MATH 541 SYLLABUS, Spring Semester, 2002-03 Academic Year
Lec. 1, MWF 8:50 - 9:40 AM, B105 Van Vleck

Prof. Richard A. Brualdi
Office: 725 Van Vleck Hall
Tel: 262-3298; E-mail: brualdi@math.wisc.edu
Office Hours: Mon. (3:30-4:30 PM), Tues. (3:00-4:00 PM), Fri. (9:55-10:45 AM)
WWW: http://www.math.wisc.edu/~brualdi

Through DoIT I have created an email list to communicate to the class.

Please read carefully

Course Content This is a first course in abstract algebraic systems that capture properties of many familiar systems such as: the system of real numbers (or integers) with the basic binary operation of addition, the system of nonzero real numbers with multiplication, the system of bijections of a set (permutations) with the basic binary operation of composition, the system of nonsingular matrices of a given order with matrix multiplication. We shall develop properties common to all of these groups using the axiomatic approach. Another type of system with two binary operations is called a ring. Examples of rings include the real numbers (addition and multiplication), matrices of a given order (matrix addition and multiplication), integers (addition and multiplication), and polynomials in a variable x (polynomial addition and multiplication). We shall also develop properties common to these systems using the axiomatic approach. A special kind of a ring is a field, and you may have introduced to fields in your elementary linear algebra course.

Math 541 may for many of the students be the first proof-oriented course. Students are expected to read (and study) proofs and be able to understand their meaning, their structure, their validity. Students are also expected to construct their own proofs and write them out in a clear, understandable way in proper grammatical English. This is your challenge in the course.

Study Habits, Exercises, Exams and Grades This course does require considerable work. You should be devoting 6-8 hours a week minimum to it, outside of the classroom; reading the book (the proofs), going over your class notes, thinking about the ideas, concepts, and techniques, talking with some of your classmates about them, doing all the assigned exercises etc. You are encouraged to form study/problem 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. If you are not prepared to make a big effort in this course, you should re-examine the reasons why you are taking it.

There will be regular reading and homework assignments (see attached). It is expected that students will read the portions of the book covered in class - not everything you should learn and know will be discussed in class, and not everything you should learn is in the book. Of course, I will write stuff on the chalkboard but I will not write the book on the board,
and occasionally I will be less formal in order to get the main points across or because of lack of time. The class and the book will reinforce each other, and neither is a replacement for the other. It is expected that students will be present at all classes. While I don’t take attendance, before very long I will know who is and who isn’t coming to class. The course is more than just getting a good grade; it’s about learning a way of thinking and doing. Questions, comments, and participation from students are encouraged. The reading assignments (sections of the book) should be done before the class in which they are discussed. In the class, we (you and I) will discuss the material - class participation is encouraged and expected.

Exercises There will be two kinds of exercises: some to do and check your answers (after you’ve done them!) with those given in the back of the book; in addition, there are exercises to be handed in (after we finish each section) for marking (by a graduate student grader assigned to me). I will let you know in class when hand-in exercises are due; roughly a couple of days after we finish discussing the section in which they are in. It is essential that you do both kinds of exercises with the not-to-be-handed-in exercises completed before you do the to-be-handed-in exercises. I shall require you to keep a (tidy!) journal (separate notebook) of the completed exercises that are not handed in. I will collect your journals two or three times during the semester to examine them (not to grade them) in order to see that you are keeping up with the assigned work. Your journal work will be worth 50 points, and it will be based on my light examination of it. The assignments to be handed-in will have a due date in class; no late assignments will be accepted but the lowest assignment will be dropped. Your work on these exercises should be well-presented in good English, and not written carelessly. While you can discuss the exercises with classmates, the work you hand in should be your own write-up and not copied from someone else. The assigned homework will be scaled to 50 points, and I will only use multiples of 5. I allow myself the possibility to increase someone’s scaled homework score based on class participation. For this I need to know your name, so I recommend that you identify yourself when you ask a question etc.

Exams There will be two in-class exams during the semester (each worth 75 points) and a final exam (worth 150 points) - see the accompanying schedule. I do not intend to give make-up exams. Check this schedule now, so that if you have a conflict you can change sections or drop the course.

Exam Schedule

- Exam 1, Friday, February 28, 2003.
- Note that Spring Break is March 15-23, 2003.
- Final Exam: Sunday, May 11, 2003, 7:25-9:25 PM (Don’t blame me!).
Approximate Chapter Schedule

- Chapter 1, Sections 2,3,4: 1 week.
- Chapter 2. Sections 1,2,3: 1 week.
- Chapter 4. Sections 1,2,3,4,5,6: 3 to 4 weeks.
- Chapter 5. Sections 1, 2(up to page 99): 1 to 1 1/2 weeks.
- Chapter 7. Sections 1,2: 1 week.
- Chapter 9. Sections 1,2,3,4,5: 1 week.
- Chapter 10. Sections 1,2,4: 2 weeks.
- Chapter 11. Sections 1,2,3: 2 weeks.

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Accomplishment level</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>superior</td>
<td>370 ▲</td>
</tr>
<tr>
<td>AB</td>
<td>excellent</td>
<td>355 ▲</td>
</tr>
<tr>
<td>B</td>
<td>proficient</td>
<td>330 ▲</td>
</tr>
<tr>
<td>BC</td>
<td>good</td>
<td>310 ▲</td>
</tr>
<tr>
<td>C</td>
<td>acceptable</td>
<td>275 ▲</td>
</tr>
<tr>
<td>D</td>
<td>mediocre</td>
<td>240 ▲</td>
</tr>
<tr>
<td>F</td>
<td>unacceptable</td>
<td>0 ▲</td>
</tr>
</tbody>
</table>

If necessary, I will curve exams by adding points in order to reflect this grading scheme. It would please me greatly if everyone earned an AB or A in the course.

Attendance: As already mentioned it is expected that each student will be present at all of the classes. Office hours are for students who need additional help beyond that given in the class; they 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 McBury Disability Resource Center students: Students of the Center who are recommended for some accommodation (e.g., extended time on exams) should contact the instructor about this no later than January 31.

The Department of Mathematics; Van Vleck Hall (VV):
Chair: D. Griffeath (219 VV)
Associate Chair: D. Uhlenbrock (421 VV)
Department Administrator: G. Novara (223 VV)
Undergraduate Advisor: G. Mari-Beffa (309 VV)
TA Supervisor: R. Wilson (411 VV)
Undergraduate Secretary: J. Schwantz (203 VV)
Sexual Harrasment Contact Persons: D. Rivard (B207 VV) and L. Smith (505 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]

MATH 475 EXERCISES- PARTIAL LIST

Only the exercises in bold type are to be handed in. Due date given in class.

- page 13: 2,3,4,5,6,7,8,9
- page 21: 2,3,5,7,8,9
- page 25: 1,2,3,4,5
- pages 34-35: 1,2,3a,4,5,6,7,9
- pages 68-69: 1,2,3,4,5,6,7,8,9
- pages 71-72: 1,2,3,4,5,6
- pages 81-82: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,21,22.
- pages 83-84: 1,2,3,4,5,7,8,9,10
- page 89: 1,2,3,4
- More to come