

Study programmes: PhD studies - Informatics				
Course name: R468 - Computational intelligence - advanced concepts				
Lecturers: Dušan Tošić, Vladimir Filipović, Miroslav Marić and other teachers from Department for Computer Science and Informatics				
Status: Optional				
ECTS: 9				
Attendance prerequisites: There are no prerequisites				
Course aims: Making student capable to develop and to use different soft-computing techniques in order to solve problems from various domains and to be well-prepared in practical programming.				
Course outcome: Upon finishing this course, student is capable for advanced work within computational intelligence domain.				
Course content: - Artificial intelligence problems and solving techniques. <ul style="list-style-type: none"> - Artificial neural networks - inspiration and theoretical foundations. Algorithms, applications and programming techniques for artificial neural networks. - Fuzzy logic and fuzzy sets. Application of fuzzy logic. - Support vector machine. Algorithms based on the support vector machine. - Searching and optimization problems. - Heuristic and exact methods for solving search and optimization problems. - Metaheuristics (Genetic algorithms, Simulated annealing, Electromagnetism-based metaheuristic, Tabu search, Variable neighbourhood search). - Rule-based systems. - Agent-based systems. - Machine learning techniques. 				
Literature: <ol style="list-style-type: none"> 1. Vojislav Kecman: Learning and Soft Computing, MIT Press, 2001. 2. Konar Amit: Artificial Intelligence and Soft Computing, CRC Press, 2000. 3. G. Rozenberg, T. Back, J. N. Kok: Handbook of Natural Computing, Springer, 2012. (teacher can some select other adequate books)				
Number of hours: 10	Lectures: 4	Tutorials: -	Laboratory: -	Research: 6
Teaching and learning methods: Frontal, group, individual and practical.				
Assessment (maximal 100 points)				
Course assignments	points	Final exam		points
Lectures	-	Written exam		-
Exercises / Tutorials	-	Oral exam		40
Colloquia	-	Written-oral exam		-
Essay / Project	60			