COURSE DATA

Data Subject	
Code	36500
Name	Programming and Algorithmics Fundamentals
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1332 - Degree in Business Intelligence and Analytics	Faculty of Economics	1	First term

Subject-matter

Degree	Subject-matter	Character
1332 - Degree in Business Intelligence and Analytics	14 - Informatics	Basic Training

Coordination

Name	Department
MARTIN-SACRISTAN GANDIA, DAVID	240 - Computer Science

SUMMARY

The course "Programming and Algorithmics Fundamentals" is a core course of the first year of the Degree in Business Intelligence and Analytics. The course workload is 6 ECTS and it is given in the first four-month period of the first year.

The student will be introduced to the knowledge and management of the operating system, as well as sufficient knowledge of the design of algorithms through structured programming and modular programming, basic data structures and data management through files.

In the laboratory sessions, the student will implement the theoretical concepts learned in the course, will use some basic software tools and will program some simple software developments using a general purpose structured programming language.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

No prerequisites are established

OUTCOMES

1332 - Degree in Business Intelligence and Analytics

- Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.
- Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.
- Acquire basic training that can be used to learn new methods and technologies and to adapt to new situations in academic and professional areas.
- Be able to solve problems and to communicate and spread knowledge, skills and abilities, taking account of the ethical, egalitarian and professional responsibility of the activity of business intelligence and analytics.
- Be able to access and manage information in different formats for subsequent analysis in order to obtain knowledge through data.
- Demonstrate skills for analysis and synthesis.
- Be able to use ICT, both in academia and in professional practice.
- Be able to define, solve and present complex problems systemically.
- Know the basic concepts of logic, algorithmics, computational complexity and their application to business intelligence.
- Know the different types of data.
- Reorganise and restructure variables and databases.

LEARNING OUTCOMES

Learning goals of the course:

- Describe algorithmically solutions to problems.

- Ability to use a programming language to describe the algorithm that solves a problem.

- Describe the basic and composite data types used to store information.

- Design simple computer programs structured with loops and functions.

- Design simple computer programs structured with functions.

- Perform basic operations on files.

- Edit technical texts, use spreadsheets, create presentations and small databases using office application programs.

It is also a goal of this course to further develop the following skills:

- Logical reasoning.

- Analysis and synthesis.

- Oral and written communication skills.

- Personal work capacity.

- Teamwork and group leadership skills

DESCRIPTION OF CONTENTS

1. INTRODUCTION

1.1. Basic concepts
1.2. Computer History
1.3. Von Neumann's machine
1.4. Data storage
1.5. Types of computers
1.6. Software and operating system

2. PROGRAMMING IN HIGH-LEVEL LANGUAGES

2.1. Algorithm and program concepts
2.2. Programming languages
2.3. High-level languages
2.4. Phases in the realization of a program

3. STRUCTURED PROGRAMMING

3.1. Structured programming theorem
3.2. Sequential control structures
3.3. Conditional control structures
3.4. Iterative control structures

4. HOMOGENEOUS STRUCTURED DATA TYPES: STRINGS

4.1. Introduction
4.2. Strings

5. FILES

5.1. Introduction
5.2. Types of access
5.3. Types of files
5.4. Processing of files

6. MODULAR PROGRAMMING

6.1. Definition of module: Modular programming
6.2. Definition of subprograms: Functions
6.3. Parameters of a subprogram
6.4. Scope of identifiers
6.5. Recursivity
6.6. Separate writing

7. HETEROGENEOUS STRUCTURED DATA TYPES

7.1. Lists
7.2. Registers

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Computer classroom practice	30,00	100
Development of group work	20,00	0
Development of individual work	10,00	0
Study and independent work	10,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	15,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

Theoretical activities.

Description: The lectures will present the course contents providing a global vision, a detailed analysis of the key concepts and encouraging the student participation. The workload of this section for the students is 20% of the total of the course.

Practical activities.

Description: The practical activities complement the theoretical classes and allow the students to put into practice the contents and improve the understanding of the course concepts. They include the following types of classroom activities:

- Solving problems in class.

- Regular discussion of exercises and problems that the students have previously tried to work out.

- Laboratory sessions.

- Support tutorial sessions (individualized or in group).

- Individual evaluation of questionnaires to be done in class with the help of professors.

The workload of this section for the students is 20% of the total of the course.

Personal work.

Description: It is the work that the student must carry out individually out of the classroom timetable. It tries to promote the autonomous work habit. Activities in this group are: monographs, guided literature search, exercises and problems as well as preparation of classes and exams. The workload of this section for the students is 45% of the total of the course.

Teamwork in small groups.

Description: It will be carried out by small groups of students (2-4). It consists of work to be done out of the class timetable in form of exercises and problems. This work tries to improve the teamwork and leadership skills. The workload of this section for the student is 15% of the total charge of the course.

During the course the e-learning (pizarra virtual) platform of the University of Valencia will be used to support the teaching activities. This platform allows the access to the course materials used in the classes as well as additional documents, solved problems and exercises

EVALUATION

The breakdown of the course assessment is the following:

(C) Continuous assessment. It is based on participation and the degree of involvement in the teaching-learning process. In this section it will be taken into account the attendance to classroom activities and the resolution of exercises and problems.

(E) Individual examination. Consisting of a final exam that will include both theoretical and practical questions and problems.

(P) Laboratory activities assessment. The marks of this part will take into account the achievement of objectives in the laboratory sessions.

Final Mark = 0.2*C + 0.5*E + 0.3*P

It will be necessary to obtain at least 4 out of 10 and to have attended a minimum of 75% of the practical and/or theoretical sessions in each of the parts in order to be able to average the grade. Non-attendance duly justified to the professor responsible for the module will not count in this computation.

Only those assignments that are handed in before the deadline stipulated by the professor for each assignment will be evaluated.

Alternative evaluation: aimed at students who study part-time or who are unable to attend class. This option will have been chosen at the beginning of the course by the student in agreement with the teacher. In the continuous assessment, only the resolution of exercises and problems will be considered.

Final Mark = 0,1*C + 0,6*E + 0,3*P

In second call the final grade will be the final exam.

If it is detected that a student has copied or plagiarized any of the evaluation activities, or that he/she has not respected the rules established in this regard, he/she may obtain a failing grade for the entire evaluation and the academic authority will be notified so that it may proceed to adopt the sanctioning measures deemed appropriate.

REFERENCES

Basic

- Apuntes de la asignatura.
- [G. Beekman (2005)]. Introducción a la informática (Prentice-Hall).
- [Kent D. Lee (2014)] Python Programming Fundamentals (Spinger)
- [A. Marzal, I. Gracia, P. García (1993)] Introducción a la programación con Python.
- [N. R. Ceder (2010)] The quick Python book (Manning Publications Co.)

Additional

- [A. Downey, J. Elkner, C. Meyers (2002)] Aprenda a Pensar Como un Programador con Python (Green Tea Press). Traducido por M.A. Vilella, A. Arnal, I. Juanes, L. Amurrio, E. Andia, C. Ballardini