Course content

This course focuses on hands-on experimentation to deepen students' understanding of computer system structures and operations. It is designed as a complement to the Computer Organization and Architecture course and introduces students to the practical principles of computer hardware and instruction systems. Students perform experiments on dedicated experimental boards, using both manual and instruction-based controls to manipulate data and verify computer operations.

The course covers essential topics such as:

1. Computer Components and Operations: Hands-on exploration of hardware components and their roles in data processing.
2. Data Pathways: Observation and analysis of data movement between computer components.
3. Model Verification: Verification of operational principles using a model computer.
4. Microprogramming Design: Design and implementation of microprograms to execute custom instruction sets.
5. Instruction System Development: Development of machine-level programs using the designed instruction system.

Course objectives

Knowledge

1. Understand the structure, components, and operations of computer systems.
2. Learn the principles of data pathways and the interactions between computer components.
3. Verify and interpret results based on model computer operations.

Skills

1. Design and implement microprograms for custom instruction sets.
2. Develop functional machine-level programs using defined instruction systems.

Competencies

1. Apply scientific methods to design and analyze computer system experiments.
2. Evaluate experimental data to identify insights and draw meaningful conclusions.
3. Develop a sustainable perspective on the design and execution of computer engineering practices.