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| **UNIVERSITY OF NIŠ** | | | | | | |
| **Course Unit Descriptor** | | **Faculty** | | | Faculty of Electronic Engineering, Niš | |
| **GENERAL INFORMATION** | | | | | | |
| Study program | | | | Electrical Engineering and Computing | | |
| Study Module (if applicable) | | | | Electronics | | |
| Course title | | | | DSP Architectures and Algorithms | | |
| Level of study | | | | ☐Bachelor ☐ Master’s ☐ Doctoral | | |
| Type of course | | | | ☐ Obligatory ☐ Elective | | |
| Semester | | | | ☐ Autumn ☐Spring | | |
| Year of study | | | | I | | |
| Number of ECTS allocated | | | | 10 | | |
| Name of lecturer/lecturers | | | | Nikolić R. Tatjana, Stojčev K. Mile | | |
| Teaching mode | | | | ☐Lectures ☐Group tutorials ☐ Individual tutorials  ☐Laboratory work ☐ Project work ☐ Seminar  ☐Distance learning ☐ Blended learning ☐ Other | | |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** | | | | | | |
| The goal of this course is to involve students to theoretical and practical knowledge required for: a) programming DSP processors, and b) design of DSP hardware. Study will be focused on: 1) understanding the architecture and programming of DSP processors, 2) design of DSP systems for real-time application, 3) efficient design of DSP hardware, and 4) implementation of DSP processor/ hardware in a SoC.  Competence of students to use DSP processor for digital signal processing in real time applications. Introduction to modern tools for efficient design of complex DSP applications. Competence for hardware design of basic DSP blocks and usage of DSP IP cores for the implementation in complex DSP applications. | | | | | | |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** | | | | | | |
| Specificity and DSP processor architecture. Data presentation and arithmetic, the effect of finite length words, aspects of the program, working in real time, and hardware interface. Programming the DSP processors in assembly language and higher programming language. DSP for use in fixed point format. DSP in floating point format. DSP for embedded applications. Areas of DSP applications. DSP on FPGA. Code optimization. Hardware realizations: digital filters (FIR and IIR), Discrete Fourier Transform, CORDIC, algorithms for cryptography, digital modulation and demodulation circuits.  It is planned that students individually do the following exercises: 1) manipulation with the number in fixed- and floating-point format, 2) understanding the capabilities of modern development tools for the design, 3) digital filter, 4) FFT, 5) convolution and correlation, 6) decimation, 7) adaptive filtering, and 8) interface with DSP processor. | | | | | | |
| **LANGUAGE OF INSTRUCTION** | | | | | | |
| ☐Serbian (complete course) ☐ 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** |  | | **Written examination** | | |  |
| **Practical teaching** | **50** | | **Oral examination** | | | **50** |
| **Teaching colloquia** |  | | **OVERALL SUM** | | | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** | | | | | | |