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820006 - I - Informatics

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering

Teaching unit: 723 - CS - Department of Computer Science

Academic year: 2017

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

ECTS credits: 6 Teaching languages: Catalan, Spanish, English

Teaching staff

Coordinator: Escudero Bakx, Gerard
Farreres De La Morena, Javier

Others: Professorat dels departaments CS i ESAII.

Opening hours

Timetable: Please see notice desk.

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 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.

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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

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours medium group:	0h	0.00%
	Hours small group:	30h	20.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

Chapter 1 - Basic concepts

Learning time: 2h
Laboratory classes: 2h

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

Related activities:
Theoretical classes.

Specific objectives:
0. Learn the basics of hardware and operating systems.

Chapter 2 - Structured programming basics

Learning time: 16h
Theory classes: 4h
Laboratory classes: 4h
Self study : 8h

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

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

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.

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Chapter 3- Compositions sequential, alternative and iterative

Learning time: 20h

Theory classes: 4h
Laboratory classes: 6h
Self study : 10h

Description:
Concept of sequence
Alternatives (if ... elif ... else)
Iteratives (for, while)
Iterative schemes

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

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.

Chapter 4 - Functions and parameters

Learning time: 14h

Theory classes: 2h
Laboratory classes: 4h
Self study : 8h

Description:
Input parameters
Output parameters
Dessign with functions

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

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

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Chapter 5- Structured Types

Learning time: 39h

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

Description:
String treatment
Homogeneus and heterogeneus lists treatment
Dictionaries
Files and data bases

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

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.

Chapter 6 - Sequencial Treatment Schemas

Learning time: 36h

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

Description:
Concept of travel and search
Troubleshooting

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

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.

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Chapter 7 - External Libraries	Learning time: 23h Theory classes: 3h Self study : 20h

Description:
Documentation
Use

Related activities:
Theoretical classes

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.

Qualification 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

Regulations for carrying out activities

· 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.

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. No Starch Press, Inc, 2015. ISBN 9781593276034.