Summary
The course introduces the students to the basic notions of computer architecture and, in particular, to the choices of the Instruction Set Architecture and to the memory hierarchy of modern systems.

Content
• Complex digital systems in VHDL.
• Basic components of a computer.
• Instruction Set Architectures.
• Assembly-level programming.
• Multi-cycle implementation of processors.
• Caches.
• Virtual memory.

Keywords
Computer Architecture, Basic Processor Architecture, Instructions Sets, Cache Hierarchies, Virtual Memory.

Learning Prerequisites
Required courses
• Conception de systèmes numériques

Learning Outcomes
By the end of the course, the student must be able to:
• Design and implement a processor at the Register Transfert Level using logic synthesizers and simulators.
• Develop assembly language programs.
• Justify the organization of a modern memory system including cache hierarchies and virtual memory.
• Design and implement a cache memory.

Teaching methods
Courses and labs on a dedicated FPGA board.

Assessment methods
Midterm exam and final exam.

Resources

Bibliography

Ressources en bibliothèque

• Computer Organization and Design: The Hardware-Software Interface / Patterson

Prerequisite for

• Architecture des systems-on-chip.