

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		Machine Intelligence in Logic Games		
Lecturer (for lectures)		Vučković V. Vladan		
Lecturer/associate (for exercises)		Veljanovski D. Aleksandar		
Lecturer/associate (for OFE)		Veljanovski D. Aleksandar		
Number of ECTS		5	Course status (obligatory/elective)	Elective
Prerequisites				
Course objectives		Mastering the basic techniques of artificial intelligence and algorithms that are applied in logic games as well as their implementation of various logic games.		
Course outcomes		Students' ability to understand the principles of machines and programs that autonomously play logic games, as well as the application of basic methods of mathematical theory of games and artificial intelligence in the development of real algorithms and procedures.		
Course outline				
Theoretical teaching		Mathematical basis of logic games. Mathematical models of logic games - examples. A general class of logic games. Characteristic of logic games. Basics of logic game algorithms. The notion of complexity and combinatorial explosion. Methods to overcome complexity problems. Heuristic cutting method for forward pruning. Restricting the expansion of the tree. Basic algorithms for processing trees in logical games. Alfa-Beta, PVS, Null-move, NegaScout, MTD (f), Probe and Multu-Cut, Quiescence, MVV-LVA and SEE procedures. Auxiliary procedures and heuristics (Minimal Window Search, ETC, History, Futility, Contempt factor). Alternative logic game algorithms - Berliner algorithm. Parallel algorithms of logic games. Application of transposition bases in logic games. Evaluation functions. Parallel and distributed algorithms of logic games. Client-Server architecture as the basis for the implementation of logic games on the Internet. Examples and analysis of installed large systems for remote game logic games (facebook games, playchess server). Application of the principle of machine intelligence in logic games.		
Practical teaching (exercises, OFE, study and research)		Exercises; Preparation of seminar papers. Programming and testing basic logic game procedures (Alfa-Beta, PVS, Null-move, NegaScout, MTD (f)). Software and examples of logic games. Application of theoretical principles in the realization of some simple logic games or segments of the more complex logic games.		
Textbooks/references				
1	Dixit A., and Skeath S., Games of Strategy, 2nd edition, Norton, New York, 2004.			
2	Vladan Vučković, "An Introduction to the Theory and Practice of Advanced Chess Algorithms", Doctoral Dissertation, Faculty of Electronic Engineering in Niš, October 2006.			
3	Lsat Logic Games, Robert Webking, Clayton Holland, Jerry McLain, Daniel Avelar, Research & Education Assoc., 2005, ISBN 073860111X, 9780738601113			
4	www.gametheory.net			
5	Vladan Vučković "Advanced chess algorithms and systems", monograph, Endowment Andrejević, Biblioteka Dissertatio, Belgrade 2011, ISSN 0354-7671.			
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, exercises on the board, laboratory exercises, students' independent work on homework assignments and projects, consultations.		
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	
Exercises		20	Oral exam	40
Colloquia		30		
Projects		10		