



# Course guide

## 300502 - CC - Computer's Science

**Last modified:** 05/07/2024

**Unit in charge:** Castelldefels School of Telecommunications and Aerospace Engineering  
**Teaching unit:** 701 - DAC - Department of Computer Architecture.

**Degree:** BACHELOR'S DEGREE IN SATELLITE ENGINEERING (Syllabus 2024). (Compulsory subject).

**Academic year:** 2024    **ECTS Credits:** 6.0    **Languages:** Spanish

### LECTURER

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**Coordinating lecturer:** Definit a la infoweb de l'assignatura.

**Others:** Definit a la infoweb de l'assignatura.

### TEACHING METHODOLOGY

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The course combines the following teaching methodologies:

- Participatory exhibition sessions.
- Solving exercises and problems individually and in small groups.
- Learning based on projects.

### LEARNING OBJECTIVES OF THE SUBJECT

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The student will acquire knowledge, skills and competencies in the field of computer science, and in particular those involved in satellites. More specifically, at the end of the course, students will be able to:

- Describe the basic principles of how a computer works
- Code simple algorithms in C and Python
- Code in C language the operations necessary to acquire the signals provided by sensors connected to the processor
- Code in Python the operations necessary to process the data received from the outside and present them appropriately to the user
- Learn independently
- Work effectively in a team
- Communicate work results effectively

#### LEARNING OUTCOMES

##### Knowledge

K1. Identify the basic computing tools applied to application development.

##### Skills

S1. Apply programming languages, algorithmic patterns, data structures, visual programming tools, engines, and libraries for application development in the field of satellite engineering.

S2. Demonstrate the ability to search, gather, and critically interpret information related to application design in the satellite field.

##### Competences

C1. Perform tasks and projects individually or as part of a group, according to a set of initial requirements.

C2. Communicate orally and in writing with others about learning outcomes and decision-making processes.



## CONTENTS

### The simple machine

**Description:**

Learning the basic components of a computer and the principles of operation through a brief presentation in class and independent study with self-study materials.

**Specific objectives:**

Describe the principles of operation of a computer

**Full-or-part-time:** 33h

Theory classes: 18h

Self study : 15h

### Programming in limited environments

**Description:**

Learning the basic aspects of programming using the C and Python languages through participatory expository sessions alternating with individual and small group exercise sessions and independent work.

The purpose of solving exercises is to consolidate the concepts presented by the teacher and to prepare students for the midterm and final exams. It is an activity that takes place both outside the classroom and in-class sessions. Outside the classroom, students will carry out exercises the teacher proposes (autonomous learning and optionally cooperative if done in a group). In the class sessions, some of the proposed exercises will be reviewed through peer evaluation and presentation by the students themselves and the teacher. Short exercises will also be proposed and solved during the session that requires the application of the concepts presented by the teacher.

**Specific objectives:**

Code simple algorithms in C and Python Languages

**Full-or-part-time:** 76h

Theory classes: 18h

Self study : 58h

### Project

**Description:**

Development, in teams of 3 or 4, of a simple system that simulates the interaction between a satellite and a ground station. The satellite has a control system implemented in C language that acquires external digital and analog data, processes them, and sends them to the ground station. The ground station, implemented in Python, receives the data and processes it to show meaningful results to the user.

The work will be developed using the project-based learning method. Students will apply the knowledge acquired in the first part of the course but will have to acquire new knowledge independently, as it is needed to advance in the project.

**Specific objectives:**

- Code in C language the operations necessary to acquire the signals provided by sensors connected to the processor
- Code in Python the operations necessary to process the data received from the outside and present them appropriately to the user
- Learn independently
- Work effectively in a team
- Communicate work results effectively

**Full-or-part-time:** 41h

Theory classes: 12h

Laboratory classes: 12h

Self study : 17h



## GRADING SYSTEM

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The evaluation criteria defined on the subject's infoweb will be applied.

## EXAMINATION RULES.

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The rules defined on the subject's infoweb will be applied.

## BIBLIOGRAPHY

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### Basic:

- Perry, G., & Miller, D. . C Programming Absolute Beginner's Guide. 3. Que Publishing, 2013.
- Correa, Daniel - Vallejo,Paola. Python For Beginners: A Practical and Step-by-Step Guide to Programming with Python.
- Lozano, Daniel. Arduino práctico. 2022. Anaya,

## RESOURCES

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### Other resources:

Support material available on the digital campus: slides, exercise and exam collections, practice and project scripts, and electronic device specification sheets.