Faculty of Science and Mathematics / MATHEMATICS AND COMPUTER SCIENCE / ANALYSIS 1

Course:	ANALYSIS 1			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
3977	Mandatory	1	8	4+3+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 this course students will be able to: 1. Define the basic notions of Mathematical analysis 1: the set of real numbers, the limit of a sequence and function, differentiability of functions, derivatives and antiderivatives on segments. 2. Define the basic properties of the set of real numbers. 3. Derive basic propositions of limit theory and differential calculus, establish when a sequence or function has a limit or the property of continuity or differentiability. 4. Examine and relate properties of functions of one 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, Nikola Konatar - 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 covered by the course.			
I week exercises	Introducing students to basic topics covered by the 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	Convergent sequence theory.			
IV week exercises	Convergent sequence theory.			
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	Limit of a function. Continuity of a function at a point.			
VII week exercises	Limit of a function. Continuity of a function at a point.			
VIII week lectures	Global properties of functions continuous on segments.			
VIII week exercises	Global properties of functions continuous on segments.			
IX week lectures	Uniform continuity of functions.			
IX week exercises	Uniform continuity of functions.			
X week lectures	Review. First midterm exam.			
X week exercises	Review. First midterm exam.			
XI week lectures	Differentiability of functions at a point. Derivative of a function.			
XI week exercises	Differentiability of functions at a point. Derivative of a function.			
XII week lectures	Derivatives of higher order.			
XII week exercises	Derivatives of higher order.			
XIII week lectures	Mean value theorems of differential calculus. Bernouli – L’Hopital’s rule. Taylor formulas.			
XIII week exercises	Mean value theorems 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 sketching graphs of functions. Second midterm exam.
XV week exercises	Examining properties and sketching graphs of functions. Second midterm exam.
Student workload	

Per week	**Per semester**
8 credits x 40/30=10 hours and 40 minuts 4 sat(a) theoretical classes 0 sat(a) practical classes 3 excercises **3 hour(s) i 40 minuts** of independent work, including consultations	Classes and final exam: **10 hour(s) i 40 minuts x 16 =170 hour(s) i 40 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **10 hour(s) i 40 minuts x 2 =21 hour(s) i 20 minuts** Total workload for the subject: **8 x 30=240 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) **48 hour(s) i 0 minuts** Workload structure: **170 hour(s) i 40 minuts (cources), 21 hour(s) i 20 minuts (preparation), 48 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend classes, do the homework assignments and take all exams.
Consultations	As agreed with students.
Literature	V. I. Gavrilov,,Ž. Pavićević, Matematička analiza I, I.M. Lavrentjev, R. Šćepanović, Zbirka zadataka iz mat. analize I, B.P. Demidovič: Zbirka zadataka iz matematičke analize (Prevod)
Examination methods	Two homeworks or tests are graded with 8 points (4 points for each homework or test). 2 points are awarded for attendance to lectures and exercises. Two midterm exams are graded with 20 points each (40 points in total). Final exam - 50 points. A passing grade is awarded to students who accumulate at least 50 points.
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