



## Course guide

### 820006 - I - Informatics

Last modified: 30/01/2025

**Unit in charge:** Barcelona East School of Engineering  
**Teaching unit:** 723 - CS - Department of Computer Science.  
707 - ESAII - Department of Automatic Control.

**Degree:** BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).  
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Compulsory subject).

**Academic year:** 2024    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish, English

#### LECTURER

---

**Coordinating lecturer:** FERRAN JUAN BARUEL - JAVIER FARRERES DE LA MORENA

**Others:** Primer quadrimestre:  
JOAN FRANCESC ALONSO LÓPEZ - Grup: M31, Grup: M32, Grup: M33, Grup: M63, Grup: X21, Grup: X22, Grup: X23  
JORGE CASTRO RABAL - Grup: T21, Grup: X22  
NEUS CATALA ROIG - Grup: M73, Grup: M92  
JUAN LUIS ESTEBAN ÁNGELES - Grup: M21, Grup: M23, Grup: M81  
JAVIER FARRERES DE LA MORENA - Grup: M41, Grup: M42, Grup: M43, Grup: M81, Grup: M82, Grup: M83, Grup: T13  
FERRAN JUAN BARUEL - Grup: M21, Grup: M22, Grup: M23, Grup: M42, Grup: M53, Grup: M61, Grup: M62, Grup: M63, Grup: M71, Grup: M72, Grup: M73, Grup: M91, Grup: M92, Grup: M93, Grup: T21, Grup: T22, Grup: T23  
MARC LLUVA SERRA - Grup: X11  
DAVID MARTÍNEZ ESCACHX - Grup: M32, Grup: M43  
CRISTIAN MATA MIQUEL - Grup: M11, Grup: T11  
FRANCISCO JOSÉ MUGICA ALVAREZ - Grup: M41, Grup: X13  
SERGIO PAVON SALAMANCA - Grup: X11, Grup: X12, Grup: X13  
ANTONI PEREZ POCH - Grup: M11  
ELVIRA PATRÍCIA PINO BLANCO - Grup: M22, Grup: M51, Grup: M52, Grup: M53, Grup: M72, Grup: X23  
CARLES PLANUCH PRATS - Grup: T11, Grup: T12, Grup: T13, Grup: T23  
MÓNICA MARLENE ROJAS MARTÍNEZ - Grup: M31, Grup: M61  
FERNANDO GUILLERMO SANABRIA ORTEGA - Grup: M83, Grup: M91  
MARIA JOSEFINA SIERRA SANTIBAÑEZ - Grup: M52, Grup: T22, Grup: X21  
JORGE TURMO BORRÁS - Grup: M33, Grup: M62, Grup: M71, Grup: M93  
BORJA VALLES FUENTE - Grup: M82, Grup: T12

#### PRIOR SKILLS

---

There are no previous capacities.

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

---

### Specific:

2. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

### Transversal:

1. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

## TEACHING METHODOLOGY

---

This subject consists of 2-hour weekly presential classes (large group), and a 2-hour weekly session in the laboratory. During the large group classes, theoretical explanations will be combined with examples and active solving of exercises by the students. During the laboratory sessions the students will follow the laboratory teacher proposed activities.

## LEARNING OBJECTIVES OF THE SUBJECT

---

At the end of the course, the student:

0. Learn the basics of hardware and operating systems.
1. Recognize and appropriately apply the iterative search and travel schemes in trouble small and medium size. For this:
  1. know the basic constituents of imperative languages: variables, types, expressions, statements.
  2. know the three basic algorithmic compositions and properties: sequential, alternative and iterative.
  3. Know and use the concept of data stream i their properties.
2. Can design and use functions. For this:
  1. Know and apply the parameterization.
3. Perform treatment programs sequences over:
  1. structured variables.
  2. files.
  3. input data.
4. It will be able to use external libraries own field of engineering. For this:
  1. Be familiar with standard software systems documentation.
  2. will be able to include and use the libraries in their programs.

Currently the programming language used as a base is a subset of Python, although the main aim is not in learning the details of language but in solving algorithmic problems and building structured programs.

## STUDY LOAD

---

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

**Total learning time:** 150 h



## CONTENTS

### Chapter 1 - Basic concepts

**Description:**

Computer architecture: von Neumann model, computer elements.  
Operative system: virtual machine, resources manager.

**Specific objectives:**

0. Learn the basics of hardware and operating systems.

**Related activities:**

Theoretical classes.

**Related competencies :**

CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

**Full-or-part-time: 2h**

Laboratory classes: 2h

### Chapter 2 - Structured programming basics

**Description:**

Variables  
Data types  
Statements: assign, input, output  
Expressions, operators and precedence  
Variables, constants and data types.  
Algorithm structure.  
Elementary instructions: reading, writing, assigning.

**Specific objectives:**

1. Recognize and appropriately apply the iterative search and travel schemes in trouble small and medium size. For this:  
1. know the basic constituents of imperative languages: variables, types, expressions, statements.

**Related activities:**

Theoretical classes.  
Practical classes  
Activity 1: Assessments with computer  
Activity 2: Written assessment  
Activity 3: Use of external libraries

**Related competencies :**

CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

**Full-or-part-time: 16h**

Theory classes: 4h  
Laboratory classes: 4h  
Self study : 8h

### Chapter 3- Compositions sequential, alternative and iterative

**Description:**

Concept of data sequence

Development of the algorithmic structures resulting from the structured program theorem:

Sequential composition

Alternative composition

Iterative composition

Iterative schemes

**Specific objectives:**

1. Recognize and appropriately apply the iterative search and travel schemes in trouble small and medium size. For this:
  2. know the three basic algorithmic compositions and properties: sequential, alternative and iterative.
  3. Know and use the concept of data stream i their properties.

**Related activities:**

Theoretical classes.

Practical classes

Activity 1: Assessments with computer

Activity 2: Written assessment

Activity 3: Use of external libraries

**Related competencies :**

CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

**Full-or-part-time:** 20h

Theory classes: 4h

Laboratory classes: 6h

Self study : 10h

### Chapter 4 - Functions and parameters

**Description:**

Input parameters

Output parameters

Dessign with functions

**Specific objectives:**

2. Can design and use functions. For this:
  1. Know and apply the parameterization.

**Related activities:**

Theoretical classes

Practical classes

Activity 1: Assessments with computer

Activity 2: Written assessment

Activity 3: Use of external libraries

**Related competencies :**

CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

**Full-or-part-time:** 14h

Theory classes: 2h

Laboratory classes: 4h

Self study : 8h



## Chapter 5- Structured Types

### Description:

String treatment  
Homogeneous and heterogeneous lists treatment  
Dictionaries  
Files and data bases

### Specific objectives:

1. Recognize and appropriately apply the iterative search and travel schemes in trouble small and medium size. For this:
  3. Know and use the concept of data stream i their properties.
3. Perform treatment programs sequences over:
  1. structured variables.
  2. files and databases.

### Related activities:

Theoretical classes  
Practical classes  
Activity 1: Assessment with computer 2 and 3  
Activity 2: Written assessment

### Related competencies :

CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

### Full-or-part-time: 39h

Theory classes: 9h  
Laboratory classes: 8h  
Self study : 22h

## Chapter 6 - Sequential Treatment Schemas

### Description:

Concept of travel and search  
Troubleshooting

### Specific objectives:

1. Recognize and appropriately apply the iterative search and travel schemes in trouble small and medium size. For this:
  3. Know and use the concept of data stream i their properties.
3. Perform treatment programs sequences over:
  1. structured variables.
  2. files and databases.
  3. input data.

### Related activities:

Theoretical classes  
Practical classes  
Activity 1: Assessments with computer  
Activity 2: Written assessment

### Related competencies :

CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

### Full-or-part-time: 36h

Theory classes: 8h  
Laboratory classes: 6h  
Self study : 22h



## GRADING SYSTEM

---

The final note of the subject results from the following addition:

$FN = 20\% \text{ Assessment Exercise 1} + 20\% \text{ Assessment Exercise 2} + 25\% \text{ Assessment Exercise 3} + 35\% \text{ Assessment Exercise 4}$

FN: final note

There is no final reassessment

## EXAMINATION RULES.

---

- All activities are part of the continuous assessment model of the subject. Therefore, students repeating this subject will not be allowed to save any part of their notes for the following term.
- If a student does not hand over an activity, it will be considered as non marked.
- Students will be allowed to consult a reference card of the programming language during the partial and final assessment exercises.
- Solutions must be restricted to the contents explained in the theoretic sessions.
- The use of generative AI tools to solve problems is not allowed. Their use will result in a direct failure of the course.

## BIBLIOGRAPHY

---

### Basic:

- Wentworth, Peter; Elkner, Jeffrey; Downey, Allen B.; Meyers, Chris. How to think like a computer scientist : learning with Python 3 [on line]. Openbookproject.net, 2012 [Consultation: 08/06/2016]. Available on: <http://openbookproject.net/thinkcs/python/english3e/>.

### Complementary:

- Zelle, John Marvin. Python programming : an introduction to computer science. 2nd ed. Franklin, Beedle & Associates, 2010. ISBN 9781590282410.

- Matthes, Eric. Python crash course [on line]. No Starch Press, Inc, 2015 [Consultation: 29/05/2020]. Available on: <https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=4503145>. ISBN 9781593276034.