MTH 361: Abstract Algebra, Fall 2017
TR 2:00-3:30 HSC 150

Professor: Dr. Pamela Richardson

- Offices: Hoyt 157, Patterson 315 (Drinko Center)
- Phone: (724)946-7286
- E-mail: richarpa@westminster.edu
- Office Hours: M 2:00-4:00 PM (Hoyt), W 2:00-4:00 PM (Hoyt), F 11:30 AM-1:00 PM (Drinko), or by appointment

Email Policy

Email is the official means of communication at Westminster College. Please feel free to contact me via email, but be sure that you email the correct Dr. Richardson! All messages received after 5:00PM may not be answered until the following day.

Prerequisite

Successful completion of both MTH 241 and MTH 261 (with a grade of C- or higher) is required to be enrolled in this course. Please see me if you do not satisfy this prerequisite.

Text

To be successful in this course, it is extremely important that you READ!. The required textbook is Abstract Algebra: An Introduction, Third Edition, by Thomas W. Hungerford. Please note that other textbooks and internet sources should not be used on homework in this course. It is imperative that you are doing your own work and not doing “literature searches” to find the answers to your homework problems. Presenting a solution found online as your own work is plagiarism. Thus, use of any other books, articles, web sites, tutors, solutions, etc. will be considered an academic integrity violation and will be handled according to the policy below.

Course Description:

Abstract algebra is an elegant branch of mathematics that extends to different sets familiar notions from our knowledge of the real numbers. We will study algebraic systems (sets paired with operations such as addition, multiplication, composition, etc.) and their properties and structures. Topics will include a review of sets, functions, and topics from number theory, rings, subrings and ideals, homomorphisms, cosets and quotients, fields, and groups.
Dually, Math 361 will focus on mathematical abstraction and methods of proof. **Great emphasis will be placed on mathematical writing in this course.**

**Student Learning Outcomes:**

By the end of the semester, students must demonstrate the ability to

- Interpret and employ the appropriate vocabulary and notation used in abstract algebra.
- Accurately describe the fundamental theorems in abstract algebra covered in this course.
- Correctly apply theorems and definitions to prove new theorems and solve new problems.
- Construct proofs, including direct proofs, proofs by contradiction, proofs by contrapositive, and if-and-only-if proofs.

**Attendance and Participation:**

This course will be a collaborative learning experience. It is extremely important that you are not only present physically in class but that you are actively participating in all class activities. Our class time will be spent in a variety of ways. Each day, new material will be presented to the class, typically during the first half of class. The students will then break into groups of at most 3 to work together on problems designed to deepen the understanding of this new material. These in-class problems often contain major results and ideas, so it is important to complete as many of them as possible, even if your group needs to finish them outside of class time. Each group may be asked to present a solution to one of the in-class problems at the beginning of the next class. Students will be graded on their active participation during each in-class problem session and on the correctness and completeness of the solutions they present. **Unless told otherwise, please turn off all cellular phones and other electronic devices during class.**

**Homework:**

In addition to in-class activities, you will also have homework due at the beginning of class each Tuesday and Thursday. Typically, homework assigned in class one day will be due the following class period. Homework sets will be posted on Desire 2 Learn and will include problems from your textbook as well as problems that I design for the course. Many of the homework problems will be proofs. All problems will be collected for each assignment, but only selected problems will be graded. **The lowest three homework scores will be dropped; consequently, absolutely no homework will be accepted late.**

Each group/student may resubmit at most one problem from each returned assignment to earn up to half of the missed points back on the problem. Resubmissions are due within a week of the graded assignment being returned in class.

I encourage you to work together on your homework. You may collaborate on your homework assignments in groups of at most 3 and submit one set of solutions for each group. However, please be aware that all group members are responsible for understanding (and being able to reproduce) the solutions that
are submitted! You will be tested on the material, and students who do not actively contribute to homework solutions typically do not perform well on exams.

In addition to the problems I assign, I expect you to read the textbook as part of your daily assignment. Your textbook is a valuable resource, and you should follow along as we cover new material in class.

**Extra Credit:**

Extra credit problems will occasionally appear in your homework assignments. If an extra credit problem is given on a particular assignment, unless a separate due date is given, it must be turned in with the rest of the assignment during the next class.

**Project**

This course includes a writing project, which can be done individually or in pairs. At the beginning of the semester, each student/pair will choose a mathematician (with a corresponding contribution to mathematics) from a list posted on Desire 2 Learn. You will then write a 7-10 page expository paper on your chosen mathematician and his/her mathematical contribution. At most one-third of the paper should be biographical; the rest should be explaining the mathematical topic(s) associated to your mathematician. All of your exposition should be in your own words; your job is to convince me that you understand the mathematics involved. All papers will be submitted through D2L, which will check for originality, and you will be required to use LaTeX to typeset all submitted project work. You will be graded on the mathematical correctness of your work, the quality of your exposition, and grammar and technical merit. More details about the format and technical requirements for this paper will be given at a later date. **Please note that this project will require a significant amount of research and independent learning; as such, it “counts” nearly as much as an exam!**

**Exams:**

There will be two written midterm exams and a comprehensive final exam. The tentative dates of the midterm exams are as follows:

- Exam 1: Thursday, September 28
- Exam 2: Tuesday, October 31

Makeup exams may only be given if both Dr. Richardson and Dean McMinn approve the reason and alternate arrangements are made BEFORE the exam is given in class. The final exam will be held on **Thursday, December 14th from 11:30AM-2:00 PM.**
Course Grades:

Your course grade will be determined by the following distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>14%</td>
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<tr>
<td>In-Class Problems &amp; Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Project</td>
<td>15%</td>
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<tr>
<td>Midterm Exams</td>
<td>18% each</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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</tbody>
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The grading scale will be

- B+ : 88-89
- C+: 78-79
- D+: 68-69
- A: 92-100
- B: 82-87
- C: 72-77
- D: 62-67
- F: 0-59
- A-: 90-91
- B-: 80-81
- C-: 70-71
- D-: 60-61.

Academic Integrity:

Central to the purpose and pursuit of any academic community is academic integrity. All members of the Westminster community, including students, faculty, staff, and administrators, are expected to maintain the highest standards of honesty and integrity, in keeping with the philosophy and mission of the College.

Westminster College 2016-17 Undergraduate Catalog, p. 54

Some forms of academic dishonesty include (but are not limited to): copying a classmate’s work (homework, extra credit, or exams), divulging answers or information to another student during or about an exam, and using unauthorized aids (e.g., professors, textbooks, internet sites) on an assignment or exam. Please note that presenting a solution found online as your own work is plagiarism. Academic dishonesty will not be tolerated in this class. The penalty for academic dishonesty is a grade of 0 on the assignment. Any event of academic dishonesty is reported to the Dean of the College. Other details of violations and consequences are given in the Catalog.

Students with Disabilities:

Westminster College actively strives for the full inclusion of all our students. Students with disabilities who require access solutions for environmental or curricular barriers should contact Faith Craig, Director of Disability Resources, located in 209 Thompson-Clark Hall. You may reach her at 724-946-7192 or craigfa@westminster.edu. No accommodations can be given without documentation from the Disability Resources Office.
### Important Dates:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>9/4</td>
<td>Last Day to Add/Drop</td>
</tr>
<tr>
<td>9/14</td>
<td>Project topics due</td>
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<tr>
<td>9/28</td>
<td>Exam 1</td>
</tr>
<tr>
<td>10/5</td>
<td>Project outline due</td>
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<tr>
<td>10/21-10/24</td>
<td>Fall Break- No Classes</td>
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<tr>
<td>10/31</td>
<td>Exam 2</td>
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<tr>
<td>11/3</td>
<td>Withdrawal deadline</td>
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<td>11/21</td>
<td>Project draft due</td>
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<td>11/22-11/26</td>
<td>Thanksgiving Break - No Classes</td>
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<td>12/7</td>
<td>Final project paper due</td>
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<tr>
<td>12/8</td>
<td>Classes End</td>
</tr>
<tr>
<td>12/14</td>
<td>Final Exam</td>
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