Hunter College of The City University of New York

MATH 156 INTRODUCTION to MATHEMATICAL PROOF WORKSHOP 2 hrs, 1 cr.

Textbook: *The Nuts and Bolts of Proofs*, 3rd Edition by Antonella Cupillari (Academic Press).

In Spring 2005 the Hunter College Senate passed a resolution requiring that the following statement about academic integrity appear on all course syllabi:

"Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures."

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The main objective of the course MATH 156 is to understand the basic logic of mathematical proofs and to learn some of the methods used for constructing proofs. The statements to be proved will deal with elementary properties of numbers, functions and sets and with some fundamental results in differential and integral calculus. Emphasis will be given to proofs requiring an ε, δ argument.

1. There will be a midterm exam and a final exam. The midterm exam will cover direct proof, related statements, indirect proof, negation of a statement, "if and only if " theorems, and use of counterexamples. The final is in two parts: one part is in-class and the other part is take-home. The midterm and the final each count as 50% of the course grade. Graduating seniors are not exempt from the final exam.

2. The plan is to have the students hand in at several class meetings a short written proof prepared during class time. These papers will be returned to the students at the next class meeting for possible re-writing.

3. The grading system used is the one described in the current undergraduate catalog. The passing grade is D. You may choose either a letter grade or the CR-NC grading system. The NC grade will not be given if the midterm is not taken. Following department policy, the IN grade applies only to students who have a valid reason for not completing the final and have a grade of 70 or more on the midterm.

4. The entire content of the required textbook will be covered. The textbook currently used in MATH 150 and MATH 155 will be a source of proofs to read and statements to prove; purchase of this textbook is not required.

5. All electronic devices must be turned off during class time, please.

Topics Covered:

Basic Techniques to Prove If/Then Statements
- Direct Proof
- Related Statements
- Indirect Proof
- How to Construct the Negation of a Statement

Special Kinds of Theorems
- "If and Only if " Theorems
- Use of Counterexamples
- Mathematical Induction
- Existence Theorems
- Uniqueness Theorems
- Equality of Sets
- Equality of Numbers
- Composite Statements