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Computer Structure

CEA Partner Institution: Universidad Carlos III de Madrid
Location: Madrid, Spain

Primary Subject Area: Computer Engineering
Level(s): 200

Instruction in: English
Recommended Semester Credits: 3.00
Contact Hours: 42

Prerequisites: Programming, Computer technology

Description
The basic concepts of this course are: organization and structure of a computer; data representation; basic arithmetic; execution of instructions; assembly programming; main memory; cache memory; virtual memory; input/output systems.

1. Introduction to computers
- Von Neumann architecture
- Computer programming
- Characteristic parameters of a computer
- Computer performance

2. Data representation and basic arithmetic
- Number representation
- Floating point
- Basic arithmetic

3. Assembly programming
- Machine instructions representation
- Programming model of a computer
- Data, instructions, and control flow structures
- Addressing modes
- Instructions format
- Procedures and stack usage

4. Processor
- Processor components
- Control unit
- Execution of instructions
- Execution modes
- Interrupts
- Control unit design
- Starting of a computer
- Program execution time
- Microcontrollers

5. Memory Hierarchy
- Technology of memories
- Memory Hierarchy concept
- Cache memory

6. input/output systems
- Input/output devices
- Storage based on disks
- Input/output modules
- Input/output techniques