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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty** | **Electronic Engineering** |
| **GENERAL INFORMATION** |
| Study program  | Electrical Engineering and Computing  |
| Study Module (if applicable) | Computing and Informatics |
| Course title | Database systems |
| Level of study | ☒Bachelor ☐ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory☒ Elective |
| Semester  | ☐ Autumn ☒Spring |
| Year of study  | 3 |
| Number of ECTS allocated | 6 |
| Name of lecturer/lecturers | Leonid Stoimenov |
| Teaching mode | ☒Lectures ☐Group tutorials ☐ Individual tutorials☒Laboratory work ☒ Project work ☐ Seminar☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Course objective:Gaining fundamental knowledge of basic concepts and principles of a database system and its components (applications, DBMS and databases). Learning advanced techniques of using SQL, using DBMS (triggers, safety, and queryoptimization). Gaining knowledge of basic concepts and principles of object-relational databases and object-relational mappers.* *Theoretical knowledge of database systems, their components and ways of usage; practical knowledge of advanced techniques of database systems usage and developing database applications. The student will be capable of using principles of object-oriented technology with relational databases, with both object-relational systems and object-oriented applications working with relational databases.*  |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| 1. Introduction: Short overview of the relational data model and relational query languages. Basic concepts and database system architectures. Modern challenges for database systems.2. Advanced techniques of using SQL: different types of joins with SQL, working with dates in SQL, nested queries, data grouping and advanced techniques of grouping.3. Database management systems: overview of architecture, basic modules and functions4. Stored procedures, Triggers: concept, purpose and using of triggers, syntax of the trigger creation command, types of triggers and granularity, row-level triggers and expression-level triggers.5. Processing and optimization of queries: the concept of query optimization, static and dynamic optimization, system catalogue, database statistics and optimization, index structures.6. Database systems safety: the concept of safety in database systems, safety in database management systems (DBMS), user privileges - granting and revoking (GRANT and REVOKE commands), privilege propagation, safety on view level, DAC and MAC mechanisms of safety.8. Object-oriented paradigm and databases: OO databases, object in OO databases and object identity, OQL and SQL, object-relational databases, object-oriented and relational data models / differences, advantages and disadvantages, mapping object-oriented to relational data model. |
| **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** | 30 | **Written examination** | 40 |
| **Practical teaching** | 30 | **Oral examination** |  |
| **Teaching colloquia** |  | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |