MAT 326 Real Analysis I

Winter 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course serves as a foundational exploration into the principles of real analysis, a branch of mathematics that rigorously studies the properties of real numbers and real-valued functions. It is designed to provide students with a deep understanding of the fundamental concepts and techniques essential for advanced mathematical analysis. Topics include limits of sequences, continuous functions, the derivative, Riemann sums, the Riemann integral and more.

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

1. Gain a solid understanding of the foundational concepts of real analysis, including sets, functions, sequences, and continuity;
2. Develop the ability to construct and understand rigorous mathematical proofs;
3. Investigate the properties of real numbers, including completeness, density, and order;
4. Explore the convergence properties of sequences of functions and investigate how pointwise and uniform convergence relate to the behavior of sequences;
5. Foster critical thinking in the context of real analysis concepts.

PREREQUISITES

MAT 113 Mathematics I; MAT 240 Discrete Mathematics

GRADING

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

ITEM	POINTS
2 Quizzes	20 Points
2 Assignments	20 Points
Midterm	30 Points
Final Project and Exam	30 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:

Robert G. Bartle; Donald R. Sherbert, ***Introduction to Real Analysis***, 4th Edition, Wiley, 2011.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Sets and Functions Topic 2: Mathematical Induction Topic 3: The Real Numbers Topic 4: Absolute Value and the Real Line **Assessments:** Quiz#1
Module 2	**Topics:** Topic 5: Sequences and Their Limits Topic 6: Limit Theorems Topic 7: Limits of Functions Topic 8: Continuous Functions **Assessments:**

	Assignment#1
Module 3	**Topics:** Topic 9: Uniform Continuity Topic 10: The Derivative Topic 11: Taylor's Theorem Topic 12: Riemann Integral **Assessments:** Midterm Quiz#2
Module 4	**Topics:** Topic 13: The Darboux Integral Topic 14: The Exponential and Logarithmic Functions Topic 15: Pointwise and Uniform Convergence Topic 16: Tests for Absolute Convergence **Assessments:** Assignment#2
Module 5	**Topics:** Topic 17: Definition and Main Properties Topic 18: Improper and Lebesgue Integrals Topic 19: Infinite Intervals Topic 20: Convergence Theorems **Assessments:** Final Project and 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).

ACEDEMIC 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.

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.