

# Course guide 240018 - 240018 - Computer Science

Unit in charge: Teaching unit:	Barcelona School of Industrial Engineering   723 - CS - Department of Computer Science.	2024
Degree:	BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subj	ect).
Academic year: 2024	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

Туре	Hours	Percentage
Hours medium group	60,0	40.00
Self study	90,0	60.00

Total learning time: 150 h



# **CONTENTS**

#### Programming environment

#### **Description:**

Basic laboratory work tools.

- $\cdot$  ETSEIB's computer system. Available Resources
- $\cdot$  Basic use of the GUI of the GNU/Linux operating system.
- $\cdot$  Using the operating system shell. Basic commands.
- $\cdot$  Using the text editor.
- $\cdot$  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.
- $\cdot$  Sequential, conditional and iterative composition.
- · Function, header, body, call, parameter, argument.
- $\cdot$  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.
- $\cdot$  Tuple.

 $\cdot$  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.
- $\cdot$  Programming schemes on sequences.
- $\cdot$  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: 14/06/2024]. Available on: <u>https://openbookproject.net/thinkcs/python/english3e/</u>.

#### **Complementary:**

- Pilgrim, M. Dive into Python 3 [on line]. 2nd ed. Nova York: Apress, 2009 [Consultation: 10/06/2024]. Available on: <a href="https://diveintopython3.net/">https://diveintopython3.net/</a>. ISBN 9781430224150.

- Guzdial, Mark; Ericson, Barbara. Introduction to computing and programming in Python : a multimedia approach [on line]. 4th ed. Boston: Pearson, 2016 [Consultation: 17/06/2024]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5185 706. ISBN 9781292109862.

## **RESOURCES**

## Hyperlink:

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