VNIVERSITAT DE VALÈNCIA

Course Guide
36500 Programming and Algorithmics Fundamentals

COURSE DATA

DATA SUBJECT

Code: 36500
Name: Programming and Algorithmics Fundamentals
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1332 - Degree in Business Intelligence and Analytics	Facultat d'Economia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1332 - Degree in Business Intelligence and Analytics	Informatics	BASIC

COORDINATION

SUMMARY

Degree in Business Intelligence and Analytics (BIA), with a workload of 6 ECTS credits taught in the first semester.

Its objective is to introduce the basic concepts of structured and modular programming, using Python as the reference language. During the course, students will learn to control the flow of execution through conditional statements and loops, work with simple data types and structures such as lists, tuples, and dictionaries, and modularize their programs using functions, understanding parameter handling and variable scope. Additionally, file manipulation for data storage and processing will be covered, as well as the application of basic algorithmic techniques.

Throughout the course, the development of computational thinking is encouraged to solve practical problems related to data analysis and the business environment. The practical component is designed to consolidate this knowledge through exercises that promote autonomy and the use of accessible development environments, thereby providing a solid foundation for further studies in the degree.

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 prior knowledge is required. There are no enrollment restrictions with other subjects in the study plan.

COMPETENCES / LEARNING OUTCOMES

1332 - Degree in Business Intelligence and Analytics

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 access and manage information in different formats for subsequent analysis in order to obtain knowledge through data.

Be able to define, solve and present complex problems systemically.

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 use ICT, both in academia and in professional practice.

Demonstrate skills for analysis and synthesis.

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.

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.

DESCRIPTION OF CONTENTS

Block 1: Introduction to Programming
1.1 Introduction to Computational Thinking
1.2 Programming Languages: Focus on Python

1.3 Concept of Variable

Block 2: Control Structures
2.1 Conditional Statements (if, elif, else)
2.2 Loops (while, for)

Block 3: Data Types
3.1 Simple Data Types: int, float, str, bool
3.2 Type Conversion and Operations
3.3 Strings and Text Processing

Block 4: Data Structures
4.1 Lists and Tuples
4.2 Dictionaries and Sets
4.3 Iteration over Data Structures

Block 5: Modularization and Functions
5.1 Definition and Use of Functions
5.2 Parameters and Return Values
5.3 Variable Scope

Block 6: Algorithmics and Practical Applications
6.1 File Manipulation
6.2 Solving Practical Problems
6.3 Basic Algorithmic Techniques

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Computer classroom practice	30,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	30,00
Independent study and work	30,00
Preparation of lessons	10,00
Preparation for assessment activities	20,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

In the theory sessions, the predominant teaching methodology will be the lecture format, where fundamental concepts are clearly presented. However, interactive activities, practical examples, problem-solving exercises, in-class questions, guided discussions, and brief activities will be included during the lessons to foster a more dynamic learning environment that prevents monotony and promotes understanding and critical thinking.

The practical sessions will be based on students solving sets of proposed exercises aimed at practicing and consolidating the concepts covered in the theoretical sessions. These exercises will be completed autonomously by students working in pairs or, exceptionally, individually.

The Virtual Classroom of the University of Valencia will be used as the platform to distribute the necessary materials for both theoretical and practical sessions, as well as to facilitate communication with the students.

EVALUATION

Assessment of the course will consider the following components:

- **(P) Continuous assessment ¿ Programming practices.** These will be conducted in class during the scheduled sessions. For each practice, students must submit on time both the work done to solve the proposed exercises and a self-assessment of their work. A practice will only be considered if both the exercise solutions and the self-assessment are submitted.

- **(C) Continuous assessment ¿ Programming tests.** Two programming tests will be held during the semester, during a portion of the scheduled class session, to evaluate the understanding of the practice exercises completed up to the test date.

- **(E) Individual objective test.** A final exam will be held in the corresponding call¿ordinary or extraordinary¿that includes both theoretical questions and practical programming exercises.

The final grade for the course is calculated as a weighted average as follows:
Final grade = 0.2 * P + 0.3 * C + 0.5 * E

To pass the course in the ordinary call, students must meet the following three requirements:

- Obtain a grade of 5 or higher in the weighted average of the programming tests (C).

- Obtain a grade of 5 or higher in the individual objective test (E).

- Submit at least 80% of the programming practices on time and complete their self-assessments.

The grade for programming practices (P) is not recoverable. Therefore, the grade obtained during the semester in (P) remains valid for both the ordinary and extraordinary calls. In the extraordinary call, the requirement to have submitted at least 80% of the practices and completed the self-assessment is waived; if the student did not meet this during the semester, they will receive a zero for (P) in the extraordinary call but can still pass the course if their grades in (C) and (E) are 5 or higher.

In the extraordinary call, the grade for programming tests (C) will be retained as long as it is 5 or higher; otherwise, it must be retaken.

In no case will the grade for the individual objective test (E) obtained in the ordinary call be kept in the extraordinary call if it was 5 or higher but the final grade is below 5.

REFERENCES

- Apuntes de la asignatura.
- A. Marzal, I. Gracia, P. García, Introducción a la programación con Python 3, 2014 https://repositori.uji.es/xmlui/handle/10234/102653
- A. Downey, J. Elkner, C. Meyers, 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. https://argentinaenpython.com/quiero-aprender-python/aprenda-a-pensar-como-un-programador-con-python.pdf
- Kent D. Lee, Python Programming Fundamentals, Springer, 2014. https://link.springer.com/book/10.1007/978-1-4471-6642-9-
- Kent D. Lee, Steve Hubbard, Data Structures and Algorithms with Python; Undergraduate Topics in Computer Science, Springer Verlag, 2015. https://link.springer.com/book/10.1007/978-3-031-42209-6
- N. R. Ceder, The quick Python book, Manning Publications Co., Third Edition, 2018. https://www.manning.com/books/the-quick-python-book-third-edition
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