Module IE.2409

Electronic Microsystems

Person in charge: Xun ZHANG
Prerequisite: Basics on assembly language, fundamentals on microprocessor based systems, digital systems. IE.1101 – IE.2403
Organization: 40h lecture, 8h Lab, overall workload 100h
Evaluation: Exam
ECTS: 4 credits

Context

Nowadays, complex digital systems are composed with billions of transistors. Only functional decomposition on subsystems interconnected permits to understand and control this complexity. This module deepens your knowledge of digital systems. It also describes the internal architecture of processors and makes a connection between computer architecture (functional perspective) and digital circuits.

Objectives

Skills

- This module describes complex electronic systems: Mastering the design phases of such systems which requires very large scale integration in a single chip and using implementation design tools adapted to these large systems in order to validate the overall behavior of the system without specifying performance at finer scales (component level).
- In addition, the concept of quality and dependability of systems are reviewed with the use of design and low power implementation of secure architectures.

Knowledge

This module enables students to develop the following concepts and skills.

- **Concepts**
    - DSP: Advanced Concepts
    - Internal architecture of a RISC microprocessor
    - Digital VLSI circuit design
    - Redundancy
    - Power dissipation reduction

- **Know-How**
  - Digital Systems Design
  - Use development tools to design digital circuits
  - Use of development tools on specialized processors

Pedagogical Approach

Lectures associated with Labs

References

- Computer Organisation and Design - John L. Hennessy et David Patterson – Morgan Kaufmann
- Les processeurs de traitement du signal - Famille 320C5x - Genevieve Baudoin, Férial Virolleau Ed Dunod
- Groupe de discussion : COMP.DSP