The Name of Institution: *School of Electrical Engineering, University of Belgrade*

Description of an Individual Course Unit							
Course Code:		**Level of Course:**	MSc	**ECTS**	**6**	Semester:	1
Course Title:	Basic optimization algorithms in engineering			Year of Study:			1
Prerequisites:	None			**Type of course:**		Elective	
Lecturer(s):	Dr. Dragan Olćan						
Course Staff:							
Objective of the course:	✓ Introduction to the theory of optimization problems in engineering. Black-box optimization problems (for which no a-priori knowledge is available) are the focus of this course. ✓ Detailed explanation of optimization algorithms commonly used in engineering practice. ✓ Training for practical applications of optimization algorithms in engineering problems and scientific research.						

Course Contents:	**Introduction.** Review of basic terms and the outline of the theory of solving nonlinear systems of equations as a basis for application of optimization algorithms in engineering.
	Systematization. Classifications of optimization algorithms.
	Optimization algorithms:
	   1) random search,
	   2) systematic (grid) search,
	   3) gradient method,
	   4) Nelder-Mead simplex,
	   5) genetic algorithm,
	   6) simulated annealing,
	   7) particle swarm optimization.
	Multi-objective optimization. Pareto front and its estimation by using optimization algorithms.
	Computer-based exercise. Comprehension of optimization algorithms and parameters essential for the practical engineering applications of those algorithms by coding the algorithms and by simulations.						

Teaching Methods:	45 hours of lectures + 15 hours of supervised problem classes.						
Literature:	1. Z. Michalewicz, D.B. Fogel, *How to Solve It: Modern Heuristics*, Springer; 2nd edition, 2004. 2. D.E. Goldberg, *Genetic Algorithms in Search, Optimization, and Machine Learning*, Addison-Wesley Professional, 1989.						
Assessment methods:	**Activities** – maximum 80 points, clipped at 70 points: **Homework** – Two assignments, 40 points each. **Final Exam** – Duration 2 hours, maximum 40 points, clipped at 30 points. **Final grade** – The total score is calculated by summing the score achieved for the course activities and the score achieved at the final exam. To pass the course, at least 51 points must be achieved. The grades 6-10 are evenly distributed in the range from 51 to 100 points.						
Language of instruction:	Serbian	Date:	06.11.2012.	Signature:			