

Math 461 Advanced Topics in Discrete Mathematics

INSTRUCTOR:	Heather Jordon
OFFICE:	Stevenson 312J
PHONE:	438-7838
E:MAIL:	hjordon@ilstu.edu
OFFICE HOURS:	MW 11:30–1:00, and by appointment.
COURSE HOME PAGE:	www.math.ilstu.edu/hjordon/Math461/

Texts: *Graphs, Groups and Surfaces*, Completely revised and enlarged edition by Arthur White; *Design Theory* by C.C. Lindner and C.A. Rodger; *Graphical Enumeration* by Frank Harary and Ed Palmer as well as other texts pertaining to class. These books will be on reserve at the library.

Course Content: This course will focus on Chapters 5, 6, 8, 10, and 12 of *Graphs, Groups, and Surfaces*, Chapters 1, 3–5 of *Design Theory*, and Chapter 1 of *Graphical Enumeration* as well as additional topics pertaining to class. Our three main areas of study are topological graph theory (drawing graphs on surfaces), designs (partitioning points into blocks), and graphical enumeration (counting the number of graphs with a specified property).

Prerequisites: Some general knowledge of graph theory and group theory.

Homework: Daily reading and homework assignments will be given. These will almost always be posted on the course web site. From the daily homework assignments, selected problems will be collected and graded. There will be **ten** problem sets collected throughout the semester (usually every week). These problem sets will be worth 20 points, each giving 200 points towards your final grade. **When a problem has been selected to be turned in, you are not to discuss it with anyone but me.** It may be the case that you have already discussed an individual problem with another student before it was assigned. In this case, you must state on your write-up the student(s) you have worked with. **Late homework will be accepted one class period after it is due at a 50% discount.**

A word about collected problem sets ... problems assigned for collection should be placed **in order**, i.e., if problems 4, 9, and 13 are assigned, then your assignment should have the problems in that order. **Staple** your assignment if it is more than one page. **No raggedy edges**, i.e., pages torn out of a notebook should be trimmed. Remember, you want to show me your best work on the collected problem sets. Therefore, make it **neat** and **readable**. Homework that does not follow the above guidelines could be returned without credit.

Problems similar to the those assigned although not necessary graded could appear on exams. **Therefore, you should make every attempt to complete all problems**

assigned, regardless of whether or not they were collected and graded. You should also try to complete the daily homework assignments in a timely manner, i.e., before the next class period.

Exams: There will be **three** exams corresponding to the three topics we will study. The exams will be worth 100 points each and will be given as take-home exams.

Withdrawal: The last day to withdraw and receive a grade of WX is Friday, 13 October 2006.

Academic Honesty: You are strongly encouraged to form study groups to assist in learning the material and completing the daily homework assignments. **However, once an homework problem has been selected for individual grading, you are to no longer discuss it with your peers** (you may discuss it with me), and the write-up of your solution **must** be your own. If you had discussed a particular homework problem with another student before it was selected for grading, your write-up must include a statement like the following “I worked on this problem with Suzy Q.” **Take-home exams are obviously not to be discussed with anyone except me.** You are also only allowed to use the course books and handouts as resources for take-home exams.

Special Needs: If you need an accommodation for which you are eligible, please inform me at the beginning of the semester (during the first two weeks of class) so that this can be implemented.

Grades: A breakdown of the points is as follows:

Homework	200
Exams	300
Total	500

Grading Scale: Grades for the course are **based** on the following percentages:

A [90, 100] **B** [80, 90) **C** [70, 80) **D** [60, 70) **F** [0, 59)

General Advice: This is an advanced course in discrete mathematics, but it is also a course that emphasizes careful expression of logical arguments. Homework problems and test questions require clear and concise explanations of why something is true. Words like “construct”, “show”, “obtain”, “determine”, etc., explicitly state that a proof is required. If you are unsure about whether or not a problem requires a proof, please ask. Use *complete sentences* that accurately state your ideas. Results covered in class can be used without proof if you state them correctly. *Mean what you say.* Be honest with yourself. If you haven’t completed a proof or don’t understand how the conclusion follows, then don’t claim the conclusion. Examples given where the conclusion holds usually do not constitute a proof. Statements with a number as the parameter must be proved for all

possible instances. *Say what you mean.* State your ideas accurately. Omitting words can lead to sentences that mean something other than you intended. Define any terminology you introduce. Be careful not to use the same notation or terminology for more than one mathematical object.

Recopy your notes after every class period and before attempting the homework. You will be amazed at how much better you learn the material by recopying your notes and how much easier the homework will be. Recopying gives you a chance to go over what you have just learned and further cements these ideas in your mind.

Start the homework early. If the statement of an exercise, or what needs to be done to complete it, is unclear, thinking about it early allows time to ask for clarification, by email or in person. If you are having trouble understanding or proving something, please come say “here is what I was trying, but it doesn’t seem to work; what am I doing wrong?” Also, trying to explain a proof orally to another person is a valuable way to find a better proof or expose gaps in an incorrect proof.