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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 functions  4. 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** | | | | | | |