

MATH 436/636 Combinatorics - Spring 2014 - 3 Credits

Instructor: Dr. Jessica Striker

Office: Minard 406C

Office phone: 701-231-6985

Email: jessica.striker@ndsu.edu

Webpage: www.ndsu.edu/pubweb/~striker

Office Hours: Mondays 1-2 and 3-4, Wednesdays 1-2. (Subject to change - check Blackboard)

Course Description: Recurrence relations, formal power series, regular and exponential generating functions, enumeration, binomial coefficients and identities, Stirling and Catalan numbers.

Course Objectives: Combinatorics, in its simplest form, is the science of counting. But it's not always as simple as it sounds! Combinatorics connects to a great variety of other subjects, such as algebra, geometry, computer science, and even physics. During this course you will:

- Enumerate a variety of mathematical objects
- Investigate various statistics and actions on mathematical objects
- Transform mathematical objects while preserving these statistics and/or actions to find surprising connections
- Use *Sage* mathematical software and other online tools to investigate these objects, statistics, and actions
- Participate in a group project in which you will contribute to an online database/wiki of combinatorial statistics

Textbook: Introductory Combinatorics, 5th edition, by Brualdi. Please bring your textbook with you to class, as we will be using it regularly.

Course Website: is on Blackboard

Prerequisites: MATH 270

Approximate Course Outline: For an up-to-date schedule, see the Blackboard course page.

1. Introduction to Combinatorics. (1 week)
2. Permutations and Combinations. (3 weeks)
3. Binomial Coefficients and Partially Ordered Sets. (2-3 weeks)
4. Inclusion-Exclusion. (2 week)
5. Recurrence Relations and Generating Functions. (2 weeks)
6. Special sequences. (2 weeks)
7. Other topics. (1-2 weeks)

Attendance: Class attendance is a necessary part of learning in this course and is, in general, a very good idea.

Evaluation: Grades will be assigned according to the following rubric: 20% Homework, 60% Exams, 20% Project. Gradelines will be 90-100% A, 80-89% B, 70-79% C, 60-69% D, 0-59% F.

Homework: The only way to learn math is by DOING math. I will post each week's assignment and due date on Blackboard; homework will generally be due on Wednesdays. It would be a good idea to start working the problems as soon as you can after class, rather than right before the deadline. There will be no late homework accepted (you may always turn it in early!), but I will drop the lowest homework assignment. Students taking the course for graduate credit will be required to turn in additional homework problems.

Participation: Participation and in-class activities are an essential part of learning in this course.

Exams: There will be three exams in class, tentatively set for the following Fridays: February 14, March 28, and May 2. Unless otherwise announced, the exams will be closed-book and closed-notes. The purpose of exams is to determine what you have learned not only theoretically, but when applied to specific problems. Many of the problems on exams will be similar to homework problems, but some may be new applications of what we have learned in class. The grading on exams will take into account the presentation of solutions. Clear, unambiguous writing in which good judgment has been exercised in deciding what to emphasize is an important aspect of this course.

Missed exams will be handled on an individual basis. Make-up exams will be granted if arranged *in advance* for legitimate, documented absences.

Project: You will work in groups on a project during the course. The groups will present their projects during our scheduled final exam time, Friday, May 16, 10:30-12:30. Please DO NOT plan to leave campus before then. More information on the project will be given on Blackboard.

Academic Honesty and Conduct: Like any community of which you would want to be a member, the academic community is operated on the basis of honesty and integrity. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties at least as harsh as a zero on the assignment, and up to suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructors can be found at www.ndsu.edu/academichonesty.

Special Needs: Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with me and contact the Disability Services Office as soon as possible.

Extra Help: Please do not hesitate to come to my office hours to discuss a homework problem or any aspect of the course.

Congratulations: You have finished reading the syllabus; it is now time to learn some combinatorics!