



# Course guide

## 240018 - 240018 - Computer Science

Last modified: 03/07/2023

**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:** 2023    **ECTS Credits:** 6.0    **Languages:** Catalan

### LECTURER

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**Coordinating lecturer:** ANTONI SOTO RIERA

**Others:**

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

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

### TEACHING METHODOLOGY

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### LEARNING OBJECTIVES OF THE SUBJECT

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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

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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

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## GRADING SYSTEM

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## BIBLIOGRAPHY

### Basic:

- Peter Wentworth, Jeffrey Elkner, Allen B. Downey, and Chris Meyers. How to Think Like a Computer Scientist. Learning with Python 3 [on line]. 2012 [Consultation: 03/07/2023]. Available on: <https://openbookproject.net/thinkcs/python/english3e/>.

### Complementary:

- Guzdial, Mark; Ericson, Barbara. Introduction to computing and programming in Python : a multimedia approach . Global edition. ©2016. ISBN 9781292109862.

- Pilgrim, Mark. Dive into Python 3 [Recurs electrònic] [on line]. 2nd ed. Nova York : Apress, 2009 [Consultation: 03/07/2023]. Available on: <https://diveintopython3.net/>. ISBN 9781430224150.

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## RESOURCES

### Hyperlink:

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