



蘇州大學
Soochow University

MAT 146 Conjecture Development and Proof

Construction

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email:TBA

COURSE OBJECTIVES

This course offers an extended exploration into elementary problems within various mathematical domains, guiding students through the intricate process of formulating conjectures, developing partial solutions, engaging in iterative revisions, and ultimately constructing convincing and rigorous proofs. The primary emphasis is on honing problem-solving skills, fostering logical reasoning abilities, and cultivating the art of constructing and presenting mathematical proofs.

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

1. Cultivate a systematic approach to problem-solving, including breaking down complex problems into manageable parts;
2. Gain various problem-solving techniques and strategies;
3. Formulate conjectures based on patterns and observations;
4. Promote an iterative problem-solving process with room for revisions and improvements;
5. Develop ability to communicate mathematical reasoning clearly and concisely.

PREREQUISITES

MAT 110 Calculus I

GRADING



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

ITEM	POINTS
2 Assignments	20 Points
2 Homework	30 Points
Midterm	20 Points
Final 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:

Martin Liebeck, *A Concise Introduction to Pure Mathematics*, 4th Edition, Chapman & Hall, 2015.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Sets and Proofs Topic 2: Number Systems Topic 3: Rationals and Irrationals Topic 4: Proof of Lagrange's Theorem Assessments: Assignment#1



Module 2	Topics: Topic 5: The Fundamental Theorem of Arithmetic Topic 6: Polynomial Equations Topic 7: The Fundamental Theorem of Algebra Topic 8: Complex Numbers Assessments: Homework#1
Module 3	Topics: Topic 9: Principle of Mathematical Induction Topic 10: Principle of Mathematical Induction II Topic 11: Principle of Strong Mathematical Induction Topic 12: Cauchy's Inequality Assessments: Midterm Assignment#2
Module 4	Topics: Topic 13: Euler's Formula and Platonic Solids Topic 14: Binomial Coefficients Topic 15: Binomial Theorem Topic 16: Multiplication Principle Assessments: Homework#2
Module 5	Topics: Topic 17: Multiplicative Notation for Groups Topic 18: The Euclidean Algorithm Topic 19: Congruence of Integers Topic 20: Fermat's Little Theorem 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.

DISABILITY ACCOMMODATION



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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.