

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Control Systems		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Mathematical Introduction to System Theory		
<b>Lecturer (for lectures)</b>		Marjanović M. Zvezdan, Ranđelović M. Branislav, Nikolić S. Saša		
<b>Lecturer/associate (for exercises)</b>		Marjanović M. Zvezdan, Ranđelović M. Branislav		
<b>Lecturer/associate (for OFE)</b>				
<b>Number of ECTS</b>		6	<b>Course status (obligatory/elective)</b>	Elective
<b>Prerequisites</b>				
<b>Course</b>		Mastering basic mathematical knowledge from theory and applying them through examples.		
<b>Course outcomes</b>		Students' ability to apply acquired knowledge in the profession.		
<b>Course outline</b>				
<b>Theoretical teaching</b>		Linear algebra. Overview of the matrix calculus. Systems of linear equations. Linear dependence. Singular values of the matrix. Norms of matrices and vectors. Rank and definiteness of the matrix. SVD decomposition. Differential equations. Systems of Linear ODE of the first order. Phase portrait. Homogeneous linear systems with constant coefficients. Complex eigenvalues. Nonhomogeneous linear systems. Nonlinear Differential Equations and Stability. Periodic solutions and boundary cycles. Difference equations. Sequence and recurrent relations. Linear difference equation of the first order. Nonlinear difference equations. Diophantine equation. Rational functions. Hurwitz and Schur stable rational functions. Diophantine equation of two variables. Bezout's equation. Euclidean algorithms. Operator calculus. Laplace transformation. Discrete Laplace transformation. Fourier's transformation. Z-transformation. Complex analysis. Elements of interval arithmetic.		
<b>Practical teaching (exercises, OFE, study and research)</b>		Lectures, computational exercises.		
<b>Textbooks/references</b>				
1	D. M. Milošević, M. S. Petković, Selected Chapters in Higher Mathematics (in Serbian), University of Niš, Faculty of Electronic Engineering, 2008.			
2	I. Ž. Milovanović, E. I. Milovanović, Discrete Mathematics (in Serbian), University of Niš, 2000.			
3	D. M. Milošević, L. Z. Rančić, M. S. Petković, Mathematics 4 (in Serbian), University of Niš, Faculty of Electronic Engineering, 2015.			
4	G. V. Milovanović: Numerical analysis I (in Serbian) . Scientific Book, Belgrade 1991.			
5	Svetlana Janković, Differential Equations (in Serbian), University of Niš, Faculty of Sciences and Mathematics, Niš 2004.			
<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	2	0	0	0
<b>Teaching methods</b>		Verbal-textual, illustrative-demonstrative, presentation, dialogue, graphic representations.		
<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>	30
<b>Exercises</b>			<b>Oral exam</b>	30
<b>Colloquia</b>		40		
<b>Projects</b>				