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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Electronic Engineering, Niš |
| **GENERAL INFORMATION** |
| Study program  | Electronics and Microsystems |
| Study Module (if applicable) | Electronics  |
| Course title | Advanced microporcessor architectures |
| Level of study | ☐Bachelor ☐ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory ☐ Elective |
| Semester  |  ☐ Autumn ☐Spring |
| Year of study  | I |
| Number of ECTS allocated | 6 |
| Name of lecturer/lecturers | Stojčev K. Mile, Nikolić R. Tatjana |
| Teaching mode |  ☐Lectures ☐Group tutorials ☐ Individual tutorials ☐Laboratory work ☐ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| To familiarize students with current trends and future development of microprocessor architectures. Matter that is taught relates to a high-performance processor and various techniques of parallelism to be implemented at the level of threads and processes.a) Acquiring knowledge of modern multicore on-chip microprocessor, b) Ability to design and programming of homogeneous and heterogeneous multiprocessor systems-on-chip, c) Create a multithread programs, performance evaluation using code profiler and debugging code, d) Architecture design and application-specific processor code design. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Trends in technology scaling. Moore's law. Measures for performance evaluation. Techniques to improve performance. Reducing energy consumption. Operating mode for saving energy in a microprocessor. Throughput increasement. Basic concepts of parallel programming. Parallelism at different levels. Concurrent and distributed systems. Processes. Threades. Data transfer and synchronization. Forms of parallel programming. The structure of the program. Multicore processor architectures. Multicore system programming. Manycore processors. Characteristics of symmetric and asymmetric multiprocessor architectures. Application specific processors. Data level parallelism with SIMD and GPU architecture. Multicore and manycore systems programming using OpenCL, OpenMP and MPI.During implementation of the plan and program the students need independently do the following exercises: 1) performance evaluation of the system with parallel execution of program sections, 2) creating a thread, 3) creating parallel-sequential programs, 4) usage of parallel library program for multicore machines, 5) creating a code with threads by modification the serial code, 6) creating complex multithread parallel programs. |
| **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** | **10** | **Written examination** | **20** |
| **Practical teaching** | **20** | **Oral examination** | **20** |
| **Teaching colloquia** | **30** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |