Syllabus

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Office Hours: Monday 11AM-Noon, Tuesday Noon-1 PM, Wednesday 10-11 AM, Thursday 2-3 PM, and by appointment.

Course Home Page: http://math.holycross.edu/~dbd/math243/math243.html

The text is available in the College Bookstore or online. Used copies are available on-line. Note that earlier 8th editions may say the publisher is Brooks Cole. This is the same book.

Prerequisites: Two semesters of one variable calculus. At Holy Cross this means the successful completion of MATH 134 or MATH 136, an equivalent second semester calculus course at another college, or a score of 4 or 5 on the BC Advanced Placement Exam in Mathematics, or permission from the department chair.

Intended Audience: This course is designed for students who are interested in mathematics beyond one variable calculus. While the course is a required course for the mathematics major, this is a good course for students who are interested in exploring an area of mathematics that is very different from calculus and gives a better idea of the theoretical side of mathematics than calculus.

Quick Summary: Algebraic Structures is a one semester course that introduces basic mathematical terminology and proof techniques that are used in junior and senior level mathematics courses. We will cover most of the material in the first four chapters and the course will roughly break down into three parts: Chapter 1 which covers basic notation, properties of sets, and basic proof techniques; Chapter 2 which covers properties of the integers with regard to divisibility and introduces the important concept of mathematical induction; and Chapters 3 and 4 which introduce the concept of a group, present examples of groups, and explore basic properties of groups. The concepts in the first two chapters will likely be familiar whereas the concepts in the second two chapters will be new.

Class Format: (See the schedule on the last page of the syllabus.) Although most classes will be lectures there will be roughly a half dozen classes devoted to group or collaborative assignments.

Homework will be generally be due on Fridays. Days when homework is due there will be a short quiz based on the homework. The quizzes will usually consist of two questions, one asking you to provide a definition of a concept and the other asking you to use that concept. Collaborative assignments will require a write-up. These will not be due on the same day as regular homework.

There will be two exams given in the evening. The exams will last 90 minutes. If you are unable to take a test at a scheduled time, it will be possible to arrange to take it at another time. The
final exam will be given at the regularly schedule time determined by the registrar.

**Grading:** There are several components to the course grade:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Collaborative Assignments</td>
<td>5%</td>
</tr>
<tr>
<td>Quizzes (8)</td>
<td>20% (total)</td>
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<tr>
<td>Tests (2 × 20% each)</td>
<td>40%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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There are 10 scheduled quizzes 10-15 minutes in length. You may drop 2 quiz grades for a total of 8 quizzes that count for credit. The two tests will be given in the evening and will be 90 minutes in length. Each graded assignment, quiz and exam will receive a numerical score which will contribute to the appropriate percentage. The final exam is a comprehensive 2 1/2 hour exam covering the entire semester. At the end of the semester, total course percentages will be used to determine final grades. I do not use an absolute scale to determine letter grades.

**Academic Honesty:** The Department of Mathematics and Computer Science adheres to the College’s policy on Academic Honesty, which may be found in the on-line College Catalogue. In addition, the department has formulated the attached statement intended to amplify the policy as to how it might apply in mathematics and computer science.
Learning Tips. Here are several suggestions to help you learn mathematics.

- In class: Take careful notes. If you don’t understand an idea or point being made or a proof, ask about it. We have plenty of time to answer questions but you must ask them. When opportunities arise to talk in groups. Talking about mathematics is an important way to formulate your understanding of the concepts.

- Out of class: Reread your class notes as soon after class as possible. Summarize your notes for the next class and reread your summaries to prepare for the next class. Read the text before attempting assignments. Mark up the text not just by highlighting but by commenting about concepts and calculations in the margins. Rewrite ideas in your own words and fill in the gaps in the text’s explanations. Also, note things that you don’t understand so that you can ask about them in class.

- Reading mathematics: Mathematics is expressed in a dense but rich symbolic language that has been refined literally over centuries. It is both precise and concise. Learning mathematics, including algebraic structures, necessarily involves mastering this symbolic language. Accordingly, mathematics must be read differently than ordinary prose. One must be attentive to every line and every word of the text and to every symbol that appears on the page.

- Homework: The goal of assignments is to help you develop your understanding of the material. This is accomplished both by basic questions which help to become fluent in the symbolic language of mathematics, and by more involved proofs which allow you to explore ideas. You should attempt homework problems after reading the text and your notes. The least effective way to learn the material is to parrot examples in the text that appear to be close to a particular homework problem. You may also find it helpful to discuss homework problems with other students in the class. It is, however, essential that you write up your own solutions and do not copy those of anyone else.

- Office Hours: If you find that you have additional questions that you would like to ask outside of class, which is quite common in Algebraic Structures, please see me in office hours. While I’m pleased to speak with students about the course at any time, it’s important for your benefit that you seek assistance before assignments are due.

- Quiz and Test Preparation: Quizzes will be given at the beginning of class, so it is important that you have your questions answered prior to that class. There will be evening review sessions prior to each test. You should begin studying for tests at least one week in advance; you should organize your studying so that you progress through all the material that is covered on the test; you should study from the text, class notes and graded assignments; and you should cover a particular topic several times from different sources. It is important to break up your studying into manageable chunks of time that are spread over each day of the week before the test. Of course, you should make use of office hours and review sessions. The same comments hold for the final exam, which is a comprehensive exam covering all the course material.
MATH 243-03, Fall 2016 Course Schedule:

• Week 1: 8/31 Lecture.
  9/2 Lecture.
• Week 2: 9/5 Lecture.
  9/7 Lecture.
  9/9 Quiz 1/Lecture.
• Week 3: 9/12 Lecture.
  9/14 Lecture.
  9/16 Quiz 2/Lecture.
• Week 4: 9/19 Lecture.
  9/21 Lecture
  9/23 Quiz 3/Lecture.
• Week 5: 9/26 Lecture.
  9/28 Lecture.
  9/30 Quiz 4/Lecture.
• Week 6: 10/3 No Class/Rosh Hashana.
  10/5 Lecture.
  10/6 TEST 1: 6:30-8:00 PM.
  10/7 Lecture.
• Fall Vacation: 10/10 – 10/14
• Week 7: 10/17 Lecture.
  10/19 Lecture.
  10/21 Quiz 5/Lecture.
• Week 8: 10/24 Lecture.
  10/26 Lecture.
  10/28 Quiz 6/Lecture.
• Week 9: 10/31 Lecture.
  11/2 Lecture.
  11/4 Quiz 7/Lecture.
• Week 10: 11/7 Lecture.
  11/9 Lecture.
  11/10 TEST 2: 6:30-8:00 PM.
  11/11 Lecture.
• Week 11: 11/14 Lecture.
  11/16 Lecture.
  11/18 Quiz 8/Lecture.
• Week 12: 11/21 Lecture.
  11/23 Thanksgiving break.
  11/25 Thanksgiving break.
• Week 13: 11/28 Lecture.
  11/30 Lecture.
  12/2 Quiz 9/Lecture.
• Week 14: 12/5 Lecture.
  12/7 Lecture.
  12/9 Quiz 10.
• 12/12-12/14 Study Period.
• Final Exam: Date TBA