

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
DEPARTMENT OF MATHEMATICS
COURSE DESCRIPTION - FALL 1999

**MATH 247 - Honors Section
FUNDAMENTAL MATHEMATICS**

12noon MWF - 343 Altgeld Hall
D. West - 226 Illini Hall, 333-1863, west@math.uiuc.edu
Office Hours - usually 3:12-4:18 MWF, or by appointment

This is a serious course in the fundamentals of mathematics and provides preparation for upper-class mathematics courses. Students will develop good habits of understanding, communicating, and writing mathematics. Techniques of reasoning will be discussed from both discrete and continuous mathematics. The methods will be applied to solve many interesting problems. The honors section will cover a broader and deeper selection of material.

The course explores themes involving numbers, sets, and functions. With elementary properties of these and logical statements as a foundation, we move on to induction and cardinality. Study of the natural numbers includes properties of divisibility and modular arithmetic. In discrete mathematics, we consider discrete probability and techniques of counting. In continuous mathematics, we develop an understanding of the real numbers and apply this to begin the explanation of why calculus works.

REQUIREMENTS: Students will be expected to exercise care in their writing and reasoning. Weekly problem sets (15 points) will require doing 5 of 6 problems; complete and clearly written solutions are required for full credit. There will be three tests, during approximately the 5th, 9th, and 13th weeks, plus a final examination. The final examination is Thursday, Dec 16, 1:30-4:30PM. Access to electronic mail is strongly recommended; this is a medium for course announcements and clarification of homework problems, and it can be a fast and simple way for students to ask questions about homework or other matters.

PREREQUISITES: One semester of calculus or consent of instructor.

TEXT: *Mathematical Thinking: Problem-Solving and Proofs*, by J.P. D'Angelo and D.B. West. The second edition has just been written and is available at UpClose Copies, 714 S. Sixth Street, for \$19.20. We will follow this edition.

GRADING POLICY: The twelve highest homework grades will count. Points available Hwk (180) + Tests (100+100+100) + Final (150). The problems are challenging, and it takes time to develop good habits of writing proofs. The thresholds for final grades reflect this: the threshold for A will perhaps be 450 points and for passing will perhaps be 150 points.