

<b>Study program: Modern computer technologies</b>			
<b>Course title:</b> Application of Microcontrollers			
<b>Professor/assistant:</b> Zoran Milivojević / Nataša Bogdanović			
<b>Type of course:</b> elective			
<b>ECTS credits:</b> 6			
<b>Pre-requisites:</b> Microcomputer systems			
<b>Aims of the course:</b> Hardware, software and mechanical implementation and reparation of devices based on microcontrollers.			
<b>Learning outcomes:</b> The students will be able to: -solve and design microcontrollers, -create and repair microcontroller devices.			
<b>Syllabus</b> <u>Theoretical part</u> Basics of programming languages C for microcontrollers. The C51 C Compiler for microcontroller 8051. The A51 Assembler. The BL51 linker. The OHS51 object-HEX converter. Microcontroller input-output port programming. Connecting and programming LED indicators, LED displays and matrix keypad. Programming timers and counters. Examples of system timing. Generating signals with precise time parameters. Coupling microcontrollers with interface 8255 <sup>th</sup> . Programming interface. Examples of the system of extended input –output interface capacity of 8255A. Programming of serial ports. Examples of serial communication lines. Connection of personal computers and microcontroller systems. A/D and D/A converters. Microcontrollers with built A/D and D/A converters. Coupling microcontrollers with external converters. Examples of microcontroller systems with A/D and D/A converters. Control of the analog processes. Analysis of the embedded systems. <u>Practical part</u> Laboratory exercises. Project tasks.			
<b>Literature</b> 1. Milivojević, Z., <i>Microcontrollers – Architecture 8051</i> , Punta, Niš, 2005. (in Serbian) 2. Karakanov, Z., Christensen, K., <i>Embedded Systems Design with 8051 Microcontrollers</i> , Marcel Dekker, New York, 1999.			
<b>Number of active classes</b>			Other forms of teaching:
Lectures: 30	Practical classes: 30	Research work:	
<b>Teaching methods</b> Combination of interactive approach with practical problem solving.			
<b>Grading system</b> (maximum 100 points), <b>grading scale</b> from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.			
<b>Pre-exam obligations</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
activity during theoretical lectures	10	written exam	
practical training	20	oral exam	30
colloquium(s)/seminar papers	40		
<b>Sum</b>	<b>70</b>	<b>Sum</b>	<b>30</b>