Math 2513 Spring 2005
Discrete Math Prof. Miller

# Course Syllabus
# Discrete Mathematical Structures

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**Office Hours:** Mondays 3:30-4:30 PM, Tuesdays/Thursdays 10:30–11:30 AM, or by appointment

**Brief Description:** The course description which appears in the OU General Catalog gives a condensed outline of the topics to be covered:

> 2513 Discrete Mathematical Structures. *Prerequisite: 2423 or concurrent enrollment. A course for math majors or prospective math majors. Provides an introduction to discrete concepts such as finite sets and structures, and their properties and applications. Also exposes students to the basic procedures and styles of mathematical proof. Topics include basic set theory, functions, integers, symbolic logic, predicate calculus, induction, counting techniques, graphs and trees. Other topics from combinatorics, probability, relations, Boolean algebras or automata theory may be covered as time permits. (F, Sp, Su)*

Discrete mathematics involves the study of objects which are separated or spaced apart from each other. For example, finite sets and the set of integers are discrete sets, while the set of real numbers would be considered to be a continuous, or non-discrete, set of objects. The difference between discreteness and continuity can also be seen in distinguishing between digital signals (discrete) and analog signals (continuous). As these examples suggest, discrete mathematics forms a conceptual complement to the continuous processes which underly the study of calculus. Discrete sets often carry additional structures such as an operation (addition, multiplication, concatenation, union or intersection, for example) or an inequality relationship, and, when present, these structures are instrumental in developing deeper theories. The basic concepts of discrete mathematics lend themselves to being axiomatized (or built up from elementary definitions) more directly than the concepts of calculus. As a result discrete mathematics forms a good subject for a first non-calculus course for mathematics majors—one where students can focus directly on the basic procedures and styles of mathematical proof. Through this course, students will be expected to develop mathematical experience and maturity, and to enhance their abilities to read, create and analyze mathematical arguments. With both the subject itself, as well as the experience of working with mathematical arguments, the course will provide a foundation for moving into higher level mathematics courses such as real analysis, abstract algebra, math modelling, geometry and topology.

**Materials:** The textbook for the course will be *Discrete Mathematics and Its Applications (5th edition)*, by Kenneth Rosen (McGraw-Hill, 2003). We will cover much of chapters 1–4 and 7 of this book, and portions of chapters 6, 8, 9 or 11, as time permits.

**Exams:** There will be three midterm tests and a final exam. The midterms will be given in class on: **Thursday, February 10**, **Thursday, March 10**, and **Thursday, April 14**, . The Final Exam is scheduled for **8:00–10:00 AM** on **Friday, May 13**.

**Grading:** Grades will be determined according to the breakdown:

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|---|---|
| *Assignments/Classwork* | 40% |
| *Three Midterms* | 35% |
| *Final Exam* | 25% |

(For each student, the highest midterm score will be weighted at 15% and the other two will be weighted at 10%.) Final course grades will be based on the scale:

**A: 90%, B: 80%, C: 70%, D: 60%, F: below 60%**

The actual cut-offs may be dropped slightly lower at the instructor's discretion. Please note that the Assignment/Classwork portion forms a **very significant** portion of the complete course grade.

**Class Attendance:** The day-to-day class lectures and discussions form the backbone of this course. Routine attendance at the class is essential and expected of students.

**Homework Assignments and Classwork:** Regular homework assignments will be collected roughly once per week. Assistance on homework and related problems is available during the instructor's office hours. The point of the homework assignments is to provide students with a minimum level of exposure to the materials outside of class time, and to give feedback on understanding of basic concepts. To prepare adequately for this course, students will need to do many more problems than just the assigned ones in order to feel comfortable with, and master, the concepts involved. The experience of many generations of students shows that the way to succeed in a math course is to work (and understand) a large number of problems. The textbook is an excellent resource for good problems, and most of the odd-numbered problems have answers (different from solutions!) at the end of the book.

There will be sporadic in-class work done by students over the semester, this work will not typically be announced in advance.

Each Homework Assignment and Classwork Paper will be graded out of 20 points. In determining the Assignment/Classwork portion of the total course grade, the lowest 20% (roughly) of the assignment and quiz grades will be dropped at the end of the semester. This policy helps ensure that students who miss one or two homework assignments will not be unduly penalized. Homework will always be due in class on the assigned date, and late homework will not be accepted.

**Student Disabilities:** The instructor is committed to providing an environment in which students will be able to successfully complete this course. Any student who has a disability that may affect their course performance should discuss this with the instructor as soon as possible so that steps can be taken to ensure full participation in the course and to facilitate academic opportunities.

**Academic Misconduct:** Students are assumed to be familiar with the Academic Misconduct Code. Any instances of academic misconduct will be strictly dealt with in accordance with this code.