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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Electronic Engineering |
| **GENERAL INFORMATION** |
| Study program  | Computing and Informatics |
| Study Module (if applicable) | Computer Engineering |
| Course title | High-performance Computing |
| Level of study | ☐ Bachelor ☒ Master’s ☐ Doctoral |
| Type of course | ☐Obligatory ☒ Elective |
| Semester  |  ☐ Autumn ☒Spring |
| Year of study  | Fifth  |
| Number of ECTS allocated | 4 |
| Name of lecturer/lecturers | Stojanović M. Natalija |
| Teaching mode |  ☒Lectures ☒Group tutorials ☐ Individual tutorials ☐Laboratory work ☒ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| Acquiring knowledge to develop high performance applications that require intensive computation and processing large amounts of data on modern computer architectures (GPU, multicore PCs, network of workstations, cluster, grid, etc.) in different domains. Understanding the concepts and technologies of high-performance computing as well as acquiring the theoretical and practical knowledge for the development and analysis of high performance applications on modern computer architectures. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Overview of advanced concepts, methods and techniques in high-performance computing (HPC High Performance Computing). High-performance computing in distributed environment on the network of workstations (cluster), grid and cloud computing. High-performance computing on multi-core computers with shared memory and many-core architectures, such as graphics processing unit (GPU). High-performance computing on hybrid architectures. Modern technologies to achieve high performance (CUDA/OpenCL, OpenMP, MPI, MapReduce). Performance analysis, assessment and improvement of HPC systems using appropriate tools. HPC applications in geographical information systems (GIS), image processing, environmental protection, business systems, bioinformatics, etc. |
| **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** | **30** |
| **Teaching colloquia** | **20** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |