MATH 240 (Elementary Discrete Math.) SYLLABUS, Fall Sem. 2001-02
Lec. 1, MWF 11:00-11:50 p.m, B-115 Van Vleck

Prof. Richard A. Brualdi
Office: 725 Van Vleck Hall

Text is:
Discrete Math. & its Applics.
4th ed., by K. Rosen

Tel: 262-3298; E-mail: brualdi@math.wisc.edu

Office Hours: Monday (3:30-4:30 p.m.), Tuesday (3:30-4:30 p.m), Friday (12:05-12:55 p.m.)

Web: http://www.math.wisc.edu/~brualdi

Through DoIT I am creating an email list for this course through which I can communicate with you over the Internet.

Please Read Carefully for Very Important Information

Course Content As the title *Elementary Discrete Mathematics* suggests, Math 240 is a course on the fundamentals of discrete (as opposed to continuous) mathematics. It is a requirement for the BS degree program in Computer Engineering offered by the ECE Department. 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. You will be introduced to many new concepts and topics, and we shall not spend a long time on any one of them. The prerequisite for the course is Math 221 (Calculus I), and the course will be taught on the level of Math 222 (Calculus II).

Briefly, the topics covered in the course include: logic, set theory, functions and their growth, Boolean functions, the integers, algorithms, relations and digraphs, inductive and recursive definitions and arguments, fundamentals of counting and discrete probability, recurrence relations, relations (equivalence, partial order, ...), elementary graph theory including trees, tree-searching, matchings, graph coloring, and networks. While there are many new concepts and topics, there are many connection between them.

Study Habits, Exercises, Exams and Grades This course requires considerable work. You should devote **6-8 hours a week** to it - reading and re-reading the book, thinking about the ideas and concepts and how they relate to each other, talking with some of your classmates about them (study groups are encouraged), doing exercises etc. If you are not prepared to make the effort, you should re-examine the reasons why you are taking this course. There will be regular reading and homework assignments (see attached). The reading assignments (sections of the book) are best done for the first time **before** the class in which they are covered. In the class, I will discuss the material. Of course, I will write stuff on the chalkboard but I will not write the book on the board! The class and the book will reinforce each other. We will be covering many pages in the book. *In the class lectures, you will learn what emphasis I am placing on the various topics in the course, and this should inform you on how to study what is in the book.* The assigned exercises also give an indication of the emphasis in the course.

Exercises There will be two kinds of exercises:

(A) Those to do and check your answers (after you've done them!) with those given in the back of the book. I have given you a minimal list of exercises; there are many other similar exercises in the book that you can choose to do. These exercises are to help you learn the material, reinforce the new concepts, and develop technique in problem-solving. If you don't do these exercises, then when it comes time for the in-class exams, you won't have the experience and facility to complete the exams in the alloted time.

(B) Six exercise sets, roughly one set every two weeks, to be handed in and graded. **These exercise sets will have a due date in class; no late assignments will be accepted. Please leave them on the desk as you enter the classroom on the due date.** Your work on these exercises should be well-presented in good English, and not written carelessly, and it should be **your** work. **Write your solutions as if they were part of your resume for a high-paying job you really want!** It is important that you do both kinds of exercises with the exercises (A) from a given chapter completed **before** you do exercises (B) from that same chapter. The exercises in these six exercise sets are not intended to be representative of what to expect on exams, and that is one reason why you should do exercises (A). The exercises (B) are some of the more difficult ones.

Exams There will be **two in-class exams** during the semester (**each worth 100 points**) and a **final exam** (**worth 150 points**) - see the accompanying schedule. **There will be no make-up exams.** The six hand-in exercise sets are worth a total of **50 points**.

Grades will be based on a **total of 400 points** according to the following standard (and exams will be constructed with this standard in mind):

Grade	Accomplishment level	Points
A	**superior**	370 ↑
AB	**excellent**	355 ↑
B	**proficient**	325 ↑
BC	**good**	310 ↑
C	**acceptable**	280 ↑
D	**mediocre**	230 ↑
F	**unacceptable**	0 ↑

You are encouraged to form study groups with your classmates; things not clear to you may become obvious when you try to explain them to others or when you hear other points of view. Sometimes just verbalizing your mathematical thoughts can deepen your understanding.

Calculator Policy 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.

Attendance It is expected that each student will be present at all of the classes and will be an active class participant. **It is rude and disruptive to both me and your fellow students to leave a class before the bell has sounded or the class has been dismissed for for the day.**

Office Hours Listed on page 1. These are for students who need additional help beyond that given in the class; **office hours are not substitutes for class**.

Other Information

GUTS: GUTS (Greater University Tutoring Service) is a free peer tutoring service offered either as one on one, in small groups, or in drop-in centers. The drop-in centers are located in Gordon Commons, Helen C. White Library, Kronshage Hall, and Union South. The GUTS office is 303 Union South (263-5666). They also have an exam file in their office.

Private Tutors: The receptionist office on the 2nd floor of Van Vleck has a list of private tutors.

Note to McBurney Disability Resource Center students: Students of the Center who are recommended for some accomodation (e.g., extended time on exams) should contact the instructor about this no later than September 12.

The Department of Mathematics; Van Vleck Hall (VV):

Chair: A. Adem (219 VV)

Associate Chair: D. Uhlenbrock (421 VV)

Department Administrator: G. Novara (223 VV)

Undergraduate Advisor: D. Shea (316 VV)

TA Supervisor: R. Wilson (411 VV)

Undergraduate Secretary: P. Conklin (203 VV)

Sexual Harrassment Contact Persons: G. Benkart (817 VV), D. Rivard (B207 VV)

Access and Accomodation Coordinators: D. Uhlenbrock (421 VV)

Faculty Minority Liaison: D. Rider (821 VV) [Information available concerning diversity and multicultural issues (e.g. support services, academic internships and grants/fellowships). Prof. Rider is also available to discuss minority students' concerns about mathematics courses: 263-3603, drider@math.wisc.edu)]

SCHEDULE

With possible minor deviations, we shall follow the schedule (referring to sections in the book):

Week of	Sections
September $3-7$	$1.1-1.3$
September $10-14$	$1.4-1.6, 9.1-9.2$
September $17-21$	$1.7-1.8, 2.1-2.2$
September $24-28$	$2.3-2.5$
October $1-5$	$2.6, 3.1-3.2$
October $8-12$	$3.2-3.3$
Friday, October 12	**In-Class Exam**
October $15-19$	$4.1, 4.3$
October $22-26$	$4.4, 4.6, 5.1$
Oct. 29 - Nov. 2	$5.2, 5.5, 6.1$
November $5-9$	$6.3-6.5$
November $12-16$	$6.5-6.6$
November 16, Friday	**In-Class Exam**
November $19-23$	$7.1-7.2$
November $26-30$	$7.3-7.5$
December $3-7$	$7.6, 7.8, 8.1$
December $10-14$	$8.3, 8.5-8.6$
December 20, Thursday	**Final Exam 2:45-4:45**

Exercise List

Below is a minimal set of exercises on the topics covered in the first examination. These should be worked out on a regular basis - not just before the examination. If you need more exercises, just pick some near those assigned. There are also review questions and supplementary exercises at the end of each chapter. The **exercises in boldtype** are those to be handed in on the following Mondays:

Sept. 17: those from sections 1.1-1.6, 9.1-9.2

Oct. 1: those from sections 1.7-1.8, 2.1-2.5

Oct. 15: those from sections 2.6, 3.1-3.3

Oct. 29: those from sections 4.1-4.4, 4.6, 5.1

Nov. 12: those from sections 5.2, 5.5-5.6, 6.1, 6.3-6.5

Dec. 3: those from sections 6.6, 7.1-7.5

Experience has shown that a student's performance on examinations is directly related to having worked through the assigned exercises in a timely manner.

Section	Exercises
1.1	$1, 3, 5, 7, 9, 15, 19, 23, 29, \mathbf{40}$
1.2	$5, 7e, f, 9e, f, 19, \mathbf{24}, 25$
1.3	$7, 9, 13, \mathbf{14}, 21, 25, 35$
1.4	$\emptyset$
1.5	$3, 11, \mathbf{16}, 19, 21, 23, 25, 29, 31$
1.6	$5, 7, 15, 19, \mathbf{20}, 29, 33, 43, 45, 47, 57$
9.1	21
9.2	$1, 3, 5, \mathbf{6}$
1.7	$9, 15, 17, \mathbf{18}, 27$
1.8	$1, 5, 7, 9, 15, , 19, 23, 25, 51, 53, \mathbf{62}$
2.1	$3, 5, 9, 11, 15, \mathbf{18}, 19$
2.2	$3, 5, 7, \mathbf{8}, 11$
2.3	$7, 11, \mathbf{12}, 15, 17, 18, 19, 21, 22, 23, 29, 32, 35, 37, 41, 45c, 47, 49$
2.4	$1b, d, 5a, 7c, 9, 11b, 12$
2.5	$1c, g, 3, 5, 7, 9, 11, 13, 19, 21, \mathbf{22}, 23, 25, 35, 36$
2.6	$3b, 11, 15, 23, 29, 31, 32$
3.1	$3, 7, 11, 17, 21, 23, \mathbf{30}, 37, 43, 49, 65$
3.2	$7, 9, \mathbf{10}, 13, 15, 17, 21, 29, 31a, b, 52$
3.3	$3, 5, 11, \mathbf{14}, 15, 23, 27, 31, \mathbf{32}, 51$
4.1	$3, 7, 8, 15, 16, 19, 23, 27, 29, 30, 31, \mathbf{38}, \mathbf{42}, 47$
4.3	$7, 11, 17, 19, 20, \mathbf{22}, 27, 39, 40, 50$
4.4	$5, 6, 8, 9, 12, 13, 16, 23, \mathbf{28}, 31, \mathbf{32}$
4.6	$1, 5, 8, \mathbf{10}, 13, 17, \mathbf{18}, 21, 25, 27, \mathbf{34}, 37, 46, 47$
5.1	$3., 5, \mathbf{10}, 13, 17, 19, 21, \mathbf{22}, 29$
5.2	$3, \mathbf{6}, \mathbf{7}, 9, 13$
5.5	$5, 7, \mathbf{10}, 11, 13, 15, \mathbf{16}$
6.1	$5, 13, 15, 21, 27, 29, 33$
6.3	$1, 7, 9, 11, 15$
6.4	$11, 13, 16, 17, 19, 21, 23, 25, \mathbf{28c}, \mathbf{d}$
6.5	$1, 3, 5, \mathbf{10}, 11, 13, 14, 25, 27, 28, \mathbf{30}, 35, 41$
6.6	$1, 3, 8, 9, 11, 13, 15, 19, 21, 23, \mathbf{24}, 25, 27, 29, 31, 35, \mathbf{36}$

More to come