25802 - Computer Science

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	271 - Bachelor's Degree in Industrial Design and Product Development Engineering 558 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS	6.0
Year	---
Semester	Indeterminate
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

Each subject/course timetables, starting and ending dates, teaching schedules and teachers' office hours are published and can be found at EINA website:

https://eina.unizar.es/

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

BASIC COMPETENCES

CB01. Students have demonstrated knowledge and understanding in a field of study that is part of the general secondary education curricular, and is typically at a level which, although it is supported by advanced textbooks, includes some aspects that involve knowledge of the forefront of their field of study.

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CB02. Students can apply their knowledge to their work or vocation in a professional manner and have competences typically demonstrated through devising and defending arguments and solving problems within their field of study.

CB03. Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include an important reflection on social, scientific or ethical issues.

CB04. Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

CB05. Students have developed those skills needed to undertake further studies with a high degree of autonomy.

GENERAL COMPETENCES

GC04. Ability to organize time effectively and coordinate activities to acquire new knowledge quickly and perform under pressure.

GC06. Ability to generate the necessary documentation for the proper transmission of ideas through graphics, reports and technical documents, models and prototypes, oral presentations in Spanish and other languages.

GC07. Ability to use and master techniques, skills, tools and techniques and communication and others specific of design engineering needed for design practice.

GC08. Ability to learn continuously, to develop autonomous learning strategies and to work in multidisciplinary groups with motivation and determination to achieve goals.

SPECIFIC COMPETENCES

SC03. Basic knowledge of the use and programming of computers, operating systems, databases and software with applications in Engineering in Industrial Design and Product Development.

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The course is composed of two sections:

- Section 1: Overview of Computer Science
  - It introduces the constituents of a computer and their functioning. The methodology applied is based on lectures
- Section 2: Programming
  - The goal is the student's development of skills for solving problems by writing computer programs. The methodology

applied is based on problem-based learning

5.2.Learning tasks

1. **Theory Sessions** . 30 on-site hours
   - Theory sessions of section 1 are lectures whereby the teacher presents the structure of a computer and its functioning
   - Theory sessions of section 2 are based on illustrative applied problems solved on the board by the teacher and students working together, because «programming is learned by writing programs». Thus, the students can progressively acquire the necessary experience and knowledge in this area
2. **Problem-solving Sessions** . 9 on-site hours
   - The teacher proposes a collection of problems to be solved by the students working independently or in groups
3. **Computer lab Sessions** . 21 on-site hours
   - The students carry out the proposed activities working with a computer
   - Computer lab sessions of section 1 are dedicated to learning how to work with several operating systems and software tools related to industrial design
   - Computer lab sessions of section 2 are dedicated to learning programming ; in order for this aim to be achieved, it is necessary to learn to use an integrated development environment related to the programming language employed
4. **Individual Works** . 15 off-site hours
   - In each section of the course, one work will be published in the virtual platform ADD (2 works in total) that are to be carried out individually by the students. They shall be submitted before the corresponding deadlines
   - The work of section 1 consists in making a technical slideshow
   - The work of section 2 consists in solving a programming problem
5. **Group Work** . Optional. 3 tutorial hours and 12 off-site hours
   - Optionally, groups of 2 or 3 students may request a work. It consists in a medium-complexity problem which has to be solved writing a computer program
   - This activity is highly recommended to reach a medium-high level of programming skills
   - This activity has scheduled support of face-to-face tutorials to advice and guidance in pre-established dates

5.3.Syllabus

Theory Syllabus

- **Section 1: Overview of Computer Science**

1. Computer Organization and Architecture
2. Software
3. Operating Systems
4. Hardware
5. Computer Networks
6. Information Representation
7. Databases

- **Section 2: Programming**

8. Basic Elements of Programming
9. Algorithms and Programs Design

Practice Syllabus

- **Section 1: Overview of Computer Science**

1. Operating Systems: Windows and Linux
2. Introduction to Relational Databases
3. Software Tools

- **Section 2: Programming**

4. First Steps in Programming
5. Control Flow Statements
6. Collections
7. More Items

5.4.Course planning and calendar

The course is estimated to take 150 hours of student effort

- 60 on-site hours

- 39 classroom hours (30 theory sessions and 9 problem-solving sessions): 3 weekly hours.
- 21 computer lab hours: 2.5 or 3 hour sessions, about every 2 weeks
- 3 face-to-face tutorial hours: Tutorial support of group work
- 87 off-site hours
- 15 hours making the individual works
- 12 hours making the group work
- 55 study hours
- 5 hours of exams

The planned schedule of activities is as follows:

- Section 1 (Overview of Computer Science)
- It takes place in the first 5 weeks
- It is composed of 10 theory sessions, 2 problem-solving sessions, 3 computer lab session, and 1 individual work
- The written exam of this section takes place immediately after its completion, in sixth or seventh week
- Section 2 (Programming)
- It takes place from the sixth week
- It is composed of 25 theory sessions, 8 problem-solving sessions, 4 computer lab sessions, 1 individual work, and 1 optional group work

Detailed information will be provided on the first day of class.

5.5.Bibliography and recommended resources

[BB:Basic Bibliography / CB: Complementary Bibliography]

- [BB] Barnes, David J.. Programación orientada a objetos con Java usando Blue J: 5ª edición. / David J. Barnes, Michael Kölling. - Madrid: Pearson Educación, D. L. 2013
- [CB] Beekman, George. Introducción a la informática / George Beekman ; traducción, José Manuel Díaz Martín . - 6ª ed. Madrid : Pearson Educación, cop. 2005
- [CB] Prieto Espinosa, Alberto. Introducción a la informática / Alberto Prieto Espinosa, Antonio Lloris Ruiz, Juan Carlos Torres Cantero . - 4ª ed. Madrid [etc.] : MacGraw-Hill, D.L. 2006

Listado de URL

- Java with BlueJ Part 1 [http://www.acs.uwinnipeg.ca/rmcfadyen/CreativeCommons/Java with BlueJ Part 1 Sept 2016.pdf]
- Learning the Java Language [https://docs.oracle.com/javase/tutorial/java]
- Tutorial de BlueJ [http://www.bluej.org/tutorial/tutorial-spanish-201.pdf]