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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 | Artificial Intelligence |
| 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 the field of artificial intelligence and basic research directions. Showing students basic algorithms from different artificial intelligence areas and the potential of their application in solving specific problems. Showing capabilities of artificial intelligence programming languages and, specifically, capabilities of Lisp for implementation of presented algorithms.* *In the end of the course the student will be able to understand basic problems possible solutions and directions of research in artificial intelligence. The student will be able to answer the questions: what is artificial intelligence, what do expert systems consist of, what is data engineering and what formalisms are used for representing knowledge. The student will be capable to recognize artificial intelligence problems and ways of solving them through mastered algorithms from different areas of artificial intelligence. The student will be able to develop programs based on artificial intelligence techniques in Lisp and other programming languages.*  |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| The notion of knowledge and artificial intelligence; the areas of artificial intelligence application (on real systems examples). Programming languages of artificial intelligence (Lisp and Prolog). Intelligent agents. Formal representation of problems. Solving problems and searching (uninformed, blind and informed, heuristic algorithms: by depth and breadth, searching with uniform price, first best, A\*, min-max, alpha-beta cut-off, etc.) Definition and characteristics of knowledge; Representing knowledge: Logical models (first order logic, rules of derivation, logical axioms, resolution). Semantic networks. Production rules and production systems. Frames. Expert systems (architecture and implementation). Working in uncertain environment. Planning. Machine learning: introductory notes. Neural networks and their application. Genetic algorithms - description and implementation. Short overview of other areas through examples: Robotics, Speech and image recognition, Natural language processing, Games.Practical teaching: Programming language Lisp: basic characteristics, basic primitives, S-expressions. Functions for working with lists. Other system functions. Development of user defined functions. Implementation of breadth-search, depth-search and A\*. Implementation of a logical game and game algorithms (min-max, alpha-beta cut-off). Algorithm for unification and pattern matching. Implementation of a simple system with production rules. Example of using neural networks. Examples of implementation and using existing environment. Implementation of a genetic algorithms. Green's and STRIPS planning method.  |
| **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** | 35 | **Oral examination** |  |
| **Teaching colloquia** | 20 | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |