Math 348/648 - Combinatorial Analysis I  
Syllabus: Fall 2011

Professor: Dr. Sarah K Mason, 334 Manchester, masonsk@wfu.edu
Office Hours:  
Mondays: 10:00am-11:00am  
Wednesdays: 1:45pm-2:30pm  
Thursdays: 2:00pm-3:00pm  
Fridays: 11:00am-12:00noon  
(subject to change)

Course Meetings: WF 9:30am-10:45am, Manchester 245
Course Website: www.wfu.edu/~masonsk/M348.html
Textbook: Kenneth P. Bogart, Combinatorics Through Guided Discovery

1. Course Summary and Goals

Combinatorics is the art of counting. The numbers we’ll be using in this course are the integers instead of the real numbers. Our graphs will be dots and lines instead of representations of functions. One of the major goals of this course is to develop abstract reasoning skills in a concrete setting. You will explore different ways to represent mathematics pictorially and solve problems using these pictures. Relationships between different sets of objects will be developed to discover patterns and properties. Occasionally we will take a look at some of the current research topics in combinatorics, since combinatorics is the professor’s main area of research! We will cover all of chapter 1, the first two sections of chapter 2, all of chapter 3, and most of chapter 5.

In this class you will be challenged to ask questions and think about problems before receiving the solution. We will follow a somewhat non-traditional approach in that a significant portion of each class period will be devoted to student presentations and active discussion. The goal of this approach is twofold:

1) By grappling with the material on your own first instead of reiterating a format presented to you in advance, your understanding of the material will be deeper and your ability to apply the skills acquired in this class to other situations (both in and out of the classroom) will broaden.

2) By interacting with the students and maintaining an active learning environment during class time, the professor will be able to better gauge the level of the class’s understanding and focus instruction on the places where detailed explanations and clarification are most needed.

“The principle goal of education is to create men and women who are capable of doing new things, not simply of repeating what other generations have done - men and women who are creative, inventive, and discoverers.” - Jean Piaget

2. Homework (20% of final grade)

Weekly homework will be posted on the course website each Friday and due at the beginning of class the following Friday. A typical assignment will consist of about 5 to 10 problems, all of which will be graded. (The problems assigned only to enrollees in 648 will count as bonus points for enrollees in 348.) I do not accept late homework. Instead, I will drop your lowest homework grade. You may work together on your homework but the solutions you submit must be your own and must accurately reflect your own understanding. Your homework grades will periodically be posted on https://sakai.wfu.edu.

3. Classwork and class participation (20% of final grade)

Each Wednesday, 8 to 12 presentation problems for the following week will be posted. Students enrolled in 348 will select at least 5 of these to turn in while students enrolled in 648 will select at least 7 of these to turn in. You will receive two points for each correct solution (or one point for a reasonable but incorrect attempt), which means that it is possible to earn bonus points by turning in additional problems. These will be due
each MONDAY by 2:00pm, and I will read these promptly and select a student to present each problem in class. You will be notified by noon on Tuesday if your solution was selected for a presentation. You may not work with anyone else or consult any outside sources for these problems. Your grade for this category will be based on the solutions you submit, your class presentations, and your participation in class. (See course website for rubrics.) Your classwork grades will periodically be posted on https://sakai.wfu.edu.

4. Topics Project (10% of final grade)

There will be an individual project that you will work on throughout the semester and present during the last few days of class. About a month into the semester, you will pick a topic. (You will be provided a description of possible topics, but are welcome to diverge from that list if you find something that interests you.) At the end of the semester you will submit a written report on your topic and present this orally to your classmates. Although the final project and presentation are not due until the end of the semester, there will be several assignments along the way so that there is not too much left to do at the end of the semester. Detailed instructions for the project and its associated due dates are posted on our course website.

5. Midterms/Final Exam (50% of final grade)

There will be two in-class midterms and one comprehensive final exam for this course. Exam questions will reflect the material covered in class discussions, readings, presentations, and homework. The dates for the exams are:

**Midterm 1:** 28 September (15%)  
**Midterm 2:** 9 November (15%)  
**Final Exam:** 15 December, 9:00am-12:00noon (20%)

6. Enrollees in 648

As per Wake Forest’s policy on 300/600 level courses, you will be held to a higher standard than the students enrolled in 348. This expectation will be reflected in the following ways:

- You will be required to complete more homework, presentation, and exam problems.
- At the end of each chapter, you will present to the class a brief summary of one of its main topics.
- Your project will be graded according to a higher standard than the 348 projects.