Universitat de Lleida

DEGREE CURRICULUM
COMPUTER SCIENCE BASICS

Coordination: Josep Lluís Lérida

Academic year 2015-16

COMPUTER SCIENCE BASICS 2015-16

Subject's general information

Subject name	COMPUTER SCIENCE BASICS
Code	102109
Semester	2n Q
Typology	Continuous Assessment
ECTS credits	6
Theoretical credits	50
Practical credits	50
Coordination	Josep Lluís Lérida
Office and hour of attention	Contact by email with the teacher: jlerida@diei.udl.cat valenti.pardo@udl.cat jmsola@diei.udl.cat
Department	Informàtica i Enginyeria Industrial
Teaching load distribution between lectures and independent student work	40% Classroom 60% Autonomous Work
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Catalan
Degree	Degree in Automation and Industrial Electronic Engineering Degree in Mechanical Engineering
Distribution of credits	50% Lectures and problems 50% Practices
Office and hour of attention	Contact by email with the teacher: jlerida@diei.udl.cat valenti.pardo@udl.cat jmsola@diei.udl.cat
E-mail addresses	jlerida@diei.udl.cat valenti.pardo@udl.cat jmsola@diei.udl.cat

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Learning objectives

The instrumental nature of the computer programming course make it very useful in many areas and professional fields. The computer programming provides a variety of specific solutions for the professional development in the field of Industrial Engineering, but also plays an essential role in the area of process engineering, control systems and automation. The main objective for this course is that students learn to design and implement on a programmable device, efficient and quality solutions to different types of problems. In addition to manage the programming environment and the solving techniques, this course pretend to introduce the students to the basic components of a programmable device as well as to acquire the conception and practice of how to write a program, compile and run knowledge.

This overall objective can be divided into the following more specific objectives:

1. Identify the basic components of a computer or programmable device, its functionality and the process of interaction with the other components.
2. Learn the utility of E/S alphanumeric codes and how the computer recognizes and uses them.
3. Learn how current programmable devices perform numerical representation and basic operations.
4. Identify the basic characteristics of a high-level language and understand the processes that must be taken in a programmable device to compile or interpret a program and run it.
5. Learn and understand the syntax and semantics of a high-level language.
6. Analyze and identify the functionality of a program encoded in a high level language.
7. Use correctly the basic structures of high-level programming language: conditionals and iterators.
8. Define and properly use data structures that provides a high-level language.
9. Use properly a top-down design to address complex problems by dividing them into a subset of simpler problems.
10. Evaluate and validate the quality of the solution according to the results.
11. Acquire practical skills in solving real problems in both compiled and interpreted environments.

Competences

University of Lleida strategic competences

- UdL3. Mastering ICT's.

Degree-specific competences

- EPS5. Capacity of abstraction and of critical, logical and mathematical thinking.

Degree-transversal competences

- GEM3. Basic knowledge of the use and programming of computers, operating systems, databases and computer programs with applications in engineering.

Subject contents

1. Preliminiaries

      1.1 Information representation

      1.2 Von Neumann Architecture

      1.3 Evolution and Current status of programmable systems

2. Introduction to Problem Solving for Engineering

    2.1 Computational Thinking

    2.2 Algorithmic Thinking

3. Programming with MATLA

    3.1 Getting started. Interface and basic syntax in MATLAB.

    3.2 Introduction to programming in MATLAB

        3.2.1 M-File Scripts

        3.2.2 Control Flow and operators

        3.2.3 User-defined Functions. Top-down algorithm design.

        3.2.4 Input/Ouput Functions

    3.3 Vectors and Matrices

    3.4 Toolboxes i Advanced tools in MATLAB

Methodology

This is a mainly practical course in which the study is based on the resolution of recommended and compulsory exercises. Individual work is essential for acquisition of the skills and the correctly use computer tools that will be used during the course.

You can find the following collections of teaching materials in the Virtual Campus: http://cv.udl.cat

1. Introduction to the Computer Basics
2. Introduction to Programming in C
3. MATLAB notes
4. Collections of problems, Examples, Solutions and Bibliography

The use of the Virtual Campus is essential to access the resources of the course, notifications, deadlines information, teaching plan and assessment.

Evaluation

Objectives	Evaluation activities	%	Dates	O/V (1)	I/G (2)	Remarks
Continous assesment Topics 2 & 3	Evaluable practice PLAB1	15	Week 12	O	I	
Continous assesment Topics 2 & 3	Evaluable practice PLAB2	15	Week 15	O	I	
Continous assesment Topics 1 & 2 & 3	Autonomous work and classroom participation. AP	10	During all the course	O	I	
Continous assesment Temas 1 & 2 & 3	Project	10	Weeks 11 to 15	O	I	
Continous assesment Topics 1 & 2 & 3	PA1. Writting exam	20	Week 9	O	I	
Continous assesment Topics 2 & 3	PA2. Writting exam	30	Week 16 i 17	O	I	

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Objectives	Evaluation activities	%	Dates	O/V (1)	I/G (2)	Remarks
Recovery assesment. Topics 1 & 2 & 3	Recovery assesment. Writting exam (*)	60	Week 19	V	I	Recoveries Week

(1) Mandatory / Voluntary
(2) Individual / Group

Final Marks:
In the weeks 9th and 16th / 17th will be performed the writting exams: PA1 and PA2. Each of these tests has a weight of 30% over the final mark.

The final grade is calculated by the sum of the results of the writting test (PA1, PA2) plus the classroom practices (PRA1, PRA2), Project and autonomous work and classroom participation (AP): **Final Mark = PA1 + PA2 + PLAB1+ PLAB2+ AP + Project.**

(*) On the 19th week the grade of the course can be recovered with a final writting exam, following the guidelines of the EPS Academic Degrees Framework. The recovery will be done through a written exam with all contents of the course with a weight of 60% of the final grade. The continuous assessment practices can not be recovered. This test can also be done by all those students having passed the ongoing assessment and want to modify their grade, assuming that the obtained score in the recovery test is the only score that will be considered for the calculation of the final mark.

Bibliography

Basic bibliography:

Matlab. A Practical Introduction to Programming and Problem Solving. Stormy Attaway. Butterworth-Heinemann; 3 edition (July 1, 2013)

Essential MATLAB for Engineers and Scientists. Brian Hahn, Daniel Valentine. Academic Press; 5 edition (January 24, 2013)

Breves apuntes de MATLAB. Una introducción rápida pero no trivial. Rosa Echevarria. Universidad de Sevilla. (http://personal.us.es/echevarria/documentos/IntroduccionMATLAB.pdf)