Introduction to Mathematical Proof

MTH 301 [29196], Fall 2025

Mon and Wed, 12:20 - 2:15 pm, 1S-102

Instructor: Professor Abhijit Champanerkar

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Office Hours: (In 1S-230) Mon 3:30-4:30 pm, (In Tutoring Lab 1S-214) M 2:30-3:30, Wed 2:30-3:30 pm
Class Homepage: http://www.math.csi.cuny.edu/abhijit/301/ (this page)
Academic Calendar **First Day Handout**

Course Information

Course description: The goals of this course are for you to become adept at logical reasoning by learning mathematical processes that are essential for studying higher mathematics. We will focus especially on the idea of a mathematical proof. We will learn how to (1) understand mathematics in its **three modes** of communication - hearing, reading and writing, and (2) discover mathematics by exploration and experimentation. You will have succeeded in this course if by the end of the semester you understand or have learned

- properties of sets, integers, functions, proof by induction, relations and partitions covered in class
- existential and universal quantifiers; translating between English and symbolic sentences using quantifiers
- if-then statements: when they are true, what they are saying / not saying, what constitutes a counterexample
- how the appearance of quantifiers in the conclusion of an if-then statement guides the structure of its proof
- how to think deeply, carefully, and logically about new concepts
- how to explore a concept, formulate your own questions about the concept as a result of your exploration, and use proof techniques to prove or disprove these questions with certainty
- how to express your ideas clearly, both in English and using the language of mathematics

Prerequisite MTH 232.

Text Book and Syllabus: Fendel and Resek, *Foundations of Higher Mathematics* , Pearson ISBN 9780201125870. We will cover Chapters 1 to 6 from the text book. See below for a tentative list of topics by dates for this semester.

The first 6 chapters of the textbook will be supplied to students in second week of classes. Please note that you may not distribute, photocopy any parts of this material at any time, and students have to return the textbook at the end of the semester. Please bring the textbook to every class.

Attendance and class participation:

- **Attendance** for classes is very important and mandatory. Students are allowed 3 excused absences.
- **Class participation** in form of in-class interaction and group work is important.

Homework, Quizzes and Exams Practising the concepts learned in the class and their assessment will be in the following ways:

- **Homework** will be assigned in most weeks in form of reading and hand-in problems. All assignments more than one page long must be stapled, or they will not be accepted
- **Quizzes** will be held at end of every chapter usually on Wednesday. Quizzes will be announced a week in advance.
- **Exams:** There will be one midterm exams during the semester and a Final exam at the end of the semester. Here are the tentative dates (any changes will be announced well in advance)
    - **Midterm Exam:** Wednesday Oct 29th, **Review:** Monday Oct 27th
    - **Final Exam:** TBA

Grading: The course grade will determined as follows:

- **Midterm Exam -** 25% each exam
- **Final Exam -** 45%
- **Homework and Quizzes -** 25 %
- **Attendance and class participation -** 5%

Resources

- For help and question please use my office hours or email me for questions.
- Use Math Building Tutoring Lab 1S-214. I will hold some of my office hours here.

Course Policies

- **Textbook Return Policy:** Failure to return the textbook on day of the final exam will result in a **F** grade in the course.
- Attendance is mandatory.
- Cell phone usage of any kind during class and on exams is not allowed.
- Missing the Final exam will result in an F grade. Any changes to the grading policy will be announced in the class.
- You must take the Final exams at the time scheduled by the university.
- Students are not allowed to step out of the classroom during exams, except in case of emergencies.
- **Academic dishonesty:** Cheating in any form will not be tolerated. Please see CUNY Policy on Academic Integrity.
- **Disability policy:** Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Center for Student Accessibility. Please provide written verification of student's eligibility from the OAS. Prior to granting disability accommodations in this course, the instructor must receive written verification of student's eligibility from the Center for Student Accessibility, which is located in 1P-101. It is the student's responsibility to initiate contact with the Center for Student Accessibility staff and to follow the established procedures for having the accommodation notice sent to the instructor.

Course schedule and Homework Here is a tentative list of topics by week for this semester. Note that this schedule may change depending on how the class progresses.

Week #	Week of	Topic	Homework
1	Aug 25	1.1 Exploration 1.2 From Exploration to Proof	
2*	Sept 1	1.3 Proof: An Introduction	
3	Sept 8	1.3 Proof: An Introduction	
4	Sept 15	2.1 Exploring Sets **Quiz 1**	

Week #	Week of	Topic	Homework
5*	Sept 22	**No classes**	
6*	Sept 29	2.2 Proofs about Sets, 2.3 Exploring Integers	
7	Oct 6	2.4 Proofs about Integers	
8*	Oct 13	3.1 Quantifiers **Quiz 2**	
9*	Oct 20	3.1 Quantifiers	
10	Oct 27	**Review and Midterm Exam**	
11	Nov 3	3.2 Working with Quantifiers	
12	Nov 10	4.1 Proofs with Quantifiers	
13	Nov 17	4.2 Equivalences in Proofs	
14*	Nov 24	5.1 Induction part 1 **Quiz 3**	
15	Dec 1	5.1 Induction	
16	Dec 8	5.2 Second Principle of Induction	
17*	Dec 15	**Review for Final Exam**	
		Final Exam TBA	

Note:

- No classes on Sept 1st (Mon, Week 2), Sept 22nd (Mon, Week 5), Sept 24 (Wed, Week 5), Oct 1st (Wed, Week 6), Oct 13 (Mon, Week 8), Oct 20 (Mon, Week 9).
- Tuesday 10/14 (week 8) is Monday schedule
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- Friday 10/24 (week 10) is Monday schedule
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- Monday 12/15 (week 16) is last day of classes.