



蘇州大學
Soochow University

MAT 225 Real Analysis

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course gives an introduction of real analysis, focusing on sequences, continuity, sequences and series of functions, differentiation and integration. The course discusses the fundamentals of pure mathematics and the elementary analysis of calculus. The topics covered in this course include real numbers, supremum and infimum, subsequences, \limsup , \liminf , the topology of \mathbb{R}^n , continuous functions, uniform continuity, compactness, Heine-Borel, The Riemann integral, the fundamental theorem of calculus, improper integrals, power series uniform convergence, and Fourier series.

Upon Completion of this Course, students will be able to:

1. Demonstrate a conceptual understanding of fundamental concepts of analysis (completeness, epsilon-N, continuity, epsilon-delta)
2. Be able to derive basic results from them
3. Demonstrate a conceptual understanding of fundamental concepts of Group Theory (groups, group actions, symmetries) and be able to derive basic results from them
4. Explain their reasoning about algebra and analysis clearly and precisely using appropriate technical language

PREREQUISITES

MAT 110 Calculus I



GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
3 Assignments	30 Points
Midterm Test	30 Points
Final Exam	40 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Kenneth Ross, *Elementary Analysis: The Theory of Calculus*, 2nd Edition, Springer, 2013.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Course Introduction Topic 2: The Set \mathbb{R} of Real Numbers Topic 3: Sequences Supremum and Infimum Topic 4: A Discussion about Proofs Subsequences Limsup's and Liminf's Topic 5: Heine-Borel Alternating Series and Integral Tests Assessments: Assignment#1



Module 2	Topics: Topic 6: The Topology of \mathbb{R} and Fourier Series Topic 7: Continuity Continuous Functions Topic 8: Uniform Continuity Topic 9: Limits of Functions Topic 10: Compactness Assessments: Midterm Test
Module 3	Topics: Topic 11: Sequences and Series of Functions Power Series Topic 12: Sequences and Series of Functions Power Series (Cont.) Topic 13: Uniform Convergence Topic 14: Differentiation and Integration of Power Series Topic 15: Differentiation Basic Properties of the Derivative Assessments: Assignment#2
Module 4	Topics: Topic 16: The Mean Value Theorem Topic 17: Taylor's Theorem Topic 18: Specialization and Changing Categories Topic 19: Integration The Riemann Integral Topic 20: Properties of the Riemann Integral Assessments: Assignment#3
Module 5	Topics: Topic 21: Fundamental Theorem of Calculus Topic 22: Riemann-Stieltjes Integrals Topic 23: Improper Integrals Topic 24: Improper Integrals (Cont.) Topic 25: Final Exam Reviews Assessments: Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow



University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.



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DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.