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	Modelling and Simulation of Dynamical Systems		
Lecturer (for lectures)	Antić S. Dragan, Milojković T. Marko		
Lecturer/associate (for exercises)	Milovanović B. Miroslav		
Lecturer/associate (for OFE)	Milovanović B. Miroslav, Spasić D. Miodrag		
Number of ECTS	6	**Course status (obligatory/elective)**	Elective
Prerequisites			
Course objectives	Modeling and simulation of dynamical systems are unavoidable in todays life and all areas of technology and modern industry. The goal of this course is gaining knowledge on the modeling of dynamical systems, computer simulation of dynamical systems and modeling and simulation of various dynamical systems from technique and life.		
Course outcomes	At the end of the course students will gain knowledge on the methods for the modeling of different dynamical systems from technique and life and their computer simulation.		
Course outline			
Theoretical teaching	Concept of dynamic system model. Model classification. Graphic modeling techniques. Principles of forming mathematical models. Types of mathematical models. Examples of mathematical models. Design of mathematical models of mechanical, hydraulic, thermal, chemical and technological processes. Linearization of nonlinear elements. Validation and model verification techniques. Methods of simulation. Design of simulation models. Simulation tools. Mathematical basis of digital simulation. Simulation errors and methods for overcoming them. Application of simulation in identification, design and optimization of systems of automatic control. Modeling and simulation of artificial intelligence and intelligent systems.		
Practical teaching (exercises, OFE, study and research	Introduction to the Matlab software environment. Introduction to the Simulink. Models in the form of differential equations, state space models, the models given by their input-output equation, transfer function models. Modeling and simulation of mechanical systems. Modeling and simulation of electrical systems. Modeling and simulation of electro-mechanical systems. Modeling and simulation of the systems in automotive industry. Modeling and simulation of thermal systems. Modeling and simulation of hydraulic systems.		
Textbooks/references			
1	D. Antić, B Danković, Modelling and Simulation of Dynamical Systems, Faculty of Electronic Engineering, Niš, 2001. (in Serbian)		
2	M. Milojkovic, D. Antić, S. Nikolic, Practical Handbook on Modelling and Simulation of Dynamical Systems, Faculty of Electronic Engineering, Niš, 2018. (in Serbian)		
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	1	2	0	0
Teaching methods	Lectures; Laboratory Exercises; Computer Exercises; Consultations			

Grade (maximum number of points 100)			
Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures		**Written exam**	35
Exercises		**Oral exam**	35
Colloquia	30		
Projects			