ÓBUDA UNIVERSITY
JOHN VON NEUMANN FACULTY OF INFORMATICS

Institute of Applied Mathematics			Semester 2. of the curriculum 2025-26-2			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Calculus I.	NMXAN1EBNF	4	full time	2	2	0
Responsible person for the subject: Dr. István VAJDA			Classification: honorary associate professor			
Subject lecturer(s): Dr. István Vajda						
Prerequisites:	NMXMA1EBNF	Basic Mathematics				
Way of the assessment:	exam					

Course description	
Goal:	The aim of the course is to develop students' conceptualization and problem-solving abilities through the acquisition of the basic concepts of univariate mathematical analysis; as well as an introduction to the use of the Matlab program.
Course description:	Convergence of series, continuity, and limit of functions. Differential calculus of univariate functions, derivation rules, applications, function analysis. Indefinite and definite integral. Symbolic and numerical integration techniques, applications.

Lecture schedule	
Education week	Topic
1.	The concept of sequence of numbers. Monotonicity boundedness, convergence.
2.	Limits and operations. Some often used types of sequences. Cauchy's criteria.
3.	Continuity and limits of functions at a finite point.
4.	Limits at the infinities, infinite limits.
5.	Differentiability of functions, derivatives. Rules of differentiation.
6.	Higher order derivatives. Derivatives of elementary functions.
7.	Tangent of a curve. Osculation of curves, angle of curves. L'Hôpital's rule. Rolle's theorem, mean value theorem.
8.	Examining properties of functions (monotonicity, extrema, concavity, ...) with derivatives. Analysing functions.
9.	The Riemann integral. Properties of integrals. Integral function.
10.	Antiderivatives and indefinite integrals. Technics of integration.
11.	Integration by parts, integration with substitution.
12.	Integration of elementary functions. Numeric methods of integration.
13.	Applications of integrals.
14.	Improper integrals.

Mid-term requirements	
Conditions for obtaining a mid-term grade/signature	It can be achieved 50-50 points at most on midterm test. (100 points altogether) Students can get their signature only if all the following conditions are fulfilled:

	• They attend the lessons regularly (see study-and-examination-regulations-of-obuda-university.pdf). • They don't fail to hand in both midterm tests. • The results of both midterm tests are at least 30% (15 points). • Students achieve at least 50% (50 points) on the two tests altogether. The tests are written in a classroom under the supervision of teachers. They contain a theoretic part and a practical. Without a signature students can not register for the exam.

Assessment schedule	
Education week	Topic
6.	Sequences, differential calculus.
12.	Differential and integral calculus.
13.	Retake.
Method used to calculate the mid-term grade (to be filled out only for subjects with mid-term grades)	

Type of the replacement	
Type of the replacement of written test/mid-term grade/signature	If a student has less then 50% of the points on the midterm tests or failed to hand in one of them, or has less than 30% of the points for one of them, then they can retake the missing midterm test or the one with less achieved points on the 13th week. In the latter case the newly achieved points will replace the points of the original test. Students can get their signature if they have at least 50 points altogether and at least 15 points for both midterm tests separately after the retake. Students absent from more then 30% of the lessons, or failed to hand in both of their midterm tests, will be banned. In this case, they can not take their exam in this semester. Students who have no signature at the and of the 14th week, but are not banned, may take the signature retake exam. On the signature retake exam they have to answer questions from the material of the whole semester. To get a signature, students have to achieve at least 60% of the point on the signature retake exam. In case they have less than 60%, but at least 55%, then they can take a short oral test as well to prove themselves.

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Type of the exam (to be filled out only for subjects with exams)	
It is a written exam, which may be completed by a short oral part if it is necessary.	
Calculation of the exam mark (to be filled only for subjects with exams)	
Students have to sit a written exam, which has a theoretic part and a practical. They can get at most 30 points for the theoretic part, 40 points for the practical. They need at least 50% on both part to pass the exam. If they fulfilled these conditions, we add to their achieved points 30% of the points they achieved on the midterm test, i.e., they can have at most 100 points.	
Final grade calculation methods:	
0-49 points:	Fail (1)
50-61 points:	Pass (2)
62-73 points:	Satisfactory (3)
74-85 points:	Good (4)
86-100 points:	Excellent (5)

References	
Obligatory:	J. Hass, M. D. Weir, G.B. Thomas: University Calculus Early Transcendentals, Addison-Wesley, 2007.
Recommended:	Course materials in the Moodle system. (https://elearning.uni-obuda.hu/)
Other references:	

04.12.2025.