Math 7222.01 Syllabus **Spring 2017**

Ergodic Theory 2

Instructor and Class Information

Lecturer:	**Course Num.:**
Office:	**Lecture Room:**
Phone:	**Lecture Times:**
Email:	**Office Hours:**

About Course Goals

FORMAT

The course will meet three times a week for 55 minutes each meeting. Instruction will be mainly by lecture delivered by the instructor. It may also include occasional in-class discussions as well as short student presentations, particularly, by post-candidacy students.

DESCRIPTION & GOALS

This course sequence is aimed at providing students with a solid working knowledge of the basic concepts, important techniques, examples and connections of Ergodic Theory, and constitutes a natural continuation of the Math 7221 (Ergodic Theory I). The course should be of interest to all students with research interests in various flavors of Ergodic Theory and dynamical systems, and its applications to study problems in Combinatorics, Number theory, Homogeneous Dynamics, Differential equations, Probability theory etc.

PREREQUISITES

Math 7221 or permission of the instructor

Textbook

MAIN REFERENCES

Peter Walters, "*An Introduction to Ergodic theory*". Graduate Texts in Mathematics **79**, Springer 2000, ISBN-13: 978-0387951522.

William Parry, *"Topics in Ergodic Theory".* Cambridge University Press, 2004, ISBN-9780521604901.

H. Furstenberg, *"Recurrence in Ergodic Theory and Combinatorial Number Theory"*, Princeton University Press, 2014, ISBN: 9780691615363

ADDITIONAL REFERENCES

Karl E. Petersen, "*Ergodic Theory*". Cambridge Studies in Advanced Mathematics **2**, Cambridge University Press 1990, ISBN-13: 978-0521389976.

M. Einsiedler and T. Ward: "*Ergodic theory: with a view towards Number Theory*". Graduate Texts in Mathematics **259**, Springer 2010, ISBN-13: 978-0857290205.

Assessments

HOMEWORK ASSIGNMENTS

There will be approximately 6 homework assignment sheets, which will typically contain several fully described problems as well as a list of numbers of textbook problems. Due dates of assignments will announced and set typically a week after the assignments are published

FINAL PROJECT

The final project is a more extensive written assignment that will draw on techniques acquired throughout the semester. It will be published about two weeks before the end of classes and will be dues at the beginning of finals week.

CLASS PARTICIPATION AND ATTENDANCE

Although attendance is not regularly monitored frequent absences are likely to be noted and may factor into the grade in borderline cases.

Grading

COURSE SCORE

A course score will be computed from the above assessments. Homework assignments will count 70% towards the grade and the final project 30%.

LETTER GRADES

Letter grades will be determined based on the course score. The approximate minimum scores letter grades are 80% for an “A”, 73% for an “A-”, 67% for a “B+”, 55% for a “B-”, and 40% for a “C-”. The exact cut-off scores may vary depending on the difficulty of assignments.

Weekly Schedule

Week 1	Basic principles of Ergodic Ramsey Theory
Week 2	Furstenberg’s correspondence principle
Week 3	Review of mixing properties of measure-preserving systems
Week 4	Multiple recurrence for weakly mixing systems
Week 5	Structure theory of measure-preserving system
Week 6	Ergodic Szemeredi theorem
Week 7	Ergodic theory along polynomials; polynomial Szemeredi theorem
Week 8	Ergodic theory and IP sets; refinements of multiple recurrence results
Week 9	Ergodic theory and amenable groups
Week 10	Flows on homogeneous spaces I
Week 11	Flows on homogeneous spaces II
Week 12	Diophantine applications of ergodic theory
Week 13	Miscellaneous topics
Week 14	Open problems and suggestions for future research

General Policies

ACADEMIC MISCONDUCT

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/info_for_students/csc.asp)."

DISABILITY SERVICES

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.