

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Control Systems		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Optimal Control		
Lecturer (for lectures)		Veselić R. Boban		
Lecturer/associate (for exercises)		Mitić M. Vladimir		
Lecturer/associate (for OFE)				
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	The goal of this course is to master the basic theoretical knowledge necessary for the application of different optimization methods and their application in control systems.			
Course outcomes	Based on the acquired theoretical knowledge, students can successfully solve different optimization tasks in automatic control systems.			
Course outline				
Theoretical teaching	Introduction to optimal control. Formulation of optimal control task. Cost functions. Necessary and sufficient conditions for optimality. Unconstrained optimization methods. Optimization with constraints. Lagrange multipliers and Hamiltonian function. Classical calculus of variations. The Euler-Lagrange equation and transversality conditions. Maximum principle. Principle of optimality and dynamic programming. Continuous-time LQR problem. Separation principle and observers in optimal control systems. Examples.			
Practical teaching (exercises, OFE, study and research)	Solving concrete problems during computational exercises and homework assignments will make it easier for students to master method units that are studied through theoretical lectures.			
Textbooks/references				
1	F. L. Lewis, V. L. Syrmos: Optimal Control, John Wiley&Sons. Inc., New York, 1995.			
2	J. B. Burl: Linear Optimal Control – H ₂ and H [∞] methods, Addison-Wesley, 1999.			
3				
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	0	0	0
Teaching methods	Lectures; Exercises; Consultations.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	5	Written exam	20	
Exercises	0	Oral exam	20	
Colloquia	40			
Projects	15			