Ergodic Theory and Dynamical Systems 2 , Spring 2017

MTG6402, Spring 2017

This course is the second course in a two course sequence on Ergodic theory and Dynamical systems.

Ergodic theory and dynamical systems is a research area which provides mathematical tools to study the long term behavior of systems which evolve over time. In the first semester, we will look at discrete dynamical systems or iterated functions from the topological point of view. Here we will study the dynamics of a continuous map of a metric space to itself. Topics include types of recurrence, minimality, symbolic dynamics, the "horseshoe" example of Smale, and toral automorphisms. In the second semester, we will study iterated functions from a measure theoretic point of view or measure preserving transformations. We will prove the Birkhoff Ergodic Theorem and Von Neumann's Mean Ergodic Theorem. Finally, we will see that the topological and measure theoretic points of view are interconnected as we consider the space of invariant measures associated to a continuous map of a metric space to itself.

Time and Place

The course will meet Monday, Wednesday and Friday, Period 8, in Little 207.

Office Hours (in Little 478).

Monday period 6, Wednesday period 6, and Friday period 7.

Notes:

Links to course notes will be added here. There will be no required text.

mtg6401-notes1-140 (notes from first semester).

Problem sets:

Links to problem sets will be added here

References

- Walters, P. ,**An Introduction to Ergodic Theory**, Springer-Verlag, 1982. Sections 1.1–1.7,
- Brin, M. and Stuck, G. **Introduction to Dynamical Systems**, Cambridge, 2002.
- Devaney, R., **An Introduction To Chaotic Dynamical Systems**, Westview Press, 2003 (or older editions).
- Katok, A. and Hasselblatt, B., **Introduction to the Modern Theory of Dynamical Systems**,Cambridge University Press, 1997.
- Block, L. and Coppel, W.A. **Dynamics in One Dimension**, Lecture Notes in Math. 1513, Springer, 1992.
- Cohn, Donald L., Measure Theory (second edition) (e-book, available from UF library), Birkhäuser Advanced Texts, 2013.

Grades

Grades will be based on problem sets and class participation. No exams will be given.

- **Additional Information and Links:**

    Grades: Grading will be in accord with the UF policy stated at https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

    Honor Code: "UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class."

    Class Attendance: "Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx."

    Accommodations for Students with Disabilities: "Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester."

    Online Evaluations: "Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/."

    Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.