



## COURSE DATASHEET

<b>Semester:</b>	2013/14/2
<b>Course:</b>	Microcontrollers
<b>Code:</b>	VEMKFIB255V
<b>Responsible department:</b>	Institute of Physics and Mechatronics
<b>Department code:</b>	MKFI
<b>Responsible instructor:</b>	dr. Balázs József Kránicz

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### Course objectives:

The main objectives of this course are: the understanding of microcontrollers and their applications in various control systems.

### Course content:

1. Lecture (5 hours): Microprocessors, microcontrollers; CISC, RISC; von Neumann-Harvard. Embedded devices, microconverters. Peripheral uC's. 8051/8052 core. Frequences and PLL. Various 8051 solutions and their applications. Integrated peripherals and their versions.
2. Lecture (5 hours): MCS52 architecture, memory types, SFR. Instruction set. The skeletor of an Assembly program. The use of subroutines. Interrupts. The home-made uController (design, functioning).
3. Software translation and download.
4. Establishing an in-out connection. Coding combinatorial networks. Sequential networks. Timing.
5. Serial communication with a PC. "2DI – 8DO" TTL I/O device.
6. Lecture (5 hours): uC's in time critical applications. Event oriented programming. External interrupts. Interrupts of the timers/counters. Serial communication handling with interrupts. Interrupts of the other internal peripherals.
7. Seven-segment display project 1. Hardware wiring diagram and functioning. Solution with and without 74LS47 IC's. Software planning.
8. Seven-segment display project 2. Displaying two digits using interrupts. Counting forward. Stopper with controlling buttons.
9. Seven-segment display project 3. Building and programming a full solution for the stopper.
10. Unipolar L/R stepper motor project 1. Hardware wiring diagram and functioning. Concrete solution with a darlington transistor array. Software planning. Motion in one direction.
11. Unipolar L/R stepper motor project 2. Motion forward and backward. Stop and go with a push button.
12. Stepper motor with PC's control through the serial port.
13. Opto coupler project
  1. Measuring velocity and RPM. Project planning.
14. Opto coupler project
  2. Measuring velocity and RPM. Solution.
15. Written exam.

### Requirements, evaluation and grading:



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### Requirements, evaluation and grading:

Successful problem solving in the written exam.

### Required and recommended readings:

A gyártók internetes oldalai.