

Syllabus - MATH 2030

Combinatorics 1

Fall 2015

Instructor: Dr. M. Davidson
431 Machray Hall
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Office Hours:

Monday 10:00 – 11:00, Wednesday 9:00 – 10:00, Thursday 1:30 – 2:30

Lectures:

12:30–1:20 Monday, Wednesday, & Friday

Textbook: Fred S. Roberts and Barry Tesman, *Applied Combinatorics*, 2nd edition, Pearson Prentice Hall, 2005

Tentative Topics:

- ★ **Basic Counting:** (Chapter 2) Rules (incl. Product rule, Sum rule), permutations, r-permutations, subsets, r-combinations, binomial coefficients, probability, sampling with replacement, occupancy problems (e.g., distinguishable balls into indistinguishable cells), Stirling numbers of the second kind, multinomial coefficients, binomial expansion, generating permutations and combinations, and pigeonhole principle.
- ★ **Principle of Inclusion and Exclusion:** (Chapter 7) Counting derangements, number of objects having exactly m properties, hatcheck problem.
- ★ **Relations:** (Chapter 4) Binary relations, order (linear, partial), interval orders, lattices and boolean algebras, distributive and complemented lattices, modular lattices, lexicographic order.
- ★ **Recurrence relations:** (Chapter 6) Fibonacci numbers, derangements, method of characteristic roots.
- ★ **If Time Permits:** (Chapter 5, handouts) Introduction to generating functions, partitions of integers, and Ferrer diagrams.

Evaluation of Student Performance:

Quizzes	5 %	Occasionally, in class / lab, there will be short quizzes
Midterm Test 1	20%	Scheduled for October 14 th , 5:30 - 6:30
Midterm Test 2	25%	Scheduled for November 12 th , 5:30 - 7:00
Final Examination	50%	(3 hours) - to be scheduled by registrar

Website:

<http://home.cc.umanitoba.ca/~davidsom/>

Notes:

- ◇ The Voluntary Withdrawal Deadline is November 18th.
- ◇ If you miss the midterm, you will be assigned a grade of 'zero' unless reasons and acceptable supporting evidence are provided. There will be no make-up midterms.
- ◇ If you miss a quiz, you will be assigned a grade of 'zero' unless reasons and acceptable supporting evidence are provided. There will be no make-up quizzes.

Faculty of Science Statement on Academic Dishonesty

The Faculty of Science and The University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include, but are not limited to bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination personation.

Note: cell phones, pagers, PDAs, MP3 units or electronic translators are explicitly listed as unauthorized materials, and must not be present during tests or examinations.

Penalties that may apply, as provided for under the University of Manitoba's Student Discipline ByLaw, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. The Student Discipline ByLaw may be accessed at:

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html

Suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty are available on the Faculty of Science webpage:

<http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html>

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.