30205 - Computer architecture and organisation I

Syllabus Information

Academic year: 2023/24
Subject: 30205 - Computer architecture and organisation I
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
326 - Escuela Universitaria Politécnica de Teruel
Degree: 439 - Bachelor's Degree in Informatics Engineering
443 - Bachelor's Degree in Informatics Engineering
ECTS: 6.0
Year: 1
Semester: Second semester
Subject type: Basic Education
Module:

1. General information

This introductory course aims to enable each student to understand a machine language architecture and design assembly language programs capable of communicating with peripherals. The use case of the subject will be the architecture: ARMv4T

This subject belongs to the basic subjects of Computer Architecture in the Computer Engineering Degree. The subject links to Introduction to Computers and is required to take Architecture and Organization 2. To take this subject it is a prerequisite to have taken the subject Introduction to Computers.

This course does not explicitly work on or evaluate any of the Sustainable Development Goals (SDGs) included in the 2030 Agenda (Agenda 2030) the 2030 Agenda (https://www.un.org/sustainabledevelopment/es/).

2. Learning results

- Know at a basic level the parameters that define the machine language architecture (repertoire, instruction format and coding, stores, data types, addressing modes, control of sequencing and control transfers, exception handling).
- Know and be able to handle the machine language architecture of a reference processor.
- Distinguish the concepts of machine and assembly language.
- Know the methods of representation and codification of information and its basic operations. Be capable of translating data structures and control from high-level languages to assembly.
- Use subroutine calls.
- Know how to integrate assembly code and library routines into programs written in high-level languages.
- Understand the generic register model of a peripheral device driver and the basic methods of synchronization and transfer. Program any simple I/O device and know how to handle exceptions.

3. Syllabus

The program to be developed in this subject consists of the following blocks or topics that are taught in the following order:

- Processor Architecture: Interpretation and translation, machine and assembly language, development environment, information representation and coding, basic operations, stores, addressing modes, instruction repertoire, data structure translation and high-level language control.
- Subroutines: Calls to subroutines. Activation block. Case study. High-level code integration with assembly code and library routines.
- I/O subsystem: Generic model of device driver registers. Basic synchronization methods and transfer. Exceptions. Integration of peripherals in microcontrollers.

4. Academic activities

The teaching organization of the subject is as follows:

- Theoretical classes (2 hours per week)
- Problem classes (1 hour per week)
- Practical laboratory classes

    - School of Engineering and Architecture of Zaragoza: 2 hours every two weeks
    - Polytechnic University School of Teruel: 1 hour per week
- Tutorials and evaluation activities

The schedules of all classes and the dates of the practical sessions will be announced well in advance through the webs of the center and of the subject.

Student work

The student's dedication to achieve the learning results in this subject is estimated in 150 hours, distributed as follows:

- approximately 56 hours of face-to-face activities (theory classes, problems and laboratory practice) 51 hours of effective personal study (study of notes and texts, problem solving, class and practical preparation, program development)
- 40 hours of team programming work
- 3 hours of final written exam

The schedule of exams and the dates for submission of evaluation papers will be announced well in advance.

5. Assessment system

At the School of Engineering and Architecture of the Rio Ebro Campus:

The evaluation of the subject is continuous and is based on two tests:

- P1. Written test (exam) to answer questions and solve exercises and problems. A minimum grade of 5.0 points is required in this test to pass the subject. If this test is passed, then the test weighs 90% in the grade of the subject and, if this minimum is not reached, then the grade in the subject is that of this test.
- P2. Laboratory work and tests. Each student must submit the assignments indicated in the subject's practices. A minimum grade of 5.0 points is required in this test to pass the subject. If this test is passed , then the test is weighted 10% in the grade of the subject and, if this minimum is not reached,then the grade in the subject is that of this test.
- Tests on a voluntary basis. Throughout the term, one or several voluntary tests may be given consisting of the resolution of practical cases, exercises or problems. The total weight will be an extra 10% of the grade, only in the case of obtaining a minimum grade of 5.0 out of 10.
- Second call for applications. The assessment of the subject is based on two analogous tests of the first call, with the same weightings and minimum grade requirements.

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Written exam divided in two parts, one part of theory and questions and the other part of assembly programming.