Course: MTH 310 Abstract Algebra & Number Theory  
Instructor: Robert Bell  
Office Hours: Tu 1-2 p.m. and Th 2-3 p.m. in A-305 Wells Hall,  
M 10-11 a.m. and Wednesday 8-9 a.m. in W-32 Holmes Hall, and  
by appointment (please send an e-mail).  
E-mail: rbell@math.msu.edu (best way to contact me)  
Course Web Page: http://www.math.msu.edu/~robertbe/MTH310SP11.html

Topics: The main topics of the course are elementary number theory, abstract algebraic systems (rings, fields, and groups), and writing mathematical proofs. The content includes important concepts for future secondary educators in mathematics as well as concepts which are central to the study of advanced mathematics. We will cover chapters 1-7 of the textbook (time permitting).

Grading Criteria. In general, your work in this course will be **evaluated according to three criteria:** the *clarity* of your arguments and exposition, the *completeness* of the steps taken to arrive at a solution, and the *accuracy* of the answer. Correct answers without supporting work may not receive full credit.

<table>
<thead>
<tr>
<th>Grade Components</th>
<th>Grading Scale</th>
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<tbody>
<tr>
<td>Midterm Exams (3)</td>
<td>45%</td>
</tr>
<tr>
<td>Homework &amp; Quizzes</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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<tr>
<td></td>
<td>Grading Scale</td>
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<tr>
<td>4.0</td>
<td>90 ≤ x</td>
</tr>
<tr>
<td>3.5</td>
<td>84 ≤ x &lt; 90</td>
</tr>
<tr>
<td>3.0</td>
<td>78 ≤ x &lt; 84</td>
</tr>
<tr>
<td>2.5</td>
<td>72 ≤ x &lt; 78</td>
</tr>
<tr>
<td>2.0</td>
<td>66 ≤ x &lt; 72</td>
</tr>
<tr>
<td>1.5</td>
<td>60 ≤ x &lt; 66</td>
</tr>
<tr>
<td>1.0</td>
<td>55 ≤ x &lt; 60</td>
</tr>
<tr>
<td>0.0</td>
<td>x &lt; 55</td>
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</tbody>
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Description of Graded Assignments

1. **Midterm Exams.** There will be three midterm exams during the semester. These are tentatively scheduled as follows:  
   - Midterm I Wednesday, February 2  
   - Midterm II Friday, March 3  
   - Midterm III Wednesday, April 6  

Exams are written and completed in class without the aid of the textbook, notes, calculators, or similar materials. Exams last for the entire class period (50 minutes). Each exam is worth 15% of your final grade.
2. **Homework.** Homework is assigned and collected on a (typically) daily basis. The homework is due at the start of lecture. Late homework will not be accepted. The lowest three homework scores will not count towards your final grade.

Some assigned problems may require significantly more time to complete than the questions and problems which will typically appear on quizzes or exams. However, please be assured that reading through your homework gives the instructor an excellent opportunity to assess your overall understanding of the course material as well as your progress towards developing strong analytical problem solving skills. Please do all of the homework assignments: it is the best way to succeed in (and to find enjoyment in) this course.

*How homework is graded:* Only a select few problems will be graded (usually about 2-4 from among about 3-6 problems). Most of the assigned problems will be checked by you, the student. Selected answers and partial solutions will be provided online. Additionally, we will regularly spend the first 10 or so minutes of class discussing solutions to the homework.

A score between 0 and 10 will be assigned using the criteria below.

Problems for which a serious attempt at a solution is not given will count against the completeness. All but the most minor of errors will count against the accuracy. Problems which are not clearly stated (e.g. just listing the problem number), illegible, or disorganized will count against the clarity.

- completeness: 5 pts (100% complete 5 pts, 80% complete 4 pts, etc.)
- accuracy: 4 pts (from among graded problems)
- clarity: 1 pt (clearly state problems and neatly write solutions)

3. **Quizzes.** There will be an occasional in-class quiz. These serve two purposes: first to prepared you for timed written exams, and second to inform the instructor of the students’ understanding of the course material. The lowest quiz score will not count towards your final grade. You may make up a missed quiz only if you have missed class due to highly specialized reason (e.g. you are in the hospital or it is a religious holiday). You must contact the instructor in advance and ask permission if it is a planned event, or you must contact the instructor within 24 hours if it is an unplanned event (health emergency). You should view the quiz as an opportunity to test your current understanding and preparedness. Quizzes are written and will last 20 minutes. You are not permitted to use the textbook, notes, calculators, or similar materials during the quizzes. Solutions to quiz problems will be discussed during class time.
4. **Final Exam.** The final exam is comprehensive. The date and time of the final exam is set by the university. You must take the final exam on the scheduled day at the scheduled time.

   The final exam is on Thursday, May 5 from 10 a.m. until noon.

**Student Responsibilities**

1. **Attendance & Preparation.**
   - Regular attendance is required.
   - Before attending the lecture, read the current sections.
   - At minimum, attempt to work through one or two of the examples in each current section.

   *How to read mathematics.* You should always have paper and pencil (and eraser!) readily available when reading mathematics. Work through the examples by writing the steps out yourself until it is clear to you that the solution is correct. Once a topic has been introduced in lecture, you should re-read the corresponding sections from the text. You should work on the exercises at the end of these sections until you are proficient.

2. **Participation.**
   - Be attentive and stay alert.
   - Work with your neighbors.
   - Take careful notes.
   - Ask questions! Don’t be shy: we (yes, me too) are all here to learn!

3. **Homework.**
   - Start homework assignments early and discuss these with your classmates (on the Google Group, for instance).
   - Write your attempts on scratch paper. Write solutions that you will submit for a grade carefully and neatly.
   - When your homework is returned with a grade, compare your solutions to the posted answers and solutions; you might learn a new technique or a more appealing way to think about a topic.

**Office Hours.** Please consider bringing your questions to office hours. Office hours are times set aside specifically as an opportunity for you to get additional help. If your schedule conflicts with the scheduled office hours, please make an appointment by sending an e-mail.

Please, do not think of office hours as an inconvenience to the instructor; additional help is available if you seek it out. However, it is your responsibility
to come to office hours only after first making a sincere effort to answer questions on your own. Learning is difficult: work hard, try new ideas, and ask questions. If you do this, you will see definite progress.

**E-mail.** E-mail can be an effective way to obtain more immediate help. When e-mailing your instructor, be sure to state your question clearly. If you are asking about a specific exercise or example in the text, be sure to restate the problem in its entirety since, while it is quite possible that your instructor is also awake and online at 10 p.m., it is unlikely that he keeps a copy of the text under his pillow! (You, of course, should keep one there just in case the benefits of osmosis have been underestimated.)

When addressing e-mail, please include a greeting and sign your e-mail with your first and last name, at least until you are certain the instructor has learned your name. E-mail messages such as “how do u solve 42 on p 314 ? l8r” are inappropriate.

**Online Discussion Forum.** There is an online discussion forum for this course. You will receive an invitation via e-mail to join a Google Group named MTH310SP11. Please feel welcome to discuss problems from the course here online. The instructor will also participate and help to facilitate discussions.

**Calculators.** The use of calculators is not be permitted on any of the exams or quizzes. However, you are welcome to use your calculator or to write computer programs to help with homework problems. However, in the end, most assigned problems are looking for an explanation, not an equation or a numerical value.

**Students with Disabilities.** MSU provides the Resource Center For Persons with Disabilities (RCPD); URL: http://www.rcpd.msu.edu/ Please contact the RCPD if you require special accommodations, and then schedule an appointment to meet with me ASAP.

**Academic Honesty.** Cheating in any form will not be tolerated and will be reported to the Dean. You will receive a zero on any assignment in which their is a case of cheating. This includes, but is not limited to, plagiarism, failure to give proper citations, and copying another’s work. If you are preparing an assignment and have a question about whether you are adhering to this policy, please ask your instructor.

**Advice.** The best way to learn mathematics is to write down solutions to specific mathematical problems. If you are able to solve most of the assigned problems, then I am confident that you will do very well in the course. But don’t limit yourself to the assigned problems; the textbook offers a variety of interesting problems. Challenge yourself! Try working out problems that sound interesting to you. If you want more practice or want more challenging
problems, please drop by my office during office hours or make an appointment to meet with me.
If you are falling behind in the course, please seek help ASAP. There is help available during office hours and from your classmates and more senior mathematics majors (just ask them!). You are welcome seek out solutions online, but at the end of the day it is important that you have learned from any information you have found or been given. The majority of your grade depends upon your proficiency to solve mathematical problems on your own, under time pressure, and communicated in a written form.

I want you to succeed in this course, and I’m here to facilitate this goal. But the burden is upon you to work hard, to set aside realistic amounts of time for study and to seek out help when you need it. Additionally, there are many potentially helpful books in the library or at your favorite bookstore.

Some final advice: read the book. Then work some problems and read the book again. I cannot emphasize this enough. Read the book.