MATH 5705 (Enumerative Combinatorics), 4 credits
TENTATIVE SYLLABUS-SPRING 2006 as of January 4, 2005

CLASS TIMES: 3:35pm-5:30pm MW (with 15 minute break)
CLASS LOCATION: VinH 364

TEACHER: Fristedt (pronounced Freested)
OFFICE: VinH 252
OFFICE PHONE: (612)-625-5081
OFFICE PERIODS:

COURSE MATERIALS: The book ‘Combinatorics, Second Edition’ by Russell Merris is required. An Approximate outline consists of Chapters 1-4, including aspects of Appendices A.1 and A.3, but excluding Sections 1.3, 1.4, and 1.10.

Three books are on reserve in the Mathematics Library in VinH 310:

- “How to Read and Do Proofs, an Introduction to Mathematical Thought Processes, Fourth Edition” by Daniel Solow
- “Applied Combinatorics, Fourth Edition”, by Alan Tucker

PREREQUISITE KNOWLEDGE: Math 2243 or Math 2573 or equivalent. Also, one of the following two: (i) Math 2283 or Math 3283; (ii) Math 2263 or Math 2574 or equivalent. Those who have not taken either Math 2283 or Math 3283 are advised, in advance of the beginning of Math 5705, to review the material on finite and/or infinite power series from the 1xxx-level calculus sequence, making sure that they are as comfortable with the series for \( e^x \) and \( \ln(1 + x) \) and the Binomial Theorem as they are with solving a quadratic equation.

EXAMINATION SCHEDULE:

3:35-4:45 W Feb 8 on Chap. 1 (class then beginning at 5:00)
3:35-4:45 M Mar 6 on Chap. 2 (class then beginning at 5:00)
3:35-4:45 M Apr 10 on Chap. 3 (class then beginning at 5:00)
10:30-12:30 Sa May 13, Comprehensive Final Examination
with heavy emphasis on Chap. 4

Notify me within the first week of the semester about any examination time conflict. See the Spring Semester Class Schedule to identify exactly what constitutes a final examination time conflict. If you are making travel reservations to follow Spring Semester, it is imperative that you do so promptly so as to be able to leave after the scheduled completion time of the Math 5705 final examination (which occurs within a few hours of the end of the University final examination period).

The tests and the final examination are closed book examinations for which calculators will be permitted.
HOMEWORK SCHEDULE: Due at beginning of class on:

- W Jan 25
- M Feb 20
- W Mar 22
- W Apr 19
- W Feb 1
- M Feb 27
- M Apr 3
- M May 1

HOMEWORK RULES: Homework for submission should be clearly written on 8 by 10.5 (or 8.5 by 11) sheets of paper, using only one side of each sheet of paper. Clarity, neatness, correct reasoning, correct answers, and good judgment about how much detail to include are all important, but neatness does not preclude the clear crossing out of some writing. The pages of homework should be fastened together, preferably with a staple but a paper clip is ok, and should be numbered—for instance, "Page 1 of 3", "Page 2 of 3", "Page 3 of 3". Also, the name of the student should appear on every page.

The maximum possible gross score on each homework assignment is 30 points. The best 6 of 8 homework assignments will contribute to the gross homework score—maximum possible equals 180. Division by 5 gives the net homework score, which will be used in the evaluation for the quarter; thus the maximum homework score is 36.

You are permitted and even encouraged to discuss problems with classmates, even those problems whose solutions you are asked to submit as homework. However, you are not permitted to look at what a classmate will actually submit, and it is required that the final writing of what you will submit be done without reference to notes taken in such discussions. This rule does not preclude reading those notes with care before beginning your final write-up.

EVALUATION: There are 240 possible points in the quarter: 40 on each of three 70-minute tests, 36 on homework, and 84 on the final examination. There is no set proportion of the various grades which will be earned; it is possible that all will get better than a C+ (and there are also extreme possibilities in the other direction). The grading on tests 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 Math 5705.

Missed tests and late assignments will be handled on an individual basis according to the following guidelines listed in order of decreasing importance:
(a) fairness by comparison to those students who have taken tests in a timely fashion and submitted homework on time; (b) convenience to me; (c) reasonableness toward the person who missed a test or submitted a late assignment. (Initially, assignments late by one class day will be accepted, consistent with the grading policy just described, but this flexibility might be changed depending on circumstances.)

In no case will an ‘I’ be given for a de facto withdrawal even if the student in question plans to take Math 5705 in the future. The appropriate symbol in such a case is ‘W’, a symbol granted and regulated by the various colleges. I have no power to give a ‘W’, so if, at the end of the quarter, I am presented a grade sheet with the name of a student who has stopped participating in the class, my only choice is to give an ‘F’ or ‘N’, depending on type of registration.
The University supplies the following definitions of grades, not refined to account for pluses and minuses:

A: achievement that is outstanding relative to the level necessary to meet course requirements;

B: achievement that is significantly above the level necessary to meet course requirements;

C: achievement that meets the course requirements in every respect;

D: achievement that is worthy of credit even though it fails to meet fully the course requirements;

S: The minimal standard for S is to be no lower than C-. The instructor or department must inform the class of this minimal standard at the beginning of the course. [For registrations in Math 5705 in Spring 2006 on the ‘S to N’ basis, ‘S’ is the equivalent of ‘C-’ or higher and ‘N’ is the equivalent of ‘D+’ or lower.]

F: Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

I (Incomplete): Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. Requires a written agreement between instructor and student.

The following is another University policy that relates to grades: Academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course. (Note: This is not the only University policy related to academic dishonesty.)

Sometimes when tests (and homework) are graded, grading errors are made, say due to some unusual correct approach being used. I am willing to reconsider the scoring of particular problems on tests. For such reconsideration please resubmit the solution booklet to me within three class periods from the day the booklets are returned by me and indicate on the cover the identifying number(s) of the solution(s) which you want me to reread, and possibly include a comment of where you want me to focus my attention in case you think you know of something I have overlooked. In no case will I reconsider regrading when the writer of the solution is standing besides me pointing out what was really intended in the solution. Grading of homework can similarly be reviewed. However, the awarding of partial credit on homework will be at least as stringent as on tests. Two reasons: (1) On homework there is more chance for checking one’s own work than there is on tests. (2) Individual tests count much more than individual homework assignments, so it is better to become familiar with course standards on homework than on tests.

AFTER FINAL EXAMINATION: I do not send grades by e-mail or give them over the phone; students are able to access their grades 24 hours after I submit them. I do not throw final examinations away until a year after they are given, and you may see your examination at a convenient time before then.
THE COMMENTS THAT FOLLOW ARE INTENDED TO HELP MAKE YOUR EXPERIENCE WITH THE COURSE A SATISFYING EXPERIENCE, AND TO AID YOUR LEARNING AND THEREFORE YOUR GRADE.

Except for 8xxx-level courses, one credit is defined as equivalent to an average of three hours of learning effort per week (over a full semester) necessary for an average student to achieve an average grade in the course. For Math 5705, a 4-credit course which meets 4 hours per week, a student should expect to spend an additional 8 hours per week on course work outside the classroom. Moreover, for this effort to have its maximum benefit, it should be spread somewhat evenly over the semester and within each week. Also, there will be some variation from student to student depending on mathematical background and mathematical aptitude. In particular, a student who is taking his first 5xxx-level mathematics course or who has not taken prerequisite mathematics in the recent past should probably spend more than the 8 hours per week mentioned above.

I strongly recommend that your first reading of any section in the textbook come before that material is discussed in class, and also that you also simultaneously try some of the non-assigned problems relevant to that material. When the subsequent class presentation follows along the lines of the reading, you may want to take notes sparingly if at all so you can give full attention to thinking and listening. And you may want to take somewhat more extensive notes when the class presentation has a character different from that in the book.

It is wise to make a good attempt at almost all of the problems, especially all those problems that are not similar to other problems in the same section. It is especially important to hone your skills on some of the easier problems before attacking the problems that you are required to submit. Often the total amount of time needed to do two easier problems and then one harder problem that you are to submit is less than what it would be to do the one harder problem only. I suggest the following: two or more classmates in Math 5705 create for themselves common assignments of problems, grade each others solutions, and then discuss them constructively.

Although attendance does not play a direct role in grading, my experience as a teacher indicates that there is high correlation between attendance and grades. It might happen during the semester that you will feel that a particular class session has turned out to be useless. It would be a mistake to let that experience lure you into intentional absenteeism. Late arrival to class can also adversely affect the learning experience. One can essentially lose all the benefit of what is said in the first 30 minutes of class by being 5 minutes late to class and then trying to catch up with what has already been written on the board.

I will spend time in class discussing a wide variety of things that are not easily communicated in writing. For instance, sometimes there is a natural tendency to want to prove something by starting with the thing to be proved and going through a sequence of steps to arrive at the given information. A student who misses class when discussions about the incorrectness of this method of proof are taking place might feel that my grading on tests is harsh for this kind of error, whereas I, knowing that I have given this matter significant attention in class, have high expectations for avoiding this type of error.