

MTH U230 - Discrete Mathematics

Fall 2004

Course Information

MTHU230, Discrete Mathematics

Time and place: Mon, Wed, Thur at 10:30-11:45, in 435 RY

Text: K. Rosen, Discrete Mathematics and Its Applications, Fifth Edition. WCB/McGraw-Hill, 2003

Instructor: Dr. Hanai Sadaka

Office, Phone, and email: 540NI, 617-373-5530, hsadaka_1999@yahoo.com

Office hours: Mon, Wed 11:50 AM - 1:15 PM

Course Description

The course provides the discrete portion of the mathematical background needed by students in electrical and computer engineering. Here is an (approximate) list of topics we are planning to cover (the numbers refer to sections in Rosen's book):

Chapter 1.

- 1.1 Logic
- 1.2 Propositional equivalences
- 1.6 Sets
- 1.7 Set operations
- 1.8 Functions

Chapter 10.

- 10.1 Boolean functions
- 10.2 Representing Boolean functions
- 10.3 Logic gates

Chapter 3.

- 3.2 Sequences and summations
- 3.3 Mathematical induction
- 3.4 Recursive definitions and structural induction

Chapter 4.

- 4.1 The basics of counting
- 4.3 Permutations and combinations
- 4.4 Binomial coefficients

Chapter 6.

- 6.1 Recurrence relations
- 6.2 Solving recurrence relations

6.5 Inclusion-exclusion
6.6 Applications of inclusion-exclusion

Chapter 8.

8.1 Introduction to graphs
8.2 Graph terminology
8.3 Representing graphs and graph isomorphism
8.4 Connectivity

Chapter 9.

9.1 Introduction to trees
9.4 Spanning trees

Grading

Grading will be based on four components:

- (1) Daily homework (5%)
- (2) Weekly 30 minute quizzes (35%)
- (3) The midterm (20%) and
- (4) The final exam (40%)

Numerical-to-letter grade conversion is according to the following scheme:

$A \geq 93.33 > A- \geq 90 > B+ \geq 86.66 > B \geq 83.33 > B- \geq 80 > \dots > D \geq 63.33 > D- \geq 60 > F.$

The homework will be counted on a “check-off” basis. It does not have to be correct, but you do have to show evidence of working on every assigned problem. The quizzes are closely based on the homework. The midterm and final exam are more integrative in nature, and will generally require more thought.

Homework Assignments

This is a tentative schedule, subject to modification in class. You are responsible for any update announcements. Homework is due the class after it was assigned.

read Section 1.1; pp. 15-17, #1 (e,f,g), 3 c,d), 15.
read Section 1.2; pp. 16-18, #7 (a-f), 21, 23; p. 26, #7, 13.
read Section 1.6; p. 85, #1, 4, 20, 24 (a), 25.
read Section 1.7; pp. 94-96, #1-3, 10, 21, 40-43.
read Section 1.8; pp. 108-109, #1, 7, 10-13, 16, 17, 19 (a-c).
p.109, #25-28, 31.
read Section 10.1; p. 708, #3 (a,b), 7, 10, 11.
read Section 10.2; p. 712, #1, 3, 12-14.
read Section 10.3; p. 718, #1, 3, 6, 7, 15.
review Sections 10.1-10.3; p. 708, #29; p. 712, #4,5; p. 718, #5, 8.
read (relevant parts) of Section 3.2; pp. 236-237, #3, 7, 13, 15, 16, 19, 20.
p. 237, #21, 23; read Section 3.3; p. 253, #1, 2. 5-7.

p. 253, #9, 13, 15, 19.
253-254, #11, 25, 31; read Section 3.4 up to Example 6; pp. 270-271, #1d), 3a), 13, 15.
p. 253, #17; read Section 4.1; p. 310, #1, 7, 8, 11, 12, 16.
p. 311, #19, 25, 29-31.
read Section 4.3; pp. 324-325, #2, 3, 5, 6, 13, 17.
pp. 325-326, #20, 30, 31.
read Section 4.4; p. 333, #2, 4, 7, 9, 13.
review the material in Chapters 1 and 10 (including old homework and quizzes 1-3).
review the material in Chapters 3 and 4 (including old homework and quizzes 4-5).
read Section 6.1; pp. 409-410, #1 (a,b), 5 (a-d), 9 (a, c, e, g), 25, 27.
pp. 410-411, # 29, 40, 41.
read Section 6.2 (pp. 413-416); p. 423, #3(c,d,e), 4(a,b,d), 7, 8.
read Section 6.5; p. 456, #1, 3, 5, 7, 11, 13.
p. 456, #17, 18; read Section 6.6, pp. 457, 460-461 (the number of onto functions); p. 464, #8, 9.
read Section 6.6; pp. 461-464 (derangements); p. 464, #13, 15, 17.
read Section 8.1; pp. 544-545, #11, 13, 19.
read Section 8.2; pp. 554-555, #1, 5, 7, 13, 17.
pp. 555-556, #19, 23, 24, 25, 27.
p. 556, #29; read Section 8.3; pp. 564-565, #5, 9, 11, 34-36.
pp. 565-566, #39, 41, 57, 69; read Section 8.4; p. 575, #1, 5.
p. 576, #23-26.
pp. 641-643, #1, 3, 9, 11a), 12a), 17, 19 (read relevant parts of Section 9.1).
p. 643, #31; pp. 685-686, #5, 7, 9 (read relevant parts of Section 9.4).

Last day, course evaluations, Makeup quizzes

Make up Policy

At the end of the semester you will have the opportunity to make up two quizzes of your choice. The makeup quizzes will resemble but not be identical to the originals. I will use the makeup score only if it is greater than the original score, so you cannot be hurt by this process. I encourage you to use this as a means of turning the quizzes into a learning experience. However, if you miss a quiz it will count as a zero, unless you select it as one of your quizzes to make up.

The only other make ups would be exceptional cases in which, due to documentable circumstances beyond your control (eg., you are in the hospital or in jail) you cannot be present at a scheduled exam. If you provide acceptable documentation you may be granted an "exceptional make up". Unlike the end-of-semester make ups, this will be harder than the original it replaces. Note that the quiz makeup policy does not apply to the midterm exam. Do not miss the midterm exam.

All students without legitimate conflicts will take the final exam at the scheduled time. Do not make travel plans that conflict with the final exam which is during the week of December 10, 13-17.

Other Policies

It is your responsibility to be aware of any changes in the syllabus announced in class. You are expected to attend every class, and if you miss a class you are nevertheless responsible for all information (course content, test schedule changes, policy changes, etc.) given in that class. A reasonable effort will be made to keep the on-line syllabus up-to-date but in-class announcements take precedence and are definitive.

The grade of I (Incomplete) is rarely given and cannot be used to salvage a failing grade. It is intended to deal with unexpected difficulties in completing the course that lie beyond the student's control. Occur late in the semester, and with the student in good standing (with a grade of at least C). (The standard example is missing the final exam due to illness. However, the illness must be documented and truly incapacitating.)

It is University policy that no grade, including and Incomplete, can be changed after one year, unless authorized by the Academic Standing Committee.

If you have a concern about the course or the instructor that cannot be resolved by speaking with the instructor, please contact Professor Donald King (Vice Chair), 447LA, x5679, email: donking@neu.edu.