

Academic Year: ( 2022 / 2023 )

Review date: 20-05-2022

Department assigned to the subject: Department of Computer Science and Engineering

Coordinating teacher: MEDINA DOMINGUEZ, FUENSANTA

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Computing

**OBJECTIVES**

The competencies that the student acquires are:

- Basic Competences

BC1. Students have demonstrated knowledge and understanding in an area of study that is at the core of general secondary education, and is often at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study

BC3. Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues.

- General competencies

GC3. Be able to manage, identify, gather and interpret relevant information on issues related to the business environment in the digital age.

- Transversal Competencies

TC1. Be able to work in multidisciplinary and/or international teams and to organize and plan the work, making the right decisions based on the available information, gathering and interpreting relevant data to make judgments and critical thinking within the area of study.

TC3. To be able to assess the reliability and quality of the information and its sources using such information in an ethical way, avoiding plagiarism, and in accordance with the academic and professional conventions of the area of study.

- Specific Competencies

SC12. Know the basics of information technologies and the mechanisms of information representation, storage and transformation

Understanding information systems, the main technological tools applicable to companies and businesses, and their needs in terms of security and information protection

SC14. To know the principles of software development, production and implementation in the different organizational areas of the companies

SC15. To know the main technological products and trends of technology associated to the world of management and business, and to know how to design their implementation and innovation in the organizations

SC17. Know the main programming languages, and be able to use those languages for problem solving in different development environments

The Learning Results are:

LR1. To have acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and working methodology in the field of business administration and digital technology with a depth that reaches the forefront of knowledge.

LR2: To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding of these and problem-solving skills in complex work environments characteristic of the fourth era, making use of creative and innovative ideas, capable of creating new business opportunities.

LR3. Have the ability to collect and interpret data and information on which to base their conclusions including, where appropriate and relevant, reflection on social, scientific or ethical issues in the field of digital business.

LR4. Be able to deal with complex situations or situations that require the development of new solutions both in the academic and professional field of digital business management.

## DESCRIPTION OF CONTENTS: PROGRAMME

### U1 General Programming Concepts

1. Introduction: Data and Information
2. Algorithms and Programs: Definitions and Examples
3. Program Development Cycle
4. Programming Languages

### U2 Introduction to Programming:

1. Program Structure
2. Program Development Phases

### U3 Introduction to Language R

### U4 Data Structures

1. Vector
2. Factor
3. Matrix
4. Array
5. List
6. DataFrame

### U5 Input, output and data storage (keyboard, files)

### U6 Programming Structures

1. Conditional structure: if
2. Structures of loops: for, while, repeat

### U7 Functions

1. Definition
2. Variables and parameters in functions
3. Infix
4. Function calls

### U8 Graphics

## LEARNING ACTIVITIES AND METHODOLOGY

The subject will be taught in theory classes through master classes and practical exercises, and the practical classes through tutored classes. The master classes will be focused so that the student acquires the knowledge about programming necessary for his professional development. The practical classes will be developed so that, in a tutored way, the student acquires skills in the analysis, design, development, testing and documentation of programs

## ASSESSMENT SYSTEM

It will be 100% continuous evaluation where students will have various evaluable practices.

<b>% end-of-term-examination:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

## BASIC BIBLIOGRAPHY

- Crawley, Michael J. Statistics : An Introduction Using R , John Wiley & Sons, 2005
- Dalgaard, Peter Introductory statistics with R , Springer, 2002
- Everitt, Brian A handbook of statistical analyses using R, Chapman & Hall/CRC,, 2006
- Golemund, G., Wickham, H R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. , O'Reilly, 2016
- Lander, J R for Everyone: Advanced Analytics and Graphics. , Addison-Wesley Data and Analytics, 2017

- Maindonald, John Hilary Data analysis and graphics using R : an example-based approach , Cambridge University Press, 2003
- Rizzo, Maria L. Statistical computing with R , Chapman & Hall/CRC, 2007
- Vries, A., Meys, J. R for dummies, A Wiley Brand, 2017

#### BASIC ELECTRONIC RESOURCES

- Fuensanta Medina Domínguez . Programación II: Lenguaje R: <http://ocw.uc3m.es/course/view.php?id=299>
- Fuensanta Medina Domínguez . R que R: <http://spoc.uc3m.es>