

Study program: Modern computer technologies			
Course title: Microcontrollers Architecture			
Professor/assistant: Zoran N. Milivojević			
Type of course: compulsory			
ECTS credits: 6			
Pre-requisites: Microcomputer systems			
Aims of the course: The objective of the course is to introduce and train students to understand the architecture of microcontrollers and the mechanism of connecting with external components.			
Learning outcomes: Students will be able to independently design simple hardware modules based on modern microcontrollers compatible with the MCS-51 family.			
Syllabus <i>Theoretical part:</i> History of Microprocessor. Microprocessor Architecture. Performance of microprocessors. Microcomputers. Architecture of microcomputer systems. Classifications. Constructive characteristics. Application of microcontrollers. Microcontrollers. History of microcontroller development. Overview of the families of contemporary microcontrollers (Intel, Philips, Atmel Manufacturers). MCS-51 family of microcontrollers. Pinout diagram of 8051 Microcontroller. Architecture. Clock generator. Reset. Organization of memory. Program memory. Time-domain diagrams. Data memory. External data memory. Write and read data from external memory. Internal data memory. Special purpose registers. Ports. Reconnecting with other components of the microcontroller system. Counters and timers. Serial interface. Interrupts. Reduced consumption regime. Analysis of the realized microcomputer systems. <i>Practical part:</i> Practical exercises follow theoretical lessons. Computer -aided exercises. Project design.			
Literature 1. Milivojević, Z., Mikrokontroleri - Arhitektura 8051, Punta, Niš, 2005. 2. Karakanov, Z., Christensen, K., <i>Embedded Systems Design with 8051 Microcontrollers</i> , Marcel Dekker, New York, 1999. 3. D. Calcutt, F. Cowan, H. Parchizadeh, <i>8051 Microcontrollers - An Applications-Based Introduction</i> , ELSEVIER, Boston, 2014.			
Number of active classes			Other forms of teaching:
Lectures: 30	Practical classes: 30	Research work:	
Teaching methods Combination of interactive approach with practical problem solving.			
Grading system (maximum 100 points), grading scale 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.			
Pre-exam obligations	points	Final exam	points
activity during theoretical lectures	20	written exam	
practical training	10	oral exam	30
colloquium(s)/seminar papers	40		
Sum	70	Sum	30