UAB
Universitat Autònoma de Barcelona

Programming

Code: 106932
ECTS Credits: 6

2025/2026

Degree	Type	Year
Management of Smart and Sustainable Cities	FB	1

Contact

Name: Carlos Casado Martinez

Email: carlos.casado.martinez@uab.cat

Teachers

Pablo Ulises Herrera Sanchez

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Basic computer skills.

Objectives and Contextualisation

This course will introduce the basic concepts of algorithms and application programming.

Learning Outcomes

1. CM06 (Competence) Apply innovative solutions to solve projects related to the management, equity and sustainability of cities by applying elements of technological innovation, such as information and communication technologies.
2. KM09 (Knowledge) Understand the functioning and correct management of databases.
3. SM07 (Skill) Solve simple problems for the management of cities by means of computer applications that process and extract information from geospatial data.
4. SM08 (Skill) Use algorithm and programme analysis techniques to design new algorithmic solutions based on the idea of recursion or specific algorithm design techniques.

Content

1. Introduction to programming

    1.1. Variables and data types

    1.2. Operators

    1.3. Precedence

2. Control structures

    2.1. Conditionals

    2.2. Loops

3. Structured Data Types I

    3.1. Lists

    3.2. Dictionaries

4. Functions

5. Algorithmic schemes

6. Files

7. Structured Data Type II

    7.1. Sets

    7.2. Tuples

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theory classes	26	1.04	
Type: Supervised			
Exercises seminars	24	0.96	CM06, KM09, SM07, SM08, CM06
Type: Autonomous			
Practices	20	0.8	CM06, KM09, SM07, SM08, CM06
Realization of problems	56	2.24	CM06, KM09, SM07, SM08, CM06

The teaching methodology will be based on three types of activities:

- Guided activity: theoretical classes, laboratory, and exercise analysis.
- Supervised activity: attendance to tutorials and completion of exercises with scheduled follow-up.
- Autonomous activity: part of student study and case resolution, individually or in groups.

In order to be able to perform a correct assessment of the transversal competencies corresponding to the subject, the students will be proposed to carry out joint work. This activity will allow them to develop the transversal competencies related to group work (T01), becoming responsible for the tasks assigned, respecting the role of the different members of the team, and evaluating critically the work carried out (T05) among them.

It will be convenient to bring your own laptop to laboratory classes.

The preferred form of communication with students will be the virtual campus combined with the institutional mail of the UAB.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation tests	60%	4	0.16	CM06, SM07, SM08
Laboratory activities	30%	10	0.4	CM06, KM09, SM07, SM08
Supervised activities	10%	10	0.4	CM06, SM07, SM08

1. Evidence of continuous evaluation

There are four continuous assessment tests: two exams and two practicals.

As for the exams, there are two and they include the seven blocks of matter (1,2,3 in the first test and 4,5,6,7 in the second test).

Continuous evaluation tests	Weight note continuous assessment	Minimum mark to make an average
1-3 Introduction programming, control structures, types of data structures I.	40%	4
4-7 Functions, algorithmic schemas, files, types of data structures II.	60%	4

2. Final evaluation mark

Exams	Weight final mark
Continuous evaluation	60%
Attendance and participation in laboratory classes	10%
Laboratory	30%

3. It is considered approved by anyone:

- have a final mark equal to or greater than 5 and
- have approved the laboratory activities (minimum 5) i
- there is no evidence of continuous evaluation below the minimum mark (4.0) to do the average.

If the final grade for the practicals is less than 5, the final grade for the subject will be the final grade for the practicals. If the final grade for the exams is less than 4, the final grade for the subject will be the final grade for the exams. If the minimum grade is not exceeded in either case, the general formula will be applied to calculate the final grade.

4.Assessment of practices

There will be a total of 2 laboratory activities one per part. The practices will be carried out individually or in groups, depending on their complexity. The instructor will specify in class whether they will be carried out individually or in groups, and if so, how many participants will be involved.

The use of AI tools for the preparation of practical exercises or class problems is not permitted in this subject.

5. The faculty will specify, when publishing the grades, when and how the grade review will be done.

6. Attendance and participation notes cannot be recovered.

7. There will be a final exam intended to recover the exam grade. Although this test will be graded out of ten, it will count towards a maximum of 5 points for the entire course (any grade higher than 5 on the make-up exam will count as 5 points when calculating the final grade).

8. At the beginning of the academic year, if possible, it will be notified if there is a validation of laboratory activities. In the case of being, the validation of laboratory activities only will be realized to the students who request it and have approved the laboratory activities in the previous course. The weight of the continuous evaluation
in the final mark, in the students with the validation of laboratory activities, becomes 90%.

9. The exam dates are set at the beginning of the course and do not have alternative recovery dates in case of non-attendance. If there is any change in programming due to the adaptation to possible incidents, the virtual campus will always be informed about these changes.

10. Notwithstanding other disciplinary measures deemed appropriate, and in accordance with the current academic regulations, irregularities committed by a student that can lead to a variation of the qualification will be classified as zero (0). For example, plagiarizing, copying, copying, ..., an evaluation activity, will imply suspending this evaluation activity withzero (0). Assessment activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these assessment activities to pass the subject, this subject will be suspendeddirectly, without an opportunity to recover it in the same course.

11. Non-evaluable cases
In case no delivery is made, it will not be included in any laboratory session and no exam will be carried out, the corresponding gradewill be "not evaluable". In any other case, "notpresented" counts as a 0 for calculating the weighted average, which will be a maximum of 4.5. Then, participation in an activity evaluated implies that "not presented" in other activities such as zeros are taken into account. For example, an absence in a laboratory session involves a note for that activity.

12. Pass the course with honors
At the discretion of the teaching staff, passing the course with honors will be awarded to those who obtain a mark greater than or equal to 9.5 in each part, up to 5% of those enrolled in descending order of final grade. They may also be granted in other cases.

13. Examination by a single assessment
Single assessment is not foreseen

Bibliography

- A. Prieto, A. B. Prieto. Conceptos de informática. Ed. Mc Graw Hill, 2005.
- Mark Lutz. Learning Python, Fourth Edition. Ed. O'Reilly Media, Inc., 2009.

Software

Python IDLE

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	611	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	612	Catalan	second semester	morning-mixed
(TE) Theory	61	Catalan	second semester	morning-mixed