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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Electronic Engineering** |
| **GENERAL INFORMATION** |
| Study program  | Computing and Informatics  |
| Study Module (if applicable) | Software engineering |
| Course title | Database management systems |
| Level of study | [ ] Bachelor [x]  Master’s [ ]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [ ]  Autumn [x] Spring |
| Year of study  | 1 |
| Number of ECTS allocated | 4 |
| Name of lecturer/lecturers | Leonid Stoimenov |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [x]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Obtaining knowledge about basic concepts and principles of database management systems (DBMS) and their components. Obtaining knowledge on advanced DBMS usage techniques (triggers, security, query optimization). Obtaining knowledge on basic concepts and principles of advanced database systems functioning.* *Theoretical knowledge on DBMSs, their components and usage patterns; practical knowledge on advanced DBMS usage techniques, administration, performance tuning and data maintenance.*  |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Introduction to database management systems (DBMS). The role and responsibilities of database administrator. Database management system: architecture, basic modules and functions, examples of such systems. Stored procedures. Triggers: term, purpose and trigger usage, syntax of command for creating trigger, trigger types and granularity, row level and expression level triggers, timetable of trigger executions. Query processing and optimization: the term of query optimization, static and dynamical optimization, system catalogue, database statistics and optimization, index structures and multidimensional indices. DBMS security: the term of DBMS security, user privileges - assigning and deprivation (GRANT and REVOKE commands), privileges propagation, security at view level, statistical databases, DAC and MAC security mechanisms. DBMS trends: OO databases, OQL and SQL, object-relational DBMS, NoSQL databases. DBMS modern trends; storing large amount of distributed data.The role of database administrator, practical usage of DBMS and administration tools - practical examples and tasks. Database performance tuning, indices creation. Query optimization - practical examples, problems, DBMS tools utilization. DBMS security and role of database administrator, security on operating system level, network level, and hardware level etc. - practical examples and tasks.Modern DBMS challenges - example of new technologies utilization (object-relational mappers: Hibernate/NHibernate, XML, etc.). NoSQL databases (the term, basic concept, categorization, examples) and differences regarding traditional DBMS.  |
| **LANGUAGE OF INSTRUCTION** |
| [x] Serbian (complete course) [ ]  English (complete course) [ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)[x] 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** | 30 | **Oral examination** | 40 |
| **Teaching colloquia** | 30 | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |