

MATH 507 Dynamical Systems I Fall 2024

Class meets: Tuesday, Thursday 10:35-11:50 a.m. in 113 McAllister

Instructor: Dr. Victoria Sadovskaya (you may call me Victoria)

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Office hours: Tuesday 1:20-2:40 p.m., and by appointment.
You are also welcome to ask questions by email.

Course description: In this course we will introduce the fundamental concepts and tools of dynamics, focusing on topological properties of dynamical systems. The topics will include periodic points, equidistribution, topological transitivity and mixing, minimality, recurrence, equivalence of dynamical systems, topological entropy, and structural stability. We will discuss a variety of examples including circle maps, translations and flows on tori, symbolic dynamical systems, and hyperbolic toral automorphisms.

Prerequisite: Math 501.

Canvas: The course materials, including the syllabus, daily schedule, homework assignments, and announcements will be posted on *Canvas*.

Text (optional): *Introduction to the Modern Theory of Dynamical Systems*
by A. Katok and B. Hasselblatt.

We will cover parts of Chapters 1, 2, and 3, and additional topics if time permits.

Homework will be posted on Canvas on Thursdays and collected one week later via Canvas. In general, no late homework will be accepted, but a two day extension may be granted in case of illness or an emergency. The lowest homework score will be dropped.

Solutions of homework problems must be neatly and clearly written or typed. You may use statements proved in class and results of previous homework assignments. You may discuss general approaches to problems with me and with other students, but you must write solutions on your own. You may not copy solutions from any source.

Homework assignments will also include questions and exercises that will not be collected.

Attendance and participation: Regular attendance and participation in discussions are expected. If you miss a class, please visit Canvas later that day to see what was covered and to check for announcements. You will need to study the class notes or the book to learn the material covered that day. *Please notify me if you have to miss more than one class.*

Project: The course will include a project. You will choose a topic in dynamics that interest you, study it on your own, type and submit a report, and give a short presentation in class at the end of the semester. You should choose a topic and let me know what you have chosen by Monday, 11/12, and the report is due by Monday, 12/2.

Grading Policy: The grade will be based on the homework (70%), project (15%), and attendance and participation (15%). It will be calculated as follows:

A	88-100 %	A-	84-87.9 %	B+	80-83.9 %	B	76-79.9 %
B-	72-75.9 %	C+	68-71.9 %	C	64-67.9 %	D	50-63.9 %

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Disability accommodation: Penn State welcomes students with disabilities into the University's educational programs. Student Disability Resources (SDR) website provides contact information for every Penn State campus at

<http://equity.psu.edu/sdr/disability-coordinator>.

For further information, please visit <http://equity.psu.edu/sdr/>.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office, participate in an intake interview, and provide documentation (<http://equity.psu.edu/sdr/guidelines>). If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Counseling and psychological services: Many students face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

Counseling and Psychological Services at University Park (CAPS)

<http://studentaffairs.psu.edu/counseling/> 814-863-0395

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400

Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

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