

MATH 497 Introduction to Dynamical Systems Spring 2024

Class meets: Monday, Wednesday, Friday 2:30 - 3:20 p.m. in 106 McAllister

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

E-mail: sadovskaya@psu.edu

Office: 426 McAllister

Office hours: Monday 1:10 - 2:00 p.m.; Wednesday 11:00 - 11:50 a.m.;
and by appointment

Course description: The theory of dynamical systems is a modern branch of mathematics. Its main objective is to analyze long-term behavior of systems that evolve over time. In this course we will introduce the fundamental concepts and tools of dynamics and discuss an array of examples. The topics will include contractions, maps of circles and tori, symbolic systems, linear maps, hyperbolic systems, fractals, recurrence, entropy, and chaos.

Prerequisites: Math 220, 230, and 312.

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

Text (optional): *A First Course in Dynamics* by B. Hasselblatt and A. Katok.

Lecture notes will be posted on Canvas.

Homework will be assigned on Fridays and collected one week later.

No late homework will be accepted, but the lowest two homework scores will be dropped.

Solutions of homework problems should be neatly and clearly written or typed, in complete sentences. The solutions should be logically structured and easy to follow. 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 and you may not use any online sites (e.g., Course Hero or Chegg), technologies (e.g., ChatGPT), tools, or sources.

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

Attendance and participation: You are expected to attend every class and to participate in discussions. If you miss a class, please visit Canvas later that day to see what was covered and to check for announcements. *Please notify me if you have to miss more than one class.*

Project: The course will include a project, done individually or in pairs. Several topics will be offered, and you may suggest your own topic. You will study a topic, type a report, and make a presentation in class at the end of the semester. A project may include computer simulations or solving problems. A list of topics will be provided at the end of February. You should choose a topic by Monday, March 18, and the final version of the report is due by Wednesday, April 17.

Grading Policy: The final score and letter grade will be calculated as follows:

Homework:	65%	A	at least 90%	B-	at least 77%
Project:	20%	A-	at least 87%	C+	at least 74%
Participation:	15%	B+	at least 84%	C	at least 70%
		B	at least 80%	D	at least 60%

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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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