Specification for the book of courses

Study program	Electrical Engineering and Computer Science		
Module	Electrical Power Engineering		
Type and level of studies	Undergraduate Academic Studies		
The name of the course	Automatic Control Systems		
Lecturer (for lectures)	Nikolić S. Saša, Perić Lj. Staniša		
Lecturer/associate (for exercises)	Spasić D. Miodrag		
Lecturer/associate (for OFE)	Spasić D. Miodrag		
Number of ECTS	5	**Course status (obligatory/elective)**	Elective
Prerequisites			
Course objectives	Acquiring knowledge of non-linear, discrete, and optimal control systems and applications in professional courses and in practice.		
Course outcomes	Knowledge of the methods of analysis, modeling, simulation and synthesis of control systems..		
Course outline			
Theoretical teaching	Historical overview of automatic control systems (ACS). Nonlinear Systems. Discrete systems. The structure of a digital system and process of discretization. Discrete transfer functions. Stability of discrete ACS. Synthesis of discrete ACS. Examples of non-linear systems. Typical nonlinearities and their characteristics. Linearization of nonlinear systems. System analysis in the phase plane. Stability of nonlinear ACS. Optimal systems. Criteria functions. Design of Kalman regulator. Kalman regulator with pre-defined degree of exponential stability. Poles placement of multivariable systems with feedback. Design of the observer. Simulation of ACS. Aplication of simulation in the analysis and synthesis of ACS. Simulation software for ACS.		
Practical teaching (exercises, OFE, study and research	Discrete transfer functions. Stability of discrete ACS. Z-transform, inverse Z-transform. Jury stability criterion. Nyquist criterion for discrete systems. Method of root locus. Design of digital compensators and controllers. Methods for analysis of nonlinear ACS. Stability of nonlinear ACS. The definition of stability, indirect and direct method of Lyapunov. Examples of non-linear systems. Parameter optimization. Kalman regulator. Design of the observer.		
Textbooks/references			
1	Č. Milosavljević, Basic of automatics, Part I and II (in Serbian), Faculty of Electronic Engineering, Niš, 2003.		
2	M. Stojić, Automatic Control Systems (in Serbian), Faculty of Electronic Engineering, Niš, 2004.		
3	Č. Milosavljević, Basic of automatics - workbook (in Serbian), Faculty of Electronic Engineering, Niš, 1995.		
4	D. Antić, Č. Milosavljević, G. Golo, D. Mitić, P. Vuković, Automatic Conrol Systems - workbook (in Serbian), Faculty of Electronic Engineering, Niš, 1995,		
5			

Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
2	2	1	0	0
Teaching methods	Lectures; Auditory exercises; Computer exercises; Consultations			

Grade (maximum number of points 100)			
Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures	10	**Written exam**	20
Exercises	20	**Oral exam**	20
Colloquia	30		
Projects			