

MTH 524: Dynamical Systems Theory and Applications

Instructor: Patrick De Leenheer, deleenhp@math.oregonstate.edu Office: Kidder Hall 296.

Time & Place: MWF 10:00-10:50am in WNGR 275.

Office hours: By appointment.

Catalog Description: Theory, models, and problems for discrete and/or continuous dynamical systems. Depending on term, the emphasis may be toward deterministic or stochastic systems. Topics generally include stability theory, periodic behavior, and chaotic systems. Models selected from biology, economics, fluid dynamics, and electrical and mechanical systems. May be repeated once for credit with a different topic. This course is repeatable for a maximum of 6 credits.

This term's focus will be on Ergodic Theory & Applications.

Prerequisites: MTH 341-MTH 342, MTH 311-MTH 312, MTH 361 or consent of instructor. All courses used to satisfy MTH prerequisites must be completed with a C- or better.

Lectures Notes: Ergodic Theory by Charles Walkden (freely available for download from the web).

Grading: Bi-weekly homework assignments (60%) and class participation (40%). Class attendance is mandatory.

Schedule of lectures (may be subject to changes):

Chap 1: Wk 1

Chap 2-3: Wk 2

Chap 3-4: Wk 3

Chap 5: Wk 4

Chap 6: Wk 5

Chap 9: Wk 6-7

Chap 10: Wk 7-8

Chap 11: Wk 9-10

If there time is left, we will cover parts of Chap 7 and 8, dealing with *continuous* dynamical systems on *compact* spaces.

Course Learning Outcomes:

A student who has successfully completed MTH 524 will be able to:

- Define and apply concepts of measure preserving transformations, ergodicity.
- Formulate and prove various ergodicity and recurrence theorems.
- Recognize how to apply these theorems in practical examples.

Students With Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098. Consult <http://ds.oregonstate.edu/home/index.php>.

Student Conduct: All students are expected to obey to OSUs Student Conduct Code, see <http://oregonstate.edu/studentconduct/>

See also <http://oregonstate.edu/studentconduct/offenses>

for information on the consequences of Academic or Scholarly Dishonesty.

Course drop/add: Information is at <http://oregonstate.edu/registrar/>