Course guide
820006 - I - Informatics

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

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: 2023  ECTS Credits: 6.0  Languages: Catalan, Spanish, English

LECTURER

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

Others:

Primer quadrimestre:
- JOAN FRANCESC ALONSO LÓPEZ - Grup: M23, Grup: M41, Grup: M91
- MARTHA IVÓN CÁRDENAS DOMÍNGUEZ - Grup: X11, Grup: X22
- NEUS CATALÀ ROIG - Grup: M62, Grup: M73
- JUAN LUIS ESTEBAN ÁNGELES - Grup: M33, Grup: M43, Grup: T12
- JOAQUÍN GABARRÓ VALLÉS - Grup: M83, Grup: M92
- PEDRO GOMIS ROMAN - Grup: T11, Grup: T21
- MARC LLUVA SERRA - Grup: X23
- CRISTIAN MATA MIQUEL - Grup: M11, Grup: M31
- FRANCISCO JOSÉ MUGICA ALVAREZ - Grup: X12, Grup: X21
- SERGIO PAVON SALAMANCA - Grup: T21, Grup: T22, Grup: T23, Grup: X13
- ANTONI PEREZ POCH - Grup: M11
- ELVIRA PATRICIA PINO BLANCO - Grup: M22, Grup: M52, Grup: M72, Grup: M82, Grup: M93, Grup: T23
- CARLES PLANUCH PRATS - Grup: T11, Grup: T12, Grup: T13
- FERNANDO GUILLERMO SANABRIA ORTEGA - Grup: M21, Grup: M42
- RAMON SANGÜESA SOLE - Grup: T22
- MARIA JOSEFINA SIERRA SANTIBAÑEZ - Grup: M63, Grup: M81
- JORGE TURMO BORRÁS - Grup: M32, Grup: M53, Grup: M61
- SUSANA ADRIANA VELAZQUEZ LERMA - Grup: M51, Grup: M71

Segon quadrimestre:
- JAVIER FARRERES DE LA MORENA - Grup: M23
- PEDRO GOMIS ROMAN - Grup: M11, Grup: M12, Grup: M13
- FERRAN JUAN BARUEL - Grup: M11, Grup: M21, Grup: M22, Grup: M23
- CRISTIAN MATA MIQUEL - Grup: M13
- FLAVIO PALMIERI - Grup: M12
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 presentational 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>
Total learning time: 150 h

## CONTENTS

<table>
<thead>
<tr>
<th>Chapter 1 - Basic concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Computer architecture: von Neumann model, computer elements. Operative system: virtual machine, resources manager.</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong> 0. Learn the basics of hardware and operating systems.</td>
</tr>
<tr>
<td><strong>Related activities:</strong> Theoretical classes.</td>
</tr>
<tr>
<td><strong>Related competencies:</strong> CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.</td>
</tr>
<tr>
<td><strong>Full-or-part-time:</strong> 2h</td>
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<tr>
<td>Laboratory classes: 2h</td>
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<thead>
<tr>
<th>Chapter 2 - Structured programming basics</th>
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<tbody>
<tr>
<td><strong>Description:</strong> Variables Data types Statements: assign, input, output Expressions, operators and precedence Variables, constants and data types. Algorithm structure. Elementary instructions: reading, writing, assigning.</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong> 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.</td>
</tr>
<tr>
<td><strong>Related activities:</strong> Theoretical classes. Practical classes Activity 1: Assessments with computer Activity 2: Written assessment Activity 3: Use of external libraries</td>
</tr>
<tr>
<td><strong>Related competencies:</strong> CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.</td>
</tr>
<tr>
<td><strong>Full-or-part-time:</strong> 16h</td>
</tr>
<tr>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td>Laboratory classes: 4h</td>
</tr>
<tr>
<td>Self study : 8h</td>
</tr>
</tbody>
</table>
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 in 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

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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 and 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 and 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:

\[ FN = 20\% \text{ Exercise 1} + 20\% \text{ Exercise 2} + 20\% \text{ Exercise 3} + 35\% \text{ Theory} + 5\% \text{ Competence} \]

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.

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: