

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Common		
Type and level of studies		Doctoral studies		
The name of the course		Approximation Theory		
Lecturer (for lectures)		Džunić S. Jovana		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS	10	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives				
Train students to design and analyze numerical techniques of approximation practice. Lay theoretical foundation for the wider field of advanced approximating techniques. Engage and motivate students with exemplar applications. Capacitate students to apply and experiment with modern technical computing software. Build knowledge and develop skills for independent scientific research.				
Course outcomes				
Solve mathematical problems using computational methods. Design and apply efficient numerical tools. Understand capabilities and limitations of numerical algorithms and algebra systems. Capability to search, analyze and synthesize data and information, with the use of adequate software.				
Course outline				
Theoretical teaching				
Polynomials in scientific computing and industrial applications. Representations of polynomials. Univariate polynomials: vector space, algebraic and analytic properties. Root-finding techniques. Interpolation and data fitting. Rational functions. Iteration of rational functions. Rational interpolation and Data fitting. Polynomials in several variables. Numerical factorization. Applications with the use of software.				
Practical teaching (exercises, OFE, study and research)				
Textbooks/references				
1	H. Stetter, Numerical polynomial algebra, SIAM, 2004			
2	D. Bini, V. Pan, Polynomial and matrix computations, Springer, 1994			
3	N. Trefethen, Approximation theory and approximation practice, SIAM, 2013			
4	A. Beardon, Iteration of rational functions, Springer, 1991			
5	V. Praslov, Polynomials, Springer, 2004			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
3	0	0	0	0
Teaching methods				
Presentations, seminars and projects				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	40
Exercises			Oral exam	
Colloquia				
Projects		60		