

NAME OF THE COURSE		Introduction to Applied Mathematics				
Code	PMM701	Year of study	3rd year of undergraduate study			
Course teacher	Prof.dr.sc. Nikola Koceić Bilan	Credits (ECTS)	5			
Associate teachers	Dr.sc. Andrijana Ćurković	Type of instruction (number of hours)	P	S	V	T
			30		30	
Status of the course	Compulsory course	Percentage of application of e-learning	40			
COURSE DESCRIPTION						
Course objectives	Demonstrate examples of real life problem that can be modeled by differential equations and / or solved by numerical methods. Explore the use of differential and integral calculus to solve ordinary differential equations and simple numerical problems.					
Course enrolment requirements and entry competences required for the course	The student must have passed the following courses: Introduction to Mathematical Analysis, Mathematical Analysis I. The student must have taken the following course: Mathematical Analysis II.					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<p>After completing the course, students are expected to:</p> <ol style="list-style-type: none"> 1. identify real-life problems that can be modeled by differential equations and/or solved using numerical methods; 2. distinguish the characteristic properties of linear equation from nonlinear ones; 3. select and apply appropriate methods to solve basic differential equations; 4. explain the reasons, advantages and disadvantages of using numerical methods; 5. apply basic numerical methods for solving nonlinear equations; 6. explain ideas and apply methods to solve interpolation problems 					
Course content broken down in detail by weekly class schedule (syllabus)	<ol style="list-style-type: none"> 1. Introduction: Ordinary Differential Equations, Motivation (1) 2. First Order Ordinary Differential Equations: Existence and Uniqueness of Solution. Different types of First Order Equations (including ODE with separable variables, homogeneous, Bernoulli, exact) (3) 3. Higher Order Linear Differential Equations: Homogeneous Linear Equations. Wronskian. Nonhomogeneous Equations (Undetermined Coefficients, Variation of Parameters) (3) 4. Approximation theory, Motivation, Error analysis (1) 5. Numerical methods for solving nonlinear equations: Bisection method, Newton's method, Fixed point iteration method (1) 6. Basic idea of interpolation, Lagrange and Newton form of interpolating polynomial, Linear and cubic spline (3) 7. Basic idea of numerical integration (1) 8. Numerical methods for differential equations: basic concept (1) 					
Format of instruction	Lecture and exercises					
Student responsibilities	Attend class regularly and take notes. Take exams when scheduled.					
Screening student work (name the proportion of	Class attendance 2 ECTS Written exams 2 ECTS					

<i>ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</i>	Oral Exams 1 ECTS
Grading and evaluating student work in class and at the final exam	The final exam consists of a written and an oral part. Successful written exam is required for taking the oral exam. Acceptable results achieved in midterm exams taken during the semester replace the written part of the exam.
Required literature (available in the library and via other media)	W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, John Wiley & Sons, Inc., New York, 2012. R. Scitovski, Numerička matematika, Odjel za matematiku, Sveučilište u Osijeku, 2004.
Optional literature (at the time of submission of study programme proposal)	M. Alić, Obične diferencijalne jednadžbe, skripta, PMF, Zagreb, Matematički odjel, 1994. V. Hari i dr, Numerička analiza, skripta PMF, Zagreb, Matematički odjel, 2004. K. Atkinson, An Introduction to Numerical Analysis, John Wiley, New York, 1989.
Quality assurance methods that ensure the acquisition of exit competences	Student evaluations following completion of the course. The evaluations are administered according to the regulations of the University of Split.
Other (as the proposer wishes to add)	