Math 2513 Summer 2005
Discrete Math Prof. Miller

Course Syllabus – PRELIMINARY VERSION
Discrete Mathematical Structures

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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 develope 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. The textbook topics will not always be

presented in linear order. Nevertheless, reading and studying the textbook as the semester progresses is critically important for success in this class. As a rule, reading assignments will not be mentioned in class but it will always be assumed that students are reading the portions of the textbook as they are discussed in class.

Exams: There will be three midterm tests and a final exam. Exam dates will be announced about 10 days ahead of time.

Grading: Grades will be determined according to the breakdown:

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: Homework will be assigned for each class (as a general rule). However, it will only be collected only occasionally. Assistance on homework and related problems is available during the instructor's office hours.

At nearly every class, students will be given a problem to work. This problem will usually consist of a homework problem that had assigned for that class (or an earlier class), or a problem related to the current class discussions.

The point of the homework assignments is to provide a minimum level of exposure to the corse topics outside of class time, and to give aid in the understanding of basic concepts. To prepare adequately for this course, students will need to work many more problems than just the assigned ones in order to feel comfortable with, and master, the ideas 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 (which is different from solutions!) at the end of the book.

Each Homework Assignment and Class Problem will be graded out of 20 points. In determining the Assignment/Classwork portion of the total course grade, the lowest 15% (roughly) of the assignment and quiz grades will be dropped at the end of the semester. When homework is collected, it will always be due in class on the assigned date, and late papers 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.