Faculty of Science and Mathematics / MATHEMATICS AND COMPUTER SCIENCE / NUMERICAL ANALYSIS

Course:	NUMERICAL ANALYSIS			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
502	Mandatory	5	5	2+2+0
Programs	MATHEMATICS AND COMPUTER SCIENCE			
Prerequisites	None.			
Aims	The aim of the course is for students to adopt and master the basics of mathematical analysis: limit theory, elements of differential and integral calculus and the theory of series.			
Learning outcomes	On successful completion of the course, students will be able to: 1. Define the basic notions of mathematical analysis 1: the set of real numbers, limit of a sequence and function, differentiability of a function, derivative and indefinite integral on an interval. 2. State the basic properties of the set of real numbers. 3. Derive basic propositions in limit theory and differential calculus, determine when a sequence or function has a limit, or when the function is continuous or differentiable. 4. Examine and associate properties of functions of a real variable using differential calculus. 5. Apply the acquired knowledge to solving different tasks related to the stated content of mathematical analysis. 6. Apply the acquired knowledge to solving real tasks and problems.			
Lecturer / Teaching assistant	Prof. dr Žarko Pavićević –lecturer, Lazar Obradović – teaching assistant			
Methodology	Lectures, exercises, homework assignments, consultations, written exams.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introducing students to basic topics studied in this course.			
I week exercises	Introducing students to basic topics studied in this course.			
II week lectures	The set of real numbers – axiomatic construction.			
II week exercises	The set of real numbers – axiomatic construction.			
III week lectures	Completeness principles of the set of real numbers.			
III week exercises	Completeness principles of the set of real numbers.			
IV week lectures	Theory of convergent sequences.			
IV week exercises	Theory of convergent sequences.			
V week lectures	Bolzano's and Cauchy's theorem for sequences. Banach fixed-point theorem.			
V week exercises	Bolzano's and Cauchy's theorem for sequences. Banach fixed-point theorem.			
VI week lectures	Topology on the set of real numbers.			
VI week exercises	Topology on the set of real numbers.			
VII week lectures	Study break			
VII week exercises	Study break			
VIII week lectures	Limit of a function. Continuity of a function at a point.			
VIII week exercises	Limit of a function. Continuity of a function at a point.			
IX week lectures	Basis of a set. Convergence and continuity of a function with regard to the basis of the set.			
IX week exercises	Basis of a set. Convergence and continuity of a function with regard to the basis of the set.			
X week lectures	Global properties of functions which are continuous on a closed interval. First written exam			
X week exercises	Global properties of functions which are continuous on a closed interval. First written exam			
XI week lectures	Uniform continuity of functions			
XI week exercises	Uniform continuity of functions			
XII week lectures	Differentiability of a function at a point. Derivative. Higher order derivatives.			
XII week exercises	Differentiability of a function at a point. Derivative. Higher order derivatives.			
XIII week lectures	Mean value theorem of differential calculus. Bernouli – L'Hopital's rule. Taylor formulas.			

XIII week exercises	Mean value theorem of differential calculus. Bernouli – L'Hopital's rule. Taylor formulas.
XIV week lectures	Monotonicity and extrema of differentiable functions. Convexity of functions. Inflection points.
XIV week exercises	Monotonicity and extrema of differentiable functions. Convexity of functions. Inflection points.
XV week lectures	Examining properties and drawing the graph of a function. Second written exam
XV week exercises	Examining properties and drawing the graph of a function. Second written exam
Student workload	10 credits x 30 hours = 300 hours

Per week	**Per semester**
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **2 hour(s) i 40 minuts** of independent work, including consultations	Classes and final exam: **6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts** Total workload for the subject: **5 x 30=150 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **30 hour(s) i 0 minuts** Workload structure: **106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend classes, do the homework assignments and take all exams.
Consultations	1 hour a week (lectures) + 1 hour a week (exercises)
Literature	V. I. Gavrilov,,Ž. Pavićević, Matematička analiza I, I.M. Lavrentjev, R. Šćepanović, Zbirka zadataka iz mat. analize I
Examination methods	4 homework assignments, 2 points each (8 points in total). 2 points for attendance. 2 written exams, 20 points each (40 points in total). Final exam, 50 points. Students who collect at least 51 points pass the course.
Special remarks	
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points