Course Math 109.

Credit Hours 4

Prerequisites Math 18, or Math 20F, or Math 31AH, and Math 20C, or consent of instructor.

Course Description This course focuses on the use of a variety of topics in mathematics to introduce the students to rigorous mathematical proof. In particular, you will learn how to reason mathematically and write mathematical proofs.

Textbooks The required textbook is *An Introduction to Mathematical Reasoning: Numbers, Sets, and Functions*, by Peter J. Eccles; 2007.
However, you can also use the following books for consultation:

(i) *Mathematical Proofs*, by G. Chartrand, A. Polimeni, and P. Zhang, 4th Edition, Pearson 2018.
(ii) *Foundations of Higher Mathematics*, by P. Fletcher and C. Patty, 3rd Edition, Cengage 1995.

Subject Material The course comprehend the following topics:

(i) Logic of first degree;
(ii) Introduction to Set theory;
(iii) Basic proof techniques;
(iv) Proof by mathematical induction;
(v) Functions;
(vi) Relations and concurrence module n;
(vii) Basic number theory;
(viii) Introduction to $\epsilon - \delta$ proofs.

Lectures The lectures are Monday, Wednesday, and Friday in person. These will be held in Center Hall room 216.

Homework Completing homework is a crucial aspect of this course. To gain a thorough understanding of the material, it's vital that you approach each assignment diligently and make a sincere effort to solve every problem. The homework will usually be due at midnight on Mondays.

Office hours The instructor office hours are Tuesday and Thursday from 12:30 to 2:00 p.m at AMP 2220. The office hours for teaching assistants (TAs) are posted on the course website. You are welcome to seek assistance with homework questions during these hours. In such cases, the instructor or TA will aim to identify the specific challenges you are facing and offer guidance to help you find the correct approach. However, please keep in mind that the instructor or TA will not provide direct solutions to homework problems during office hours.

Discussion Sections Discussion sections will take place on Thursdays. While homework problems will not be addressed, you will work on similar problems that employ comparable techniques. To maintain balanced discussion group sizes, kindly attend the section you are officially enrolled in.

Midterms There will be two midterm exams given during the quarter. The first midterm will be held on October 27 and the second midterm on November 17. Both midterms will be held in class. You will be able to use one handwritten sheet of notes. Recall that calculators and any online material are not allowed during the examination. There will be no makeup exams.

Final Examination The final examination will be held at the date and time stated in the course calendar. You will be able to use one handwritten sheet of notes. However, calculators and any online material are not allowed during the examination.

Grading Grades (and other information) will be posted here.
Your course grade will be given based on your cumulative average at the end of the term. This cumulative average will be the best of the following two weighted averages:

(i) 30% Homework, 20% Midterm Exam I, 20% Midterm Exam II, 30% Final Exam.

(ii) 30% Homework, 20% Best Midterm Exam, 50% Final Exam

The cumulative average will be based on the following scale:

A+	A	A-	B+	B	B-	C+	C	C-
97	93	90	87	83	80	77	73	70

NOTE: **You must pass the final examination in order to pass the course**.