretical and practical classes and several tasks to be developed by the student. The face-to-face classes will be divided into:

- Theoretical classes, in which the basic concepts of each of the points on the agenda will be exposed.
- Practical classes, in which practical exercises of what is exposed in the theory classes will be developed in order to reinforce their understanding. These classes will also serve to generate new points of view and approaches not analyzed in the theoretical classes, as well as verify the degree of acquisition of theoretical knowledge by the students.



For his/her part, the student must develop different tasks and activities with the help of the lecturers, which will serve to verify the degree of assimilation of the skills. These must be eminently practical, although they may deal with theoretical aspects seen in the course. Possible assignments are, for example, an analysis, design and implementation of a database or a study on some aspect of current data exploitation technologies.

EVALUATION

The assessment will be established by weighting each of the blocks according to their load in working hours. At least a 4 out of 10 score is required in each of the blocks. For the evaluation of each block, the following will be taken into account:

- Assessment by an exam of the achievement of the general objectives: 50%,
- Assessment of the resolution of practical exercises and work on database technologies, data analysis and ICT methodologies and their application to the planning and management of business processes: 50%.

REFERENCES

Basic

- Fundamentos de sistemas de bases de datos
Ramez A. Elmasri, Shamkant B. Navathe. Pearson Educación, 5ª edición, 2007
- Fundamentos de Bases de Datos
Abraham Silberschatz, Henry F. Korth, S. Sudarshan. McGraw Hill, 6ª edición, 2014
- Probabilidad y Estadística para Ingeniería y Ciencias
Jay L. Devore. International Thomson, 7ª edición, 2011
- Probabilidad y estadística aplicadas a la ingeniería
Douglas C. Montgomery, George C. Runger, McGraw-Hill, 2ª edición, 2010
- Information and Communication Technologies in the Context of Globalization
Kaushalesh Lal , PalgraveMacmillan, 2007
- Information and Communication Technology in Organizations:
Adoption, Implementation, Use and Effects
Harry Bouwman, Bart van den Hooff, Lidwien van de Wijngaert, Jan A G M van Dijk,
Sage Publications Ltd; 1ª edición, 2005
- Tecnologías de la información y las comunicaciones
Alicia B. Cortagerena, Claudio F. Freijedo, Pearson, 2ª edición, 2006



Additional

- Introducción a la informática
Beekman, G., Pearson, 6ª edición, 2004
- Modern engineering statistics
Lawrence L. Lapin, Duxbury Press, 1997
- Integration of ICT in Smart Organizations
István Mezgár, Idea Group Publishing, 2006