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

Prerequisites: A standard course in Calculus I and II. Some knowledge of metric spaces and differential equations.

Class meetings: M. 16:00-17:40, ELTE Déli Tömb, 0-222. No class meeting on September 19 (we will make it up during the semester).

Office Hours: M. 14:30-15:30, Tue. 10:30-11:30 and by appointment (first office hour is on September 12. During our registration week I will have office hours on September 7, 14:00-15:00 and September 9, 11:30-12:30). My office at the Eötvös University is in Room 3-305 in ELTE Déli Tömb. My office phone number is: 372-2500 extension 8516, email: `buczo@cs.elte.hu`.

Midterm: during the week November 7-11 exact time and location will be announced later (closed book, two hour exam).

Final: during the period December 6-14 exact time and location will be announced later (open book, two hour exam).

Grading: 30% Midterm, 20% Homework, 50% Final.

Homework: You are expected to work on all regular homework assignments. Your homework grade will be based upon the graded problems. Selected homework problems will be graded only and I will not give in advance the information which ones.

Make up tests: Make up exams will not be given. In case you miss the midterm for a valid reason alternate grading: 40% Homework, 60% Final.

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. Period doubling.