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| **UNIVERSITY OF NIŠ** | | | | | | |
| **Course Unit Descriptor** | | **Faculty** | | | Faculty of Electronic Engineering | |
| **GENERAL INFORMATION** | | | | | | |
| Study program | | | | Electrical Engineering and Computing | | |
| Study Module (if applicable) | | | | Electronics - Embedded Systems | | |
| Course title | | | | Advanced Microcontrollers | | |
| Level of study | | | | XBachelor Master’s ☐ Doctoral | | |
| Type of course | | | | ☐ Obligatory X Elective | | |
| Semester | | | | Autumn X ☐Spring | | |
| Year of study | | | | IV | | |
| Number of ECTS allocated | | | | 6 | | |
| Name of lecturer/lecturers | | | | Petrović D. Branislav | | |
| Teaching mode | | | | X Lectures ☐Group tutorials ☐ Individual tutorials  X Laboratory work X Project work ☐ Seminar  ☐Distance learning ☐ Blended learning ☐ Other | | |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** | | | | | | |
| To introduce students with the most commonly used advanced microcontroller architecture and acquiring of basic knowledge for practical application and programming embedded microcontroller systems using C++, C and assembler languages.  Knowledge of advanced microcontroller architectures and acquiring knowledge for use in embedded applications. | | | | | | |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** | | | | | | |
| Background of ARM architecture. Overview of the Cortex-M3/M4: registers, operating modes, NVIC, memory map, bus interface, MMU, interrupt and exceptions, debugging support. Instruction set. Cortex- M3/M4 implementation. Pogramming: Using assembly, using C, development flow, data memory, semaphores, bit band. Exceptions programming: using interrupts, handlers, software interrupts. The systick timer, power management, multiprocessor communication. Debug architecture. Development tools: C compiler, embedded operating system support. Porting applications. GNU tool chain. Design example: development of vehicle ignition system using KEIL Real View. Development Kits and Tools, C++, C and Assembler, loading programs. Working with built-in peripherals. The aim is to familiarize students of the benefits offered by NXP1768 mbed module. Laboratory exercises are carried out using a number of analog and digital interfaces. Here are just a few:  - Provides interfaces for RS232, RS485, CAN, Ethernet, PS / 2 and USB.  - Has more memory enhancements such as serial RAM, serial EEPROM and SD / MMC slot for these types of cards  - Has AUDIO IN / OUT block for recording, processing and reproduction of sound  - Provides interactivity through the keyboard and type 4x4 KEYPAD KEYPAD MENU  - Has a 2x16 alphanumeric LCD display and RGB TFT display with 432x240 resolution touch screen. | | | | | | |
| **LANGUAGE OF INSTRUCTION** | | | | | | |
| X Serbian (complete course) X English (complete course) ☐ Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)  ☐Serbian with English mentoring ☐Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | |
| **ASSESSMENT METHODS AND CRITERIA** | | | | | | |
| **Pre exam duties** | **Points** | | **Final exam** | | | **points** |
| **Activity during lectures** | **10** | | **Written examination** | | | **20** |
| **Practical teaching** | **30** | | **Oral examination** | | | **20** |
| **Teaching colloquia** | **20** | | **OVERALL SUM** | | | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** | | | | | | |