

Syllabus

Math/CS 240 - Introduction to Discrete Math

Spring 2006

Lecturer: Rafe Jones

Office Hours: Tuesday 4:00–5:30, Weds 3:00–4:30, or by appointment

Office: 309 Van Vleck

Phone: 263-1634

Email: jones@math.wisc.edu

TA: Paul Jenkins **Email** pjenkins@math.wisc.edu

Course Web Site: <http://www.math.wisc.edu/~jones/Math240/>

Text: Rosen, *Discrete Mathematics and its Applications*, 5th ed., McGraw Hill.

Lecture: TTh 9:30–10:45AM (Chem 1361)

Discussion Sections:

303 (Paul Jenkins) M 11:00–11:50 AM
in B333 Van Vleck

304 (Paul Jenkins) W 11:00–11:50 AM
in B333 Van Vleck

307 (Paul Jenkins) M 1:20–2:10 PM
in B333 Van Vleck

308 (Paul Jenkins) W 1:20–2:10 PM
in B333 Van Vleck

Exam schedule:

Exam 1: 5:30–7:00pm Wednesday, March 1 (room TBA)

Exam 2: 5:30–7:00pm Wednesday, April 12 (room TBA)

Final Exam: 2:45–4:45PM on Tuesday, May 9 (room TBA)

Acceptable excuses for missing an exam include only official university exercises (classes, labs, etc). In these cases a make-up exam will be given. If at all possible, please notify me of such circumstances at least a week before the exam. The location of the final will be announced on the Registrar's homepage in early December. The final exam is cumulative.

Course Goals I hope that by the end of the semester:

1. You will have become acquainted with a variety of mathematical techniques and topics that will serve you well in future Math and CS courses, and also in daily life. These include:
 - (a) logic and set theory
 - (b) functions and their growth
 - (c) algorithms
 - (d) induction and recursion
 - (e) counting and finite probability
 - (f) recurrence relations
 - (g) equivalence and partial-order relations
 - (h) elementary graph theory including trees, tree-searching, and traversal, and graph coloring
2. You will have sharpened your ability to reason mathematically and solve problems requiring original thought.
3. You will have learned to recognize and write correct short mathematical proofs.

The homework exercises and exams will be constructed to further your progress towards all three goals.

Course Content: This course is on the fundamentals of discrete (as opposed to continuous) mathematics; the word discrete here means “consisting of unconnected distinct parts.” The number of topics that fall under this description is far too big to explore fully in one semester – indeed it may be too big to explore fully in one lifetime – so our course will consist of brief introductions to many different topics. The principal topics are mentioned in Course Goals above. Although we will not go into great depth in any topic, there are many connections between the topics and ideas we will cover. In the book, we will cover Chapters 1 - 5 and parts of Chapters 6-9.

Math/CS 240 is a requirement for the BS degree programs in Computer Engineering offered by the ECE Department and in Computer Science offered by the CS Department. It is now a prerequisite for (getting into) advanced computer science courses (CS 367, 520, and 577). The course is a foundational math course for this program, and is meant to be taken early in the program; it is also a good foundation for higher mathematics courses. The prerequisite for the course is Math 221 (Calculus I), and the course will be taught roughly on the level of Math 222 (Calculus II) although it will not be as technical as Math 222.

Questions: If you have questions about any aspect of the course, the first place you should go is the course web page (URL given at the top of the page). It is a veritable treasure trove of course-related information, and will be updated frequently. Among the things you’ll find there are this syllabus, homework assignments, exam-related announcements, review tips, and links to old exams.

Grades: Course grades will be based on a possible total of 400 points, determined as follows:

Discussion Score (includes homework)	50 points
Exam 1	100 points
Exam 2	100 points
Final Exam	150 points

The Discussion score is broken down as follows: 40 points for homework (see Homework section) and 10 points for participation. Students who attend nearly all the sections and come prepared with questions will receive the full 10 points. Those who miss many sections or are conspicuously not participating (e.g. sleeping, surfing the internet, etc.) will lose points.

Grades will be based on the following grade-schedule (and exams will be constructed with this standard in mind.) If appropriate, I will rescale exam scores (by adding points) to take into account this schedule (I will never subtract points); with the grade-schedule you are better informed on how you are doing and how much you may need to improve.

Grade	Accomplishment level	Points	Percentage
A	superior	370 ↑	92.5 ↑
AB	excellent	355 ↑	88.8 ↑
B	proficient	325 ↑	81.3 ↑
BC	good	310 ↑	77.5 ↑
C	acceptable	280 ↑	70.0 ↑
D	mediocre	230 ↑	57.5 ↑
F	unacceptable	0 ↑	0 ↑

Homework: The homework exercises are the most critical component of your learning in this course. The best way to cement your understanding of this subject is to work through a wide variety of problems, so it is vital that you do the homework. Moreover, the questions on the exam will be very similar to the kinds of exercises given in the homework. As mentioned in the Course Goals section, one of the aims of this course is to help you sharpen your original thinking and problem-solving skills. Thus many of the homework problems will be different from the examples done in class or the text, and require original thought.

Assignments are posted on the homework page of the course web site, which will be updated about once a week. Homework is due in the folder outside Van Vleck 820 by 10 pm each Wednesday. On exam weeks the homework may be due earlier. Late homework is not accepted. It is essential that you begin the homework early – do not expect to do it all the two days before it's due!

As you can see in the grading scheme above, the homework has an effect on your grade. Each assignment will be graded out of 10, with four points awarded for completeness, and the remaining six awarded for correctness of two problems chosen by the TA. Turning in a complete assignment every time is the easiest way to boost your homework grade.

Learning often happens best when we are forced to explain our work or thinking to someone else. Sometimes just verbalizing your mathematical thoughts can deepen your understanding. Thus, I encourage group working on the homework (groups of two or three tend to be most effective). However, you must still each write the problems up on your own. And of course there will be no group consultations during exams.

Please prepare your homework according to the following rules (failure to do so may result in your getting no credit for the assignment):

1. Write your name clearly at the top of the first page.
2. Put the problems in order, indicating clearly any you have skipped.
3. STAPLE your homework. Paper-clips, folded corners, etc. are not accepted. No matter how sturdy the corner-fold seems, while the grader is flipping through your homework during grading, it will come undone.
4. Write clearly.
5. If you naturally do the problems out of order or with very messy script, then seriously consider rewriting them neatly on a new sheet of paper after you are done and turning that in.

Also, note that a correct solution to a homework problem consists of more than just writing the correct answer. Homework solutions should also include a *convincing argument* that your solution is the correct answer. Write enough steps and work that your thought processes are clear.

Midterm exams: The questions on the exam will be very similar to the kinds of exercises given in the homework. Exams will include material covered through the Thursday prior to the exam (i.e. everything except the class the day before the exam). Students will have their exams returned within a few days, and can expect to see useful comments where points have been deducted.

Other Policies and Suggestions:

Calculators

You are encouraged to use calculators while doing the homework if complicated computations arise. However, overuse of calculators can actually impede your understanding of the ideas. In general calculators should only be used in the final stages of a problem.

It is acceptable to use calculators on exams to do arithmetic computations, but the computations are to be exact. So an answer which has $\sqrt{2}$ in it is to be presented as such and not as 1.414. In general, I am not concerned much with arithmetic calculations.

Preparing for class

You should expect to spend at least five hours per week outside of class studying. “Studying” does not mean just doing assigned exercises. The number of problems we assign is probably not enough for most students. It

is your responsibility to find and work additional exercises as needed. The five hours (minimum) of studying includes reading the texts (before and after the material is covered in lecture), writing up problems to turn in for feedback, working additional problems as needed, formulating coherent questions for your TA, and reviewing.

The lectures are intended to supplement and highlight the reading and exercises, and you will be expected to learn and understand the lecture material as well as the reading and assigned exercises. **Because of time constraints, it isn't possible to do examples of every kind of HW problem in class, nor is it possible to discuss everything you need to know in class.**

Here are some recommendations for how to get the most out of class. You should quickly read the material in the text **before** it is covered in lecture so that you'll know what to listen for. After the lecture, the big ideas will stand out for you, and some of the most difficult ideas will have been clarified so that when you sit down to **re-read the text carefully**, you will be able to focus on the details. Then, when you do the exercises, that is where you will actually **start to learn the material**. The goal of working the exercises is not to just get them done and hand something in. The goal is to learn something. *Please give yourself enough time to learn something from the problems.* If a problem is difficult, think about what makes it difficult. If you had to get help (from a person or a book) to finish a problem, don't just move on to the next one. Find more problems similar to that one and do them until you no longer need help.

Preparing for Discussion section Your weekly discussion section gives you a chance to discuss anything related to the course. You can go over problems, ask questions on examples or ideas discussed in lecture, review, etc. You will get the most out of your discussion section if you have already spent considerable time working on the problems or thinking about the ideas from lecture.

Missing a lecture

If you miss a lecture, you should contact a Note Buddy or other classmate as soon as possible to find out what you missed and to get a copy of the notes. Please do not expect me or the TA to give you notes or repeat a lecture for you during office hours.

Getting Help: Your lecturer and your TA will hold regular office hours throughout the semester. Whenever you have a question (even a homework question!) or need assistance in the course, you should see one of us right away. You should also always feel free to send email privately to me or the TA when you have a question about the course or the material. If the question cannot be answered over email, you might be instructed to come to office hours or to set up an appointment. There are also other places on campus to go for help. Other resources include

MathLab Free drop-in tutoring in room B227 Van Vleck, beginning in the second week of classes.

<<http://www.math.wisc.edu/~mathlab>>

Math Tutorial Program Free small group tutoring in a structured setting. A significant time commitment is required. Students may need a referral from an instructor. See the Math Tutorial program director, Dr. David Camacho, in room 321 Van Vleck. <<http://www.math.wisc.edu/~tprogram>>

GUTS Free small group, drop-in, and individual tutoring at various locations on campus.

<<http://guts.studentorg.wisc.edu>>

Private Tutors Cost varies. See the receptionist on the second floor of Van Vleck (or check the web) for a list of tutors. <<http://www.math.wisc.edu/~paulson/tutor.html>>

Note Buddies:

Name

Email

Phone

1. _____

2. _____