

Algebraic Structures II

Math 360

Online, using Canvas, Asynchronous

3 credits



Scott M. Lewis
Sam 218B (I think)
Phone: 963-1803
Fax: 963-3226

Hours:
I will be available most days all day.
Best by appointment,
gleefully accepted

Text:

(1974). Larsen, M. Introduction to Algebraic Structures. New York: Addison Wesley. (CWU coursepack)

A continuation of math 360.

Modern abstract algebra represents a subdiscipline of mathematics with great unifying power. We will study more "group theory," this quarter as well as an introduction to the theory of rings. again, this is essentially the study of symmetry. modern algebra has its origins in classical algebra, geometry, number theory, and analysis, with themes reaching as far back as ancient Egypt, Mesopotamia, and the Islamic world.

There will be three aspects to this course. we first undertake a very brief survey of the history and foundations of abstract algebra from the first course in the sequence. The second theme of the course is an introduction to the structure of groups and will be based on our text. Finally, we will study groups, rings, and introduce ourselves to the preliminary concepts of fields, deceptively simple mathematical objects, in two ways: deductively (we will prove stuff about groups, again based on our text) and visually (we will construct diagrams to illustrate the properties of these creatures).

Recall, a group can be considered a collection of "*actions*" on a physical object that changes the orientation of the object, but not the actual space it fills. For example, imagine you have a rectangle on a table in front of you with each vertex numbered. you are allowed to rotate the rectangle clockwise

180 degrees so that the rectangle occupies the same space on the table but the numbered vertices are in different locations. you may also flip the square about a line that runs through the midpoints of two opposite sides. There are several such actions that change the orientation of the vertices but not the actual space it occupies. the collection of all such actions that satisfy certain properties is said to form a group. simple, no?

The vehicle for accessing the course is Canvas, which you can access via My CWU.

Activities will include, but not be limited to: readings, online lectures, videos, homework assignments, and ***Problem Sets at the end of each section of the course.***

THE PROBLEM SETS ARE DISTINCT FROM THE HOMEWORK ASSIGNMENTS. You will not be graded on homework or your participation in viewing the online lectures or videos provided (although your chances of passing the course depend on keeping up with these things).

Your evaluation will be based on approximately five Problem Sets each of which will be keyed to a section of the course (you may think of these as take-home exams). Expect about four days to complete these and turn them in electronically.

The specifics for *Submitting Your Work* are posted online in the Announcements Section of our Canvas page. **Follow these instructions carefully!** Improperly lables emails and files will be returned ungraded until you getr it right, thanks in advance for being careful with your submissions.

If the technical part of this is a problem, get back to me and we will work it out.

Remember:

Questions are gleefully accepted!

and

Email is good:

slewis@fulbrightmail.org

Student Learner Outcomes

the most important things you learn in school are not going to be measurable, sorry. in fact, the absolute best service a list of 'student learner outcomes' could possibly provide is as a random sample of behavioral objectives. that said, at the end of this course, you will have a reasonable facility (as measured by the evaluation procedures described above) in describing the nature of groups deductively and visually. along the way you will be able to describe to others what is meant by the following:

mappings, equivalence relations, binary operations, groups, subgroups, cosets, normal subgroups, homomorphisms, isomorphisms, and (with a little luck this spring) why any of this could possibly help us decide whether or not polynomial equations may, or may not, have what has been described as a "solution by radicals."

Note

students with disabilities who wish to set up academic adjustments in this class should give me a copy of their confirmation of eligibility for academic adjustments from the disability support services office so that we can meet in order to discuss how the approved adjustments will be implemented in this class. students with disabilities without this form should contact the disability support services office, bouillon 205 or dssreceipt@cwu.edu or 963-2171 as soon as possible.

Fun with Influenza

if you have a severe respiratory or influenza-like illness (ILI) (high fever, aches, chills, cough) you should not come to class until you are without fever for 24 hours without the aid of fever-reducing medication. if your absences are related to a severe respiratory or flu-like illness, you will be given the opportunity to make up your assignments and class content without penalty. it is your responsibility to notify your instructor in advance when absent due to illness. you should utilize the following precautions to prevent exposure:

- 1) frequent hand washing and carry a bottle of alcohol-based hand sanitizer with you at all times.
 - 2) cough etiquette (grab your shoulder and cough into your elbow).
 - 3) place used tissues immediately in the trash, followed by washing your hands.
 - 4) use CDC-approved disinfectants on shared surfaces such as doorknobs, desks, etc.
 - 5) Stay home if you have a severe respiratory or flu-like illness.
- If you are concerned you may be ill, notify student health. plan for potential absences and assure you have access to the internet and canvas for assignments.

no! no! no!

no late assignments, no early tests, no late tests, no make-up tests.