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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 | Advanced Databases |
| Level of study | ☒Bachelor ☐ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory☒ Elective |
| Semester  | ☒ Autumn ☐Spring |
| Year of study  | 4 |
| 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:Giving students insight into advanced databases and current technologies in this field. Pointing out to students current problems of using distributed databases and multilayered architectures, as well as potentials, advantages and disadvantages of object-oriented and XML databases. One of the goals is for students to recognize the actuality of the information integration problem and to show them potential solutions of this problem. The goal is also to notice basic characteristics of NoSQL databases, their purpose and ways of usage through examples.* *In the end of the course the student will be able to recognize the basic problems, possible solutions and directions of research in the field of advanced databases. The student will be able to define the problem of information integration, distributed systems, using XML with relational databases, as well as present the properties of other types of advanced databases. The student will be capable of using No SQL databases.*  |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Introductory topics: traditional relational databases, transactions, ACID properties, recovery and concurrency control. Distributed databases, modern trends and problems, scalability and problems of ACID property realization in these systems. Interoperability and information integration. Mediators, data warehouses, federated databases. Object and object-relational databases - notion, basic concepts. Databases in Web environment. Semantic Web and databases - notion, basic concepts, ontologies. XML and databases. Relational databases and XML. Native XML databases. NoSQL databases: notion, basic concepts. Examples of modern database trends. NoSQL databases: division, examples of systems. Embedded databases: notion, basic concepts, SQLite as an example. Object and object-relational databases - notion, basic concepts, db4o as an example, Oracle object model. Document-oriented databases - notion, basic concepts, neo4j as an example. RDF, OWL, SPARQL, triple store solutions. |
| **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** | 10 | **Written examination** |  |
| **Practical teaching** | 60 | **Oral examination** | 30 |
| **Teaching colloquia** |  | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |