

Course title: Modern Analysis	Neptun code: GEMAN402-a
Course coordinator: <i>Judit Tóthné Dr. Makó, Associate Professor, PhD</i>	
type and number of lesson: lecture/seminar/practical lesson/consultation 2 hours/week	
method of accountability: colloquium	
curriculum location of the subject: autumn & spring	
pre-study conditions: -	
The task and purpose of the subject:	
The modern analysis is the important, abstract part of the mathematics, which was based on the classical analysis. Our aim is giving an overview of some classical sections of the theory of Banach spaces and Hilbert spaces and learning some important definitions and theorems of functional analysis. Understanding of the course is sufficient to know the theory of linear algebra, real analysis, topological spaces.	
Course description:	
Metric space: definitions and examples, Hölder and Minkowski inequalities, Topology in metric spaces, Convergence in special spaces, Complete metric spaces, Banach Fixed Point Theorem, Compactness, Linear spaces: definitions and examples, The Hahn-Banach theorem, Linear topological spaces, normed spaces and Banach spaces: definitions and examples, Sequences and series in normed spaces, Hilbert spaces: definitions and examples. Orthogonal series, Fourier series	
Required literature:	
<ol style="list-style-type: none"> 1. E. Kreyszig: <i>Introductory Functional Analysis with Applications</i>, Wiley India Pvt. Limited, 2007. 2. J. C. Robinson: <i>An introduction to Functional Analysis</i>, Cambridge University Press, 2020. 	
Recommended literature:	
<ol style="list-style-type: none"> 1. F. Albiac, N. J. Kalton: <i>Topics in Banach Space Theory</i>, Springer, 2006. 2. R. E. Magginson: <i>An introduction to Banach space theory</i>, Springer Verlag, New York, 2012. 3. J. B. Conway: <i>A course in functional analysis</i>, Springer-Verlag New York, 1990 	