Specification for the book of courses

Study program	Electrical Engineering and Computer Science	
Module	Common	
Type and level of studies	Doctoral studies	
The name of the course	Mathematical Methods of Optimization	
Lecturer (for lectures)	Marinković D. Slađana	
Lecturer/associate (for exercises)		
Lecturer/associate (for OFE)		
Number of ECTS	10 **Course status (obligatory/elective)**	Elective
Prerequisites		
Course objectives	Gaining mathematical knowledge of optimization and different optimization methods. Developing skills of mathematical modelling of real problems of practice or scientific research, as well as solving them.	
Course outcomes	Students' competence to identify the optimization problems of practice or scientific research, develop mathematical models, choose the appropriate methods for their solving and the application of methods. Competence to critically identify and evaluate contemporary literature as a prerequisite for independent research work.	

Course outline

Theoretical teaching	Elements of convex analysis. Convex sets and convex functions. Subgradients and generalization of convexity. Optimality and regularity conditions. Lagrange function and duality. Linear programming and simplex method. Nonlinear programming. Quadratic programming. Algorithms and convergence. Unconstrained optimization. Constrained optimization. Interior point method. Multiobjective optimization. Elements of calculus of variations. Variational methods.	
Practical teaching (exercises, OFE, study and research		

Textbooks/references

1	G.V. Milovanović, P.S. Stanimirović: Symbolic Implementation of Nonlinear Optimization, Faculty of Electronic Engineering, Niš, 2002 (Serbian).	
2	S. Boyd, L. Vandenberghe, Convex optimization, Cambrige University Press, 2009.	
3	Z. Michalewicz, D.B. Fogel, How to Solve it: Modern Heuristics, Springer-Verlag, Berlin Heidelberg, 2000.	
4	K. W. Cassel, Variational Methods with Applications in Science and Engineering, University Press, Cambridge, 2013.	
5		

Number of classes of active education per week during semester/trimester/year

Lectures	Exercises	OFE	Study and research work	Other classes
3	0	0	0	0

Teaching methods	Lectures, mentoring work

Grade (maximum number of points 100)

Pre-exam duties	Points	Final exam	Points
Activity during lectures		**Written exam**	
Exercises		**Oral exam**	50
Colloquia			
Projects	50		