# Microcontrollers (ECTS 4)

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The course is taught both in Serbian and Hungarian languages. The course has one theoretical and two practical lessons on each week of the semester.

The course covers basic principles of microcontrollers. Ports, memory organization, timers, interrupts are discussed in detail. Registers of microcontrollers. Realization of easy circuits with microcontrollers. Connecting LED-s and switch buttons with the microcontroller. 7-segment display. Realization of a counter using 7-segment display and LCD. EEPROM memory. Realization of binary calculator. Sensors. Temperature sensor, humidity sensor, ultrasound sensor. Analog-to-digital conversion. Features of A/D converters. Connecting sensors to microcontrollers. Connecting complex modules to microcontrollers.

The course covers the following topics:

1. Introduction to microcontrollers. Historical review

2. Hardware organization of microcontrollers

3. Registers, program counter

4. Instructions

5. Memory organization of microcontrollers

6. Program memory, data memory, EEPROM, stack

7. Addressing modes

8. Inputs and outputs of a microcontroller

9. Hardware components of microcontroller. A/D converter

10. Communication protocol of a microcontroller

11. Interrupts

12. Timer module of a microcontroller

13. Environment for project development

14. Compiling and programming

Aims of the course:

After completing the course, students will be able to understand the concepts of microcontrollers, and to independently construct microcontroller projects. Student will be able to connect the hardware, write, test and debug the software for the microcontroller.