Specification for the book of courses

Study program	Electrical Engineering and Computer Science		
Module	Computing and Informatics		
Type and level of studies	Undergraduate Academic Studies		
The name of the course	Artificial Intelligence		
Lecturer (for lectures)	Stoimenov V. Leonid, Bogdanović D. Miloš		
Lecturer/associate (for exercises)	Mihajlović T. Vladan, Veljković Ž. Nataša, Frtunić-Gligorijević B. Milena		
Lecturer/associate (for OFE)	Mihajlović T. Vladan, Veljković Ž. Nataša, Frtunić-Gligorijević B. Milena		
Number of ECTS	5	**Course status (obligatory/elective)**	Obligatory
Prerequisites			
Course objectives	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.		
Course outcomes	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.		
Course outline			
Theoretical teaching	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 cutoff, etc.). Constraint satisfaction problem. 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. Decision trees. 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 (exercises, OFE, study and research work)	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 cutoff). Algorithm for unification and pattern matching. Implementation of a simple system with production rules. Implementation of Constraint Satisfaction problem. Implementation of ID3 and other decision trees algorithms.Example of using neural networks. examples of implementation and using existing environment and libraries. Implementation of a genetic algorithms. Green's and STRIPS planning method.		
Textbooks/references			
1	S. Russell, P. Norvig: Artificial Intelligence: A Modern Approach, Prentice Hall Series in AI, 2010.		
2	L.Stoimenov, A.Milosavljević, Artificial intelligence labwork manual (in serbian), Faculty of Electronic Engineering, Niš, 2004.		
3	D.Bojić, D.Velasevic, V.Misic, Expeert systems, solved examples (in serbian), Naucna knjiga, Belgrade, 1996.		
4			
5			

Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
2	2	1	0	0
Teaching methods	Lectures, auditory exercises, laboratory exercises. Individual work for homework and projects			
Grade (maximum number of points 100)				
Pre-exam duties	**Points**	**Final exam**	**Points**	

Activity during lectures	5	**Written exam**	
Exercises	35	**Oral exam**	40
Colloquia			
Projects	20		