Course guide
240018 - 240018 - Computer Science

Last modified: 13/03/2025

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 723 - CS - Department of Computer Science.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Lluís Talavera Méndez

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE3. Basic knowledge on the use and programming of computers, operative systems, data bases and computer software with an engineering application.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

1. Apply fundamental computer programming concepts.
2. Show skill in using the basic programming techniques and tools.
3. Be able to solve problems by developing small and medium-sized programs.
4. Be able to use abstract models for solving real problems.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	30,0	20.00
Hours large group	30,0	20.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Programming environment

Description:
Basic laboratory work tools.
· ETSEIB's computer system. Available Resources
· Basic use of the GUI of the GNU/Linux operating system.
· Using the operating system shell. Basic commands.
· Using the text editor.
· Using the Python interpreter.

Full-or-part-time: 10h
Practical classes: 4h
Self study : 6h

Programming fundamentals

Description:
Fundamental programming concepts.
· Algorithm, program, programming language (Python).
· Type, variable, expression, assignment.
· Sequential, conditional and iterative composition.
· Function, header, body, call, parameter, argument.
· File, input/output.

Full-or-part-time: 50h
Theory classes: 10h
Practical classes: 10h
Self study : 30h

Data structures

Description:
Python built-in types:
· String.
· List.
· Tuple.
· Dictionary.

Representation of vectors and matrices.

Full-or-part-time: 50h
Theory classes: 10h
Practical classes: 10h
Self study : 30h

Program design

Description:
Introduction to structured and object-oriented programming.
· Programming schemes on sequences.
· Program documentation and testing.
· Object-oriented programming: object, class, method. Module, scope.
· Efficiency of programs.

Full-or-part-time: 40h
Theory classes: 10h
Practical classes: 6h
Self study : 24h

GRADING SYSTEM

BIBLIOGRAPHY

Basic:
- Wentworth, P.; Elkner, J.; Downey, Allen B.; Meyers, C. How to think like a computer scientist : learning with Python 3 (RLE) [on line]. 2012 [Consultation: 01/10/2025]. Available on: https://openbookproject.net/thinkcs/python/english3e/.

Complementary:
- Pilgrim, M. Dive into Python 3 [on line]. 2nd ed. Nova York: Apress, 2009 [Consultation: 01/10/2025]. Available on: https://diveintopython3.net/. ISBN 9781430224150.
- Guzdial, Mark; Ericson, Barbara. Introduction to computing and programming in Python : a multimedia approach [on line]. 4th ed. Boston: Pearson, 2016 [Consultation: 01/10/2025]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5185706. ISBN 9781292109862.

RESOURCES

Hyperlink:
- https://inf1.etseib.upc.edu. Course material
- https://docs.python.org/3/. Python documentation
- https://python.swaroopch.com/. Swaroop C.H., "A Byte of Python".