

Course guides

820006 - I - Informatics

Last modified: 19/06/2020

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

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

Academic year: 2020 **ECTS Credits:** 6.0 **Languages:** Catalan, English, Spanish

LECTURER

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

Others:

Primer quadrimestre:

JOAN FRANCESC ALONSO LÓPEZ - T11, T12, T13, T21, T22, T23
JOAQUIN BLESÀ IZQUIERDO - T81, T82, T83
JORGE CASTRO RABAL - T93
NEUS CATALÀ ROIG - M53, T81
JAVIER FARRERES DE LA MORENA - M23, M31, M32, M33, M41, M42, M43, M81
JOAQUIN GABARRÓ VALLÉS - M22, M51, M52, M53, M83
PEDRO GOMIS ROMAN - T82
ANTONI GURGUÍ VALVERDE - M41, T12, T13
FERRAN JUAN BARUEL - M61, M62, M63, T91, T92, T93
SAMIR KANAAN IZQUIERDO - M13, M62
MARC LLUVA SERRA - T11
CRISTIAN MATA MIQUEL - M73, T23, T83
M^a DEL PILAR BRIGIDA NIVELA ALOS - M82, T91
ANTONI PEREZ POCH - M11, M12, M13, M42
ELVIRA PATRICIA PINO BLANCO - M21, M43, M52, M72
JOSE MIGUEL RIVERO ALMEIDA - M21, M22, M23, M81, M82, M83
EMMA ROLLÓN RICO - M73
RAMON SANGÜESA SOLE - M32, M71, M72, M73
MARIA JOSEFINA SIERRA SANTIBAÑEZ - M31, M63, T22
SUSANA ADRIANA VELAZQUEZ LERMA - M33, M41

Segon quadrimestre:

JAVIER FARRERES DE LA MORENA - M11, M12, M13, M14, T11
ANTONI GURGUÍ VALVERDE - M22, T12
FERRAN JUAN BARUEL - M11, M13, M21, M22, M23, T11, T12, T13
MARC LLUVA SERRA - T13
ELVIRA PATRICIA PINO BLANCO - M12, M23
JORGE TURMO BORRÁS - M14

PRIOR SKILLS

There are no previous capacities.

REQUIREMENTS

No requirements.

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 two weekly presential classes in a 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 sequence
Alternatives (if ... elif ... else)
Iteratives (for, while)
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
Design 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



Chapter 7 - External Libraries

Description:

Documentation
Use

Specific objectives:

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.

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.

06 URI N1. 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.

Full-or-part-time: 23h

Theory classes: 3h

Self study : 20h

GRADING SYSTEM

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

FN = 20% Lab1 + 25% Lab2 + 25% Lab3 + 30% Written exercise

FN: final note; Labn: partial assessment exercises number n

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.

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:

- 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.

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