MICROCONTROLLER SYSTEM DESIGN

1. KEY INDICATORS

CFU / ECTS: 6
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2. OBJECTIVES OF THE COURSE

This course deals with the design techniques of microcontroller-based architectures, both CISC and RISC types, and programming techniques for embedded real time applications.

3. ACQUIRED ABILITIES

Development of the capability of designing a microcontroller based system for real-time applications.

4. PROGRAM OF THE COURSE

Features and scope of microcontrollers: modularity, families, applications. Intel mC8051 family: architecture, data and program memory, embedded peripherals (parallel ports, serial port, timer / counters); memory expansion techniques, interrupt management, instruction set, boolean processor.
Basic concepts of RISC microcontrollers.
Serial access memory devices (RAM, EEPROM) and peripherals (AD converters, LCD display controller, Real Time Clock). Serial protocols (I2C, SPI). Interface circuits for sensors and actuators for industrial applications.
Assembly language programming techniques, code optimization for real-time applications.
Use of SW simulators, development tools. Discussion of a real HW / SW application system.

5. REFERENCES

Intel, mC8051 family architecture.
Intel, mC8051 family hardware description.
Intel, mC8051 family programmer's guide and instruction set.
EdSim51 SW Simulator.
Serial access memory and peripheral devices data sheets.