

Course Name : Mathematical Analysis I							
Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 113	A	Fall	3.00	1.00	0.00	3.50	5.00
Lecturer		Sofokli Garo, PhD					
Assistant							
Course language		Albanian					
Course level		Bachelor					
Description		This course provides a review of the high school mathematical concepts. In addition, it is dedicated to the basic concepts of mathematical analysis, such as : function, limit and its computations, unidentified forms of limit, continuity on a point and interval, derivative and its techniques.					
Objectives		The course of Math Analysis (Calculus 1) has as its main objective the cover and review of the main math concepts of the high school. Another objective is providing students with the basic concepts of college math and their practicing in exercises and problems related to the computer science program.					
Core Concepts		1. The concept of a function 2. The concept of limit. Unidentified forms. 3. The concept of continuity at a point and on a interval. 4. The concept of the derivative and differentiation.					
Course Outline							
Week	Topic						
1	Functions. (Effect of algebraic operations on domain. Domain and range in applications). (P. 1-11).						
2	. New functions from the old ones. (Function compositions. The expression of a function as a composition. Translations, reflections, stretches, compressions, symmetry, odd and even functions). (P. 15-24).						
3	Family of functions. (Families of curbs, power functions, inverse proportions, polynomials, rational functions, algebraic functions, families of trig functions). (P. 27-35)						
4	Inverse functions. (Change of the independent variable, existence of inverse functions, invertible functions and their graphs, the inverse trig functions and the corresponding identities. (P. 38-48)						
5	Exponential and trigonometric functions (Irrational exponents, family of exp functions, natural exponents, log functions, solution of equations involving exponentials and logarithms, log scale in in science and engineering, exponential and logarithmic growth). (P. 52-61).						
6	Limits (intuitive approach). (Tangent lines and limits. Areas and limits. Decimals and limits. One-sided limits. Relationship between one-sided and two sided limits. Infinite limits. Vertical asymptotes. (P. 67-76).						
7	Computing limits. (Some basic limits, limits of polynomials and rational functions. Limits involving radicals. Limits of piecewise functions). (P. 80-87).						
8	. MIDTERM TEST.Limits at infinity. (Horizontal asymptotes, Laws of limits, infinite limits, limits of polynomials, limits of rational functions. Limits involving radicals, end behavior of trig, exp, and log functions). (P. 88-96).						
9	Limits (Rigorous approach). (Motivation for definition of two sided limits. Delta value. Infinite limits. (P. 100-108).						
10	Continuity. (Continuity in applications, continuity on an interval, some properties of continues functions, continuity of polynomials and rational functions; continuity of composed functions; theorem of intermediate value; approximation of roots)(P. 110-117).						

11	. Continuity of trig functions, exp functions and inverse functions. (Obtaining limits by squeezing). (P. 121-125)	
12	Derivative. (Tangent lines and rate of change; slopes and rate of change; applications). (P. 131-140).	
13	Derivative functions. (Computing instant velocity; differentiation; relationship between differentiation and continuity; derivative at segment endpoints)(P. 143-151).	
14	Introduction to differentiation techniques. (Derivative of a constant, power; derivative of sums and differences; higher derivatives. (P. 155-160).	
15	The product and quotient rules. (Derivatives of trig functions; chain rule; summary of differentiation rules). (P. 163-171)	
16	Final Exam	
Prerequisites		The student must attend the course at a minimum rate of 75%.
Literature		• Calculus, 8th Edition by Howard Anton, Irl Bivens and Stephen Davis. New York 2012.
References		• Muka, V. Analiza Matematike. Botim i universitetit A. Moisiu, Durres (2016)
Course Outcome		
1	At the end of the course students should be able to comprehend the main concepts of the course: Function, limit of a function, continuity, derivative.	
2	Students should be able to implement the course main concepts by solving exercises and word problems.	

Course Evaluation			
In-term Studies	Quantity	Percentage	
Midterms	1	30	
Quizzes	0	0	
Projects	0	0	
Term Projects	0	0	
Laboratory	0	0	
Class Participation	1	20	
Total in-term evaluation percent			50
Final exam percent			50
Total			100
ECTS Workload (Based on Student Workload)			
Activities	Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	5	70
Duties	0	0	0
Midterms	1	0	0
Final Exam	1	0	0
Other	0	0	0
Total Work Load			134
Total Work Load / 25 (hours)			5.36
ECTS			5.00