Math 417 Group Theory
Section 001

Lecture: MWF 11:30-12:20 Burnett (Burn) 205

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WWW pages for this class: http://www.math.unl.edu/∼mbrittenham2/classwk/417s16/

(There you will find copies of nearly every handout from class, lists of homework problems assigned, dates for exams, etc.)

Class lockbox: http://www.math.unl.edu/∼mbrittenham2/classwk/417s16/locked/
The lockbox username is "math417"; the passsword will be provided in class!

Office Hours: (tentatively) Mo 1:00-2:00, Tu 11:00-12:00, We 2:00-3:00, and Th 12:00-1:00, and whenever you can find me in my office and I'm not horrendously busy. You are also quite welcome to make an appointment for any other time; this is easiest to arrange just before or after class, or via email.

Text: *Contemporary Abstract Algebra*, by Joe Gallian, Brooks/Cole (8th Edition).

ACE outcome 3: This course satisfies ACE Outcome 3. You will apply mathematical reasoning and computations to draw conclusions, solve problems, and learn to check to see if your answer is reasonable. Your instructor will provide examples, you will discuss them in class, and you will practice with numerous homework problems. The exams will test how well youve mastered the material.

Prerequisite: Math 310.

This course, as the name is meant to imply, is about the theory of groups (whatever they are). In addition, as the text title suggests, this course is about abstract mathematics, that is, how to draw (abstract) conclusions from (abstract) hypotheses. That is, we will focus as much on *how we show that a statement is true* (how do we discover proofs?) as we will on what statements <u>are</u> true. The subject matter we will use will be drawn from the material covered in Part Two of the text, as well as selected topics from Part Five. Topics likely include:

Chapter 1: Introduction to Groups
Chapter 2: Groups
Chapter 3: Finite Groups and Subgroups
Chapter 4: Cyclic Groups
Chapter 5: Permutation Groups
Chapter 6: Isomorphisms
Chapter 7: Cosets and Lagrange's Theorem
Chapter 8: External Direct Products
Chapter 9: Normal Subgroups and Factor Groups
Chapter 10: Group Homomorphisms
Chapter 11: Fundamental Theorem of Finite Abelian Groups
Chapter 24: Sylow Theorems
Chapter 26: Generators and Relations
Chapter 27: Symmetry Groups
Chapter 30: Cayley Digraphs of Groups

Of course, most of these terms likely have no meaning to you right now; part of our task will be to discover why we want to give names to these objects/concepts, what they mean, and why they are important.

Homework will be assigned (approximately) weekly. It is an essential ingredient to the course - as with almost all of mathematics, we learn best by doing (again and again and ...). It will also provide to the best practice possible in formulating your own arguments (i.e., proofs). Cooperation with other students on these assignments is acceptable, and even encouraged. However, you should make sure you are understanding the process of finding the solution, on your own - after all, you get to bring only one brain to exams (and it can't be someone else's). For the same reason, I also recommend that you try working each problem on your own, first. Some portion of the homework will be collected and graded; it will count 50 percent toward your final grade.

Exams will be given two times during the semester, in the **evenings**. Specific dates will be worked out in consultation with the class, well in advance of the exam. One of these exams may occur, instead, during our final exam time: Monday, May 2, from 10:00am to 12:00noon. Each exam will count 25 percent toward your final grade. You can take a make-up exam only if there are compelling reasons (a doctor SAYS you were sick, jury duty, etc.) for you to miss an exam. Make-up exams may be harder than the originals (because make-up exams are harder to write!).

Your course grade will be based upon these percentages, and will be converted to a letter grade, taking into account the overall average of the class. However, a score of 90% or better will guarantee some kind of **A**, 80% or better at least some sort of **B**, 70% or better at least a flavor of **C**, and 60% or better at least a **D**.

Stay current! In mathematics, new concepts continually rely upon the mastery of old ones; it is therefore essential that you thoroughly understand each new topic before moving on. Our classes are an important opportunity for you to ask questions; to make sure that you are understanding concepts correctly. Speak up! It's your education at stake. Make every effort to resist the temptation to put off work, and to fall behind. Every topic has to be gotten through, not around. And it's a lot easier to read 50 pages in a week than it is in a day. Try to do some mathematics every single day. **Class attendance** is probably your best way to insure that you will keep up with the material, and make sure that you understand all of the concepts. [And on a more pragmatic note, the intructor writes the exams, so it pays to know what the instructor said!] Even more, **stay ahead!** You are strongly encouraged to read the section to be covered in class prior to its presentation in lecture; this will both improve your ability to follow the lecture and help to focus your attention on any areas where extra effort on your part will be required.

Cell phones should be silenced for the duration of all classes, and extreme restraint should be exercised in answering a call during class. If you feel that you must answer a call, please (silently...) excuse yourself from the room before beginning to take the call.

Calculators will probably be relatively useless in this course? In the end, it is not *what* the answer is but *how we arrive at* the answer, and *why* it is true, which will be most important to us.

Departmental Grading Appeals Policy: The Department of Mathematics does not tolerate discrimination or harassment on the basis of race, gender, religion or sexual orientation. If you believe you have been subject to such discrimination or harassment, in this or any math course, please contact the Department. If, for this or any other reason, you believe your grade was assigned incorrectly or capriciously, appeals may be made (in order) to the instructor, the Department Chair, the Departmental Grading Appeals Committee, the College Grading Appeals Committee, and the University Grading Appeals Committee.

Some important academic dates

Jan. 11	First day of classes.
Jan. 18	Martin Luther King Day - no classes.
Jan. 22	Last day to withdraw from a course without a **'W'**.
Mar. 4	Last day to change to or from P/NP.
Mar. 20-27	Spring break - no classes.
Apr. 8	Last day to withdraw from a course.
Apr. 30	Last day of classes.
May 2-6	Final exam week.
May 2	Math 417 final examination date.