Specification for the book of courses

Study program	Electrical Engineering and Computer Science		
Module	Communications and Information Technologies - Communications and Information Processing		
Type and level of studies	Undergraduate Academic Studies		
The name of the course	Automatics		
Lecturer (for lectures)	Veselić R. Boban		
Lecturer/associate (for exercises)	Todorović Z. Darko		
Lecturer/associate (for OFE)	Todorović Z. Darko		
Number of ECTS	6	**Course status (obligatory/elective)**	Elective
Prerequisites			
Course objectives	Introduction to the basic idea of automatic control, components of control systems, systems modeling, as well as control systems analysis and design.		
Course outcomes	Systematic approach to modeling of automatic control systems. Structural block diagram algebra. Characteristic transfer functions derivations. System analysis in time, frequency and complex domain. Controller design and tuning. Practical implementations of automatic control systems in industry.		
Course outline			
Theoretical teaching	Overview of the automatic control systems (ACSs) development.. ACSs classification. Modeling of linear analog and digital ACSs. ACS structure. Structural block diagrams of control systems. Linear systems analysis in time, frequency and complex domain. System stability. Stability analysis methods in frequency and complex domains. System performance rating and design criteria. Continuous-time ACSs synthesis. Digital control systems analysis. Discrete-time transfer functions. Digital control systems stability. Digital control systems design. Computer simulation of ACSs. Industrial controllers. PID controller design.		
Practical teaching (exercises, OFE, study and research work)	The Laplace transformation, definition, properties and applications. Signal flow graph and Mason's rule in structural block diagram analysis. Electromechanical analogies and electrical circuits transfer functions derivation. State space approach. State space models determination of electrical networks. State space model transformation into transfer function. Direct, series and parallel programming. Time and frequency responses. Stability of linear systems. Routh stability method. Nyquist stability criterion. Root locus. Compensator design using root locus method. z-transformation and inverse z-transformation. Discrete-time transfer functions of digital systems. Stability of digital control systems. Jury's stability test and bilinear transformation.		
Textbooks/references			
1	B.C. Kuo, Automatic Control Systems, Prentice-Hall, 1975.		
2	R.C. Dorf , R.H. Bishop, Modern Control Systems, Prentice-Hall, 2010.		
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	1	0	0
Teaching methods	Lectures; Auditory and computer exercises; Consultations.			

Grade (maximum number of points 100)			
Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures	5	**Written exam**	20
Exercises	15	**Oral exam**	20
Colloquia	40		
Projects	0		