

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Common		
<b>Type and level of studies</b>		Doctoral studies		
<b>The name of the course</b>		Predictive Control		
<b>Lecturer (for lectures)</b>		Mitić B. Darko, Nikolić S. Saša		
<b>Lecturer/associate (for exercises)</b>				
<b>Lecturer/associate (for OFE)</b>				
<b>Number of ECTS</b>	10	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>	The aim of the course is to provide a comprehensive knowledge of the theory of model predictive control (MPC).			
<b>Course outcomes</b>	Knowledge of MPC realization methods and their applications in industrial processes.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	Robust model predictive control. Types of uncertainty. Feedback versus open-loop control. Nominal robustness. Robust MPC design of nonlinear systems. State estimation. Moving horizon estimation (MHE). Extended Kalman filtering. Particle filtering. Combined MHE/particle filtering. Output MPC. Linear constrained systems. Offset-free MPC. Nonlinear constrained systems. Distributed MPC (DMPC). Introduction and consideration of the existing results. Unconstrained two-player game. Constrained two-player game. Constrained M-player game. Nonlinear DMPC. Explicit control laws for constrained linear systems.			
<b>Practical teaching (exercises, OFE, study and research)</b>				
<b>Textbooks/references</b>				
1	Rawlings B. R., Mayne D.Q., Model Predictive Control: Theory and Design, Nob Hill Publishing, 2009			
2				
3				
4				
5				
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
3	0	0	0	0
<b>Teaching methods</b>	Teaching methods depends on number of students (lectures or mentor). Students extend their lectures knowledge by reading scientific papers and other external literature. Students also get skills for writing scientific papers independently by consultations and research work. Students are obligatory to do project for the final exam.			
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>	<b>Points</b>	<b>Final exam</b>		<b>Points</b>
<b>Activity during lectures</b>		<b>Written exam</b>		
<b>Exercises</b>		<b>Oral exam</b>		50
<b>Colloquia</b>				
<b>Projects</b>	50			