Discrete Dynamical Systems, Spring, 2019 Course Information

Instructor: Zoltán Buczolich

Class meetings: Monday 16:20-17:50, ELTE South Building (Déli Tömb) 0-221. First class meeting: February 11. The ELTE Spring Break is: April 17-April 23. This means that there will be class on April 15th but not on April 22nd. Last class meeting is May 13.

Office Hours: M. 10:00-11:00, Wed. 9:30-10:30 and by appointment. 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@caesar.elte.hu`, web: `http://buczo.web.elte.hu/`

Prerequisites: Measure and integration theory.

Text: No official text. Recommended textbooks: A. Katok, B.Hasselblatt: Introduction to the modern theory of dynamical systems. Encyclopedia of Mathematics and its Applications, 54. Cambridge University Press,Cambridge, 1995. W. de Melo, S. van Strien, One-dimensional dynamics, Springer Verlag, New York (1993). I. P. Cornfeld, S. V. Fomin and Ya. G. Sinai, Ergodic Theory, Springer Verlag, New York, (1981).

Midterm: during the week April 8-12 exact time and location will be announced later (closed book, two hour exam).

Final: during the period May 14-24 exact time and location will be announced later (open book, two hour exam).

Grading: 30% Midterm, 30% Homework, 40% Final.

Homework: You are expected to work on all regular homework assignments. Some problems will be denoted by an *. These problems are somewhat harder and you should try to solve them but they are not mandatory practice problems. To get an A for your homework grade you should not solve all of them only some of them and do well on the regular homework. If you do very well on the regular problems and do not hand in solutions for the * problems your homework grade is an A-. 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: 50% Homework, 50% Final.

Detailed Syllabus: Topological transitivity and minimality. Omega limit sets. Symbolic Dynamics. Topological Bernoulli shift. Maps of the circle. The existence of the rotation number. Invariant measures. Krylov-Bogolubov theorem. Invariant measures and minimal homeomorphisms. Rotations of compact Abelian groups. Uniquely ergodic transformations and minimality. Unimodal maps. Kneading sequence. Eventually periodic symbolic itinerary implies convergence to periodic points. Ordering of the symbolic itineraries. Characterization of the set of the itineraries. Equivalent definitions of the topological entropy. Lap number of interval maps. Markov graphs. Sharkovskii's theorem. Foundations of the Ergodic theory. Maximal and Birkhoff ergodic theorem.