Obuda University John von Neumann Faculty of Informatics			Institute of Applied Mathematics	
Name and code: *Analysis* NMXAN1PMNE			**Credits*:*** *2021/22 year I. semester*	
Subject lecturers: Dr. Zoltán Léka				
Prerequisites (with code):	-			
Weekly hours:	Lecture: 2	Seminar.: 1	Lab. hours: 0	Consultation: 0
Way of assessment:	Final grade based on two midterm exams			
Course description:				
Goal: Our goal is to introduce the fundamental concepts of functional analysis and Lebesgue integration. These concepts are crucial in the modern study of probability theory, (partial) differential equations, and quantum theory, for instance.				
Course description: The problem of the measure. Lebesgue integral, convergence theorems. Lebesgue and Riemann integrals. Study of Hilbert spaces with orthogonal systems, duality.				

Lecture schedule	
Education week	*Topic*
1.	Introduction to measure theory
2.	Exterior measure and Lebesgue measure of R^d
3.	Measurable functions and their properties
4.	Lebesgue integral
5.	Convergence theorems: Fatou lemma, Monotone convergence theorem and Lebesgue's dominated theorem
6.	1st midterm exam
7.	General measures and the Lebesgue Lp-spaces
8.	Differentiation: absolute continuous functions
9.	Functions of bounded variations
10.	Introduction to Hilbert spaces, normed spaces
11.	Geometry of Hilbert spaces, inner product spaces
12.	Duality, orthogonal basis of L2 spaces, integral operators, kernels
13.	2nd midterm exam
14.	Resit exam

Midterm requirements

Education week	*Topic*
-	

2021. 10. 26.

Final grade calculation methods

Achieved result	Grade
89%-100%	excellent (5)
76%-88<%	good (4)
63%-75<%	average (3)
51%-62<%	satisfactory (2)
0%-50<%	failed (1)

Type of exam

To get the signature, one needs to accomplish at least 50% of the weekly home assignments. There will be two written midterms.

Type of replacement

At the last week of the semester one can have a resit exam.

References

Mandatory:

E. Stein: Real Analysis

Recommended:

Rynne and Youngson: Linear Functional Analysis