

Specification for the book of courses

Study program		Communications and Information Technologies		
Module		Communications and Information Processing		
Type and level of studies		Master studies		
The name of the course		Numerical Solution of Equations		
Lecturer (for lectures)		Rančić Z. Lidija		
Lecturer/associate (for exercises)		Rančić Z. Lidija		
Lecturer/associate (for OFE)				
Number of ECTS		4	Course status (obligatory/elective)	Elective
Prerequisites				
Course objectives		Introduction to different methods of numerical mathematics and mastering their application in solving nonlinear, ordinary differential and partial differential equations. Training for numerical solving systems of linear, nonlinear and differential equations.		
Course outcomes		Students' ability to apply acquired knowledge in practice. Ability to recognize the type of problem from practice, select the appropriate method and its implementation for finding a solution.		
Course outline				
Theoretical teaching		Numerical solving of nonlinear equations. Numerical solving of the system of linear and nonlinear equations. Numerical differentiation and integration. Classification of methods for numerical solving of ordinary differential equations of the first order. Methods for solving the Koshi problem (Euler method, Runge-Kutta method, multi-step method). Methods for solving a contour problem (probing and error method, finite difference method, variation-projection method, finite element method). Translation of a higher order ODJ to the first-order ODJ system. Numerical integration of the first-order ODJ system. Partial differential equations (classification of equations and problem classification) and their numerical solving by the finite difference method and the finite element method. Accuracy and stability of numerical methods.		
Practical teaching (exercises, OFE, study and research)				
Textbooks/references				
1	Ljiljana Petković, Numerical analysis, Faculty of Mechanical Engineering, University of Niš, 2003. (Serbian)			
2	Gradimir Milovanović, Numerical analysis I,II,III, Scientific book, Belgrade, 1991. (Serbian)			
3	Gradimir Milovanović, Milan Kovačević, Miodrag Spalević, Numerical mathematics, Collection of solved problems, Faculty of Electronic Engineering, University of Niš, 2003. (Serbian)			
4	B. Jovanović: Numerical methods for solving partial differential equations. Mathematical Institute, Belgrade 1989. (Serbian)			
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	0	0	0
Teaching methods	Lectures, auditory exercises, consultations			
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures		10	Written exam	20
Exercises		10	Oral exam	20
Colloquia		40		
Projects				