

Mathematics 212

Ergodicity and Hyperbolic Dynamics
Course Information

Spring 2009

BLOCK: H+TR, TuTh, 1:30–2:45 PM

INSTRUCTOR: Boris Hasselblatt

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OFFICE: Bromfield-Pearson 114

OFFICE HOURS: (Fall 2008) TuThFr 9:20-10:00 am

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PREREQUISITES: Mathematics 211 or consent.

TEXT: Selections from “The Modern Theory of Dynamical Systems, to be distributed

RECOMMENDED: “Introduction to the Modern Theory of Dynamical Systems” by Katok and Hasselblatt, Cambridge University Press, 1995

“Dynamics: A first course – with a panorama of recent developments” by Hasselblatt and Katok, Cambridge University Press, 2003

“Topics in Ergodic Theory” by William Parry, Cambridge University Press, 2004

COURSE DESCRIPTION:

In this course we will study the interaction between the probabilistic and differentiable aspects of dynamical systems, which are of particular interest in hyperbolic dynamical systems. In these systems the time-evolution depends so sensitively on initial conditions that it appears pseudo-random, even though the system is entirely deterministic. We will develop the notions for a probabilistic description of this pseudo-random behavior (using measure theory), and we will show the extent to which hyperbolic dynamical systems behave like random evolutions.

Much of the material is in “Introduction to the Modern Theory of Dynamical Systems”, which is most strongly recommended, indeed essential for the course. We will go beyond this book in several respect using excerpts from a book in preparation.