

Mathematics 250  
Spring, 1997

**Textbook:**

- Carol Schumacher, *Chapter Zero*, Addison-Wesley, 1996.

**Recommended Reference:**

- Richard Courant and Herbert Robbins, *What is Mathematics?*, 2<sup>nd</sup> Edition, Oxford University Press, 1996.

**Instructor:** Michael Rogers

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**Office Hours:** M–F: 2–3 p.m. Also by appointment (use e-mail).

**Course Content:** Mathematics 250 is a survey of basic mathematics with a focus on proving.

**Course Goals:** Upon completion of this course you should

- be able to discover a proof occasionally;
- be able to write a proof logically;
- be familiar with number systems and groups and with some of the issues concerning the logical foundations of mathematics.

**Written Work:** Thoughts are expressed by sentences: just so in mathematics. Pay attention to your textbook: it is written in sentences. **All work must be in complete sentences.** Use mathematical symbols wherever appropriate; do not use a lot of words. Your work needs to be neat and orderly to be intelligible. It is common practice to rewrite solutions once they are found.

**Notebook:** A formal mathematical notebook will be maintained by each student. Into it will be transcribed all calculations, definitions, examples and proofs of the problems and theorems plus any other questions, notes or calculations of interest to the student. This notebook book will be submitted each **Monday** by noon to Dr. Rogers. He will read and return the notebook by the next class.

**Midterm Examination:** A cumulative midterm examination will be given in class on Tuesday, 4 March. The exam will be closed-book, but you may use one page of notes prepared by you. You may collaborate with other people on the content of the notes, but you must prepare the page yourself. The notes may not contain any unauthorized proofs.

**Final Exam:** A cumulative final will be given at the scheduled time. You may use your formal notebook, but no other resources.



**Grading:** Evaluation will be based on the following:

Notebook	490 points
Midterm Exam	100 points
Final Exam	<u>210 points</u>
	800 points possible

A rough guide to letter grades: A – 700 and up, B – 600–700, C – 500–600, D – 400–500, F – below 400. Plus “+” and minus “–” (A<sup>–</sup>, B<sup>+</sup>, etc.) will be applied to grades.

**Homework:** Occasionally supplemental exercises will be assigned. These are for the benefit of the student and will not be collected. Most of your homework will consist of preparing for class and maintaining the notebook.

**Honor Code:** The Honor Code of Oxford College applies to all work submitted for credit in this course. All such work will be pledged to be yours and yours alone. This is the case when you place your name on work submitted. The Honor Code applies to all tests, problem sets, and any other work you may submit.

## Calendar:

Day	Topics
14 Jan.	Introduction, Logic (Ch. 1, 2)
16 Jan.	Logic (Ch. 2)
21 Jan.	Sets (Ch. 3)
23 Jan.	Functions (5.1–5.2)
28 Jan.	Sequences; Binary Operations (5.4–5.5)
30 Jan.	Relations; Equivalence Relations (4.1, 4.3)
4 Feb.	Orderings (4.2, 5.3)
6 Feb.	Inductions: Applications (Ch. 6)
11 Feb.	Induction, Complete Induction, The Well-Ordering Principle (Ch. 6; 7.1)
13 Feb.	Divisibility (7.2)
18 Feb.	Euclidean Algorithm, Relatively Prime (7.3–7.4)
20 Feb.	Prime Factorization (7.5)
25 Feb.	Congruences (7.6–7.7)
27 Feb.	Review/Catch up
4 Mar.	Test (in class)
6 Mar.	Infinite, Countable Sets (8.1–8.3)
11 Mar.	} <i>Midterm Break</i>
13 Mar.	
18 Mar.	Uncountable Sets (8.4)
20 Mar.	Group Theory
25 Mar.	"
27 Mar.	"
1 Apr.	"
3 Apr.	"
8 Apr.	"
10 Apr.	Rational Numbers (App. B.1–B.2)
15 Apr.	Real Numbers (App. B.3, Ch. 9)
17 Apr.	" (Ch. 9)
22 Apr.	Limits and Continuity
24 Apr.	"
29 Apr.	Review