INSTRUCTOR: Dr. K. Spackman  
OFFICE: Academic Affairs Annex 108 (modular building near Alderman Hall)  
PHONE: 962-3303  
E-MAIL: spackmank@uncw.edu  
WEB ADDRESS: people.uncw.edu/spackmank  

(This course information sheet is available now on my Web site. As the course proceeds, additional information and links will be added.)  

OFFICE HOURS: TR 11:00-12:00, or by appointment.  
(Actually, I’m available nearly all the time. Check with me after class, by phone or e-mail, and we’ll set up a mutually convenient time to meet.)  

CLASS MEETINGS: TR 9:30-10:45 in BR 164  


LEARNING OBJECTIVES: The goal of the course is to learn what combinatorics is, some of its techniques, and many of its applications. In brief, combinatorics is the art and science of counting. There are seven specific learning objectives for the course.

By the end of the course, you will be able to:

• Use the principles of combinatorial reasoning to solve existence, optimization and enumeration problems
• Select and apply appropriate models, formulas, tests and algorithms in problem-solving
• Use the computer software MAPLE both for routine combinatorial calculations and for manipulation of generating functions and recurrence relations
• Demonstrate a good understanding of combinatorial concepts and how they are used in a variety of applications
• Construct both graph models and enumeration models to apply the principles of combinatorics to real-life problems
• Correctly use combinatorial terminology both orally and in writing
• Construct short mathematical proofs of basic principles in combinatorics

Achievement of these objectives will require each student to solve lots and lots of problems.

COURSE CONTENT: The course comprises two main topics: graph theory and enumeration. We will cover most of Chapters 1-8 and Appendix A.4 of the text. A tentative syllabus of topics is attached.

COMPUTER USE: Most of the course topics do not really lend themselves to computer use. However, we will make occasional use of the mathematical software MAPLE, and possibly some additional applications and Web resources, for classroom demonstrations, homework and tests. The purpose of using the computer is primarily to implement tedious methods of calculation—the computer will never be used to replace reasoning—and to facilitate visualization of graph algorithms.

TESTS: There will be two in-class tests and a final exam. The in-class tests will be announced at least one week in advance. (Approximate dates are Thursday, Oct. 2, and Thursday, Nov. 6.) Ordinarily, no make-up tests will be given. If you foresee that you cannot avoid missing a test, notify me before the missed test. The final exam will be comprehensive, but will be weighed more heavily toward the second part of the course (enumeration) beginning with Chapter 5. The final exam is scheduled for Tuesday, December 9, 2008, from 8:00 - 11:00 am.
HOMEWORK: Suggested homework will be assigned after each class period. Additional written assignments will be collected approximately weekly, corrected, graded, and returned. The hand-in homework will require considerable time and thought, but the work must be your own.

ATTENDANCE: Attendance at each class is expected. Absences must be kept to a minimum for success in the course.

GRADING: Your final grade will be determined according to the following weighting.

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<tr>
<th>Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>25%</td>
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<tr>
<td>Test 2</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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<tr>
<td>Combined homework</td>
<td>20%</td>
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PLUS/MINUS GRADING: A plus or minus will be used as a possible grade modifier for final grades only, at the end of the semester. Factors that influence the judgment to assign a + or - (or neither) are: performance on the final exam, consistency of performance throughout the semester, proximity to a grade borderline, class participation and effort.

INCOMPLETES: A grade of I (incomplete) is given only if documented circumstances beyond the student's control (e.g., medical, legal) render the student unable to complete the course work and only if there is a reasonable possibility of passing the course. The grade I is not given for simply failing to meet the course requirements.

ACADEMIC HONESTY: Collaboration and discussion is encouraged on "suggested homework" problems. Homework assigned to be handed in must be done individually; that work must be your own. All tests are to be done without collaboration and without the aid of books or notes; calculators of any type are permitted and portions of the tests may require individual use of the computer. The Academic Honor Code (see the UNCW Code of Student Life) applies at all times, and rests on this principle: “It is … this institution’s stated policy that no form of dishonesty among its faculty or students will be tolerated.” All students are expected to read and abide by the Academic Honor Code.

STUDENTS WITH DISABILITIES: If you have a disability and need reasonable accommodation in this course, you should inform the instructor of this fact in writing within the first week of class or as soon as possible. If you have not already done so, you must register with the Office of Disability Services in Westside Hall, 1st floor (extension 7555) and obtain a copy of your Accommodation Letter. You should then meet with your instructor to make mutually agreeable arrangements based on the recommendations of the Accommodation Letter.

CELL PHONES: Please place cell phones and pagers on silent mode during class.

CAMPUS SAFETY: If you, or someone you know, ever feel unsafe for any reason, go to this Web site for campus and community resources available to help: http://www.uncw.edu/safe%2Drelate/

UNCW practices a zero-tolerance policy for violence and harassment of any kind. For emergencies contact UNCW CARE at 962-2273, Campus Police at 962-3184, or Wilmington Police at 911. For additional University or community resources visit http://uncw.edu/wrc/crisis.htm.

IMPORTANT DATES:

<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tr>
<td>Wednesday, Aug. 27</td>
<td>Last day to drop without a grade.</td>
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<tr>
<td>Thursday, Oct. 9</td>
<td>Last day to withdraw with a W.</td>
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<tr>
<td>Tuesday, Dec. 9</td>
<td>Final Exam.</td>
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TENTATIVE SYLLABUS:

August 21  1.1  Graph Models
August 26  1.2  Isomorphism
August 28  1.3  Edge Counting
September 2  1.4  Planar Graphs
September 4  2.1  Euler Cycles
September 9  2.2  Hamilton Circuits
September 11  2.3  Graph Coloring
September 16  3.1  Properties of Trees
September 18  3.2  Search Trees and Spanning Trees
September 23  3.3  The Traveling Salesperson Problem
September 25  3.4  Tree Analysis of Sorting Algorithms
September 30  4.1  Shortest Paths; 4.2  Minimal Spanning Trees
October 2    Test 1
October 7    FALL BREAK
October 9    5.1  Two Basic Counting Principles
October 14   5.2  Simple Arrangements and Selections
October 16   5.3  Arrangements and Selections with Repetitions
October 21   5.4  Distributions
October 23   5.5  Binomial Identities
October 28   6.1  Generating Function Models
October 30   6.2  Calculating Coefficients of Generating Functions
November 4   6.4  Exponential Generating Functions
November 6   7.1  Recurrence Relation Models
November 11  Test 2
November 13  7.3  Solution of Linear Recurrence Relations
November 18  8.1  Counting with Venn Diagrams
November 20  8.2  Inclusion-Exclusion Formula
November 25  A.4  The Pigeonhole Principle
November 27  THANKSGIVING BREAK
December 2   Last day of class; wrap-up of course, review, course evaluation
December 9   Final Exam