

Instructor: Dr. Zoltán Buczolich.

Text: No official text. Recommended textbooks: Robert L. Devaney: An introduction to chaotic dynamical systems. Second edition. AddisonWesley Studies in Nonlinearity. AddisonWesley
D. Lind and B. Marcus: An introduction to symbolic dynamics and coding. Cambridge University Press, Cambridge, 1995.

K. Falconer: Fractal geometry. Mathematical foundations and applications. Second edition. John Wiley & Sons, Inc., Hoboken, NJ, 2003.

Prerequisites: A standard course in Calculus I and II. It is also better if you have some knowledge of metric spaces and differential equations, but it is not mandatory.

Class meetings: Tuesday: 16:00-17:30, ELTE Déli tömb (South Building) 3-306.

Office Hours: Tue. 14:00-15:00, Wed. 10:30-11:30.

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Detailed Syllabus: Contractions, fixed point theorems. Examples of Dynamical Systems: Newton's method, interval maps, the quadratic family, differential equations, rotations of the circle. graphical analysis. Hyperbolic fixed points. Cantor sets as hyperbolic repelling sets. Sequence spaces as metric spaces. Symbolic dynamics and coding. Dynamical systems and fractals. Hausdorff measure and dimension. Iterated functions systems: existence of the attractor, relationship with dynamical systems. Topological transitivity, sensitive dependence on initial conditions, chaos/chaotic maps, structural stability, period three implies chaos. The Schwarzian derivative. Bifurcation theory.

Exams: If the university stays open during the session of the exams there will be oral exams in my office at the university.