Course guide
820006 - I - Informatics

Last modified: 09/08/2024

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 PATRICIA 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 INFORMATI0N 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 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
Homogeneus and heterogeneus 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 - Sequencial 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% Exercise 1 + 20% Exercise 2 + 20% Exercise 3 + 35% Theory + 5% Competence

FN: final note

There is no final reassessment

EXAMINATION RULES.

· All activities are part of the continous 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.

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.