MATH 312H   Honors Concepts of Real Analysis   Spring 2025

Class meets: Monday, Wednesday, Friday 11:15 a.m. - 12:05 p.m. in 014 Henderson Bldg

Instructor: Dr. Victoria Sadovskaya   (you may call me Victoria)
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Office hours: Monday 1:30 - 3:00 p.m.;   Wednesday 10:10 -11:00 a.m.;   and by appointment

Course description: This course provides rigorous development of the key concepts and results of real analysis. The topics include

    Real numbers. Metric spaces.
    Sequences: convergence, limsup and liminf, Cauchy sequences, sequences in metric spaces.
    Infinite series: convergence, convergence tests, power series.
    Functions of one real variable:
            limit and continuity, properties of continuous functions, uniform continuity,
            differentiation, integration, the Fundamental Theorem of Calculus.

The course is focused on theory rather than computations. The students will learn and write proofs. Mathematical exposition will be emphasized.
Prerequisites: Math 141 (required), and Math 311M or Math 311W (strongly recommended).

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

Text: *Elementary Analysis: The Theory of Calculus* by Kenneth A. Ross, second edition.
The students can access the text and download chapters, or the entire book, free of charge at
`http://link.springer.com.ezaccess.libraries.psu.edu/book/10.1007/978-1-4614-6271-2`

Homework will be assigned on Fridays and collected *by 11 p.m. on Wednesdays via Canvas.*
No late homework will be accepted. The lowest two homework scores will be dropped.
Solutions of homework problems must be neatly and clearly written or typed, in complete sentences. The solutions must be logically structured, and all steps must be justified. You may use statements proved in class and results of previous homework assignments and worksheets. 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 exercises that will not be collected.

Exams: There will be two midterm exams and a two-hour cumulative final exam.
The midterms will take place in class on *Monday, February 17,* and on *Monday, March 31.*
The final exam will be scheduled by the university during the final exam week, *May 5-9.*
You must plan to take exams at the scheduled times. If you are unable to attend a midterm exam you should notify me promptly, before the exam if possible. If there is a compelling reason for absence, such as illness or a family emergency, your score will be replaced by the final exam score. Otherwise, the score for the missed test will be zero.

Quizzes: There will be short quizzes on Mondays at the beginning of the class on the previous week's material. You will be asked to give definitions, state theorems, and answer true/false questions. There will be no make-up quizzes, but the lowest two scores will be dropped.

Team worksheets: A number of times during the semester, the students will work on problems and questions in teams. Most of these worksheets will be collected and graded. Each team will submit just one set of solutions, and all its members will get the same score.

Attendance: You are expected to attend every class. If you have to miss a class, please visit Canvas to find out what was covered and to check for announcements. You will need to study the book or get notes from your classmates to learn the material covered that day.
Please notify me if you have to miss more than one class.
Class attendance and participation will be considered in determining borderline grades.

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

Homework:	40 %	A	91 - 100 %	C+	74 - 77.9 %
Each Midterm:	10 %	A–	88 - 90.9 %	C	70 - 73.9 %
Final Exam:	20 %	B+	85 - 87.9 %	D	60 - 69.9 %
Quizzes:	10 %	B	81 - 84.9 %	F	below 60 %
Team Worksheets:	10 %	B–	78 - 80.9 %		

Academic Integrity is the pursuit of scholarly activity in an open, honest and responsible manner. It is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the Universitys Code of Conduct states that all students should act with personal integrity, respect other students dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Disability accommodation: Penn State welcomes students with disabilities into the University's educational programs. Contact information for the Student Disability Resources (SDR) office at University Park is at `https://equity.psu.edu/offices/student-disability-resources/contact`. For further information, visit `https://equity.psu.edu/offices/student-disability-resources`. In order to receive consideration for reasonable accommodations, you must contact the SDR office, participate in an introduction meeting, and provide documentation described at `https://equity.psu.edu/offices/student-disability-resources/documentation`.
If the documentation supports your request for reasonable accommodations, the SDR 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

Reporting Educational Equity Concerns: Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the University's Report Bias webpage `http://equity.psu.edu/reportbias/`