ÓBUDA UNIVERSITY
JOHN VON NEUMANN FACULTY OF INFORMATICS

Institute of Applied Mathematics			Semester 3. of the curriculum 2026-27-1			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Calculus II.	NMXAN2EBNF	4	full	2	2	0
Responsible person for the subject: Dr. István VAJDA			Classification: honorary associate professor			
Subject lecturer(s): Dr. István Vajda						
Prerequisites:	NMXAN1EBNF	Calculus I.				
Way of the assessment:	exam					

Course description	
Goal:	Learning the basic concepts and techniques of univariate and multivariate analysis based on the international trends and requirements of IT education. Creating a clear conceptual system, developing problem-solving skills, providing the student with mathematical tools for further studies.
Course description:	Integral calculus. Ordinary differential equations. Laplace-transform. Numeric series. Function series: Taylor and Fourier series. Multivariate functions

Lecture schedule	
Education week	Topic
1.	Integration with substitution. Integration of rational fractions.
2.	Improper integrals.
3.	The concept and applications of differential equations. Classification. Separable differential equations.
4.	First order linear differential equations.
5.	Second order linear differential equations. Resonance.
6.	The Laplace-transform. (Concept and properties.) The Laplace-transform of some well-known types of functions. Inverse Laplace-transform.
7.	Applications of Laplace-transform. Solving differential equations with Laplace-transform.
8.	Series of numbers. Convergence, sum, absolute convergence, alternating series. Tests of convergence.
9.	Series of functions. Region of convergence. Pointwise and uniform convergence. Operations with series of functions.
10.	Taylor-series and their applications. The Taylor-formula. Fourier-series.
11.	Multivariate functions. (Boundedness, extrema, continuity, limits.)
12.	Differential calculus of multivariate functions. Partial and total derivatives. Tangent plane and normal line. Estimation of errors of calculations.
13.	Extrema of bivariate functions. Saddle points.
14.	Integration of bivariate functions on rectangles and normal regions.

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 the midterm test are at least 30% (15 points) in both cases. • Students achieve at least 50% (50 points) on the two tests altogether. The test are written in a classroom under the supervision of the teachers. They contain a theoretic part and a practical one. Students may use a calculator during tests and exams, that can not plot functions and is not programmable. Using of the internet or any outside help is forbidden. Without a signature students can not register for the exam.

Assessment schedule	
Education week	Topic
6.	Integral calculus, differential equations, Laplace-transform.
12.	Series of functions. Multivariate functions.
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 point 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 one or both 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 can 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 one. 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. In cases where academic dishonesty is suspected but not conclusively proven, the student will be required to demonstrate their knowledge through an oral examination conducted before a professional panel of three members. Should academic dishonesty be substantiated, disciplinary proceedings will be initiated, and the student will be barred from taking further examinations during the semester.

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:	
Other references:	Course materials in the Moodle system. (https://elearning.uni-obuda.hu/)