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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty** | **Electronic Engineering** |
| **GENERAL INFORMATION** |
| Study program  | Electrical Enginering and Computing  |
| Study Module (if applicable) | Electronics – Embedded systems |
| Course title | Databases |
| Level of study | ☒Bachelor ☐ Master’s ☐ Doctoral |
| Type of course |  Obligatory x Elective |
| Semester  | ☐ Autumn ☒Spring |
| Year of study  | 4 |
| Number of ECTS allocated | 5 |
| 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 necessary to design, implement and use databases.**Course outcomes: Theoretical and practical knowledge of database design and data models (ER, EER, UML), relational data model and database implementation, and relational algebra.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| 1. Introduction to databases: basic concepts (data, information, database, database management system, database system, and database applications), conventional processing and processing based on databases.2. Data models: levels of abstraction in DBMSs, the concept of data model and its components, conceptual design of databases, (E)ER data model, designing databases.3. Relational model: concepts of the relational model, structural and integrity component, relational scheme, relation, relation key, constraint specification and SQL DDL commands.4. Relational algebra: relational algebra, relational algebra operations, relational algebra queries, examples of queries.5. Functional dependencies: definition of a functional dependency, rules of derivation for functional dependencies, closure of a set of functional dependencies.6. Relation schema analysis: analysis process and the quality of the designed database, anomalies in poorly designed databases, relation decomposition in normalization and properties.7. Normalization: the purpose of normalization and normal forms, normal forms definitions and testing (first, second, third and Boyce-Codd's normal form), normalization process.8, Introduction to transactional processing: the concept of transaction, ACID properties of transactions, DBMS level transactions.9. Database system architecture, overview: monolithic systems, multiuser systems, client-server systems, two- and three-layer architectures, parallel/distributed server database, data fragmentation.  |
| **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** | 5 | **Written examination** | 40 |
| **Practical teaching** | 15 | **Oral examination** |  |
| **Teaching colloquia** | 40 | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |