COURSE NAME	Numerical Mathematics					
Code	PMM951	Year of study	2nd year of undergraduate study			
Course teacher	Anka Golemac	Credits (ECTS)				
Associate teachers		Type of instruction (number of hours)	L	S	E	
			30		30	
Status of the course	Compulsory	Percentage of application of e-learning	30%			

COURSE DESCRIPTION	
Course objectives	The aim of this course is to introduce basic concepts and results in numerical analysis such as: approximation, numerical integration and differentiation, numerical solutions of linear and nonlinear equations. Students will gain preliminary knowledge for advanced courses and get insight in applying well-known numerical techniques to solve engineering problems and evaluate the results.
Course enrolment requirements and entry competences required for the course	Prerequisites: Taken courses M1, M2, M3 Entry competences: matrix, differential and integral calculus.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	The objective will be to train students to understand why numerical methods work, what type of errors to expect, and when an application might lead to difficulties. In particular, students will be able to: - understand the theoretical and practical aspects of appropriate numerical methods; - approximate a function using an appropriate numerical method - solve a system of linear equations using an appropriate numerical method; - solve an algebraic or transcendental equation using an appropriate numerical method; - calculate a definite integral using an appropriate numerical method; - perform an error analysis for various numerical methods.
Course content broken down in detail by weekly class schedule (syllabus)	- Introduction. Preliminaries and error analysis. (2) - Function evaluation. Horner's scheme. Complete Horner's scheme. (2) - Solving linear systems. Gaussian elimination. LU factorization. LU factorization with pivoting. Numerical properties of Gaussian elimination. Cholesky decomposition. Iteration methods. (4) - Approximation and interpolation. Lagrange interpolation. Newton interpolation. Hermite interpolation. (4) - Linear spline. Cubic spline. (2) - Least squares approximation. Minimax approximation. (4) - Numerical integration: Newton-Cotes formulae; Midpoint rule; Trapezoidal rule; Simpson's rule; Romberg integration; Gaussian quadrature. (4) - Rootfinding for nonlinear equations: The bisection method; Newton's method; Methods of higher order. (4) - Numerical solutions of nonlinear systems of equations. (2) - A chosen topic. (2)
Format of instruction	Lectures and tutorial sessions.
Student responsibilities	Class attendance. Students are expected to be present at least 70% of classes.
Screening student work *(name the proportion of ECTS credits for each activity so that the*	Class attendance: 2 ECTS. Partial exams/Written exam: 1.5 ECTS Final exam: 1.5 ECTS.

total number of ECTS credits is equal to the ECTS value of the course)	
Grading and evaluating student work in class and at the final exam	There are 2 partial written exams during the semester and the final exam. Passing the both partial exams or the final written exam allows students to take the oral exam. Successfully passing the oral exam leads to a successful completion of the course.
Required literature (available in the library and via other media)	V. Hari, Z. Drmać, Numerička analiza, PMF, Zagreb, 2003., skripta. Ivan Ivanšić, Numerička matematika, Element, Zagreb, 1998. R. Scitovski, Numerička matematika, 3. izmijenjeno i dopunjeno izdanje, Odjel za matematiku, Sveučilište u Osijeku, 2015.
Optional literature (at the time of submission of study programme proposal)	K. Atkinson, An Introduction to Numerical Analysis, John Wiley, New York, 1989. D. Kincaid and W. Cheney, Numerical Analysis, Brooks & Cole PC, Pacific Grove, 1990. R. Burden & J. D. Faires, Numerical Analysis, Brooks & Cole PC, Pacific Grove, 2011.
Quality assurance methods that ensure the acquisition of exit competences	Anonymous student evaluations according to the regulations of the University of Split and summarizing test results.
Other (as the proposer wishes to add)	