

Course Syllabus
Math 4413-01: Abstract Algebra I
Fall Semester, 2019
University of West Georgia

Instructor: Dr. David G. Robinson, Hum #221, 678-839-4137
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Office Hours: MW 12:15 – 1:45 p.m., Fri. 10 – 10:50 a.m., 1 – 2:10 p.m.

Class Meetings: MW 2 – 3:15 p.m., Pafford #109
These will consist of a combination of lectures, question-and-answer sessions, problem presentations, and general discussions. All reading will be assigned in advance of the meeting thereon.

Text/Resources: Anderson, Marlow and Todd Feil, *A First Course in Abstract Algebra: Rings, Groups and Fields*, 3rd edition, CRC Press 2015. ISBN-13: 978-1-4822-4552-3

Prerequisites: Math 2644 and Math 3003 with grades of C or better

Course Description: An introduction to the fundamental concepts of *abstract algebra*, i.e., the science of operations and relations on abstract sets.

Topics: *Numbers and Polynomials* (Chapters 1 -5): Natural numbers, well-ordering principle, mathematical induction, integer arithmetic, congruence arithmetic, rational and integer polynomial arithmetic (GCD's, irreducible, factorization, etc.)

Rings, Domains and Fields (Chapters 6 - 10): Ring axioms, subrings, ring isomorphism, integral domains, fields, complex and finite fields, polynomial rings

Ring Homomorphisms and Ideals (Chapters 11 - 15): Homomorphisms, kernels, ideals, quotient rings, isomorphism theorems, principle, maximal and prime ideals

Groups (Chapters 17 - 21): Symmetries, permutations, matrices, symmetric groups, cycle factorization, abstract group axioms, group tables, subgroups, group representations, isomorphism, order of a group element, cyclic groups and dihedral groups

Group Homomorphisms (Chapters 22 - 26): Homomorphisms, product groups, Cayley's Theorem, cosets, Lagrange's Theorem, normal subgroups, quotient groups, kernels, isomorphism theorems

General Objectives: Besides developing your understanding of the topics mentioned above, there are some general skills you should improve upon along the way in order to be able to apply what you learn in this course to future courses of study. These include:

- use of mathematical terminology and notation
- mathematical abstraction
- mathematical proof techniques (induction, contradiction, etc.)
- writing skills – both formal and informal

Evaluation Procedures: Your understanding of the subject material and your progress toward the aforementioned objectives will be evaluated on the basis of your graded *homework*, your performance on the *exams*, and your *class participation* (attendance, preparedness and contributions.)

Evaluation Criteria: Grades on all work will be based upon

- accuracy of information (including calculations and use of mathematical notation and terminology)
- depth and breadth of solutions
- logic and clarity of arguments
- neatness and clarity of presentation
- correctness of grammar and spelling
- thoroughness and timeliness of work
- intellectual honesty and creativity
- achievement of personal potential
- relative difficulty of the assignment/test

Grades: My scale for converting numerical grades (i.e., percentage points) to letter grades will be as follows:

89-100 A, 77-88 B, 65-76 C, 50-64 D, below 50 F

Your final grade will be based on the following distribution of points:

<i>Homework</i> (~50 problems)	50 %
<i>Exam scores</i> (two exams)	40 %
<i>Class participation</i> *	10 %

*Class participation includes *attendance* as well as *preparedness* and *discussion contributions*. Missing more than three class meetings *for any reason* may result in a deduction of 1 point per absence (beyond the third) from the 10 points available.

Important Policies and Electronic Communication Information:

- Attendance is important! However, should you find that you must miss a class meeting, remember that you are still responsible for any and all material you may have missed during your absence.
- Cell phones should be turned *off* during class meetings. If you need to make or receive a call/text, excuse yourself from the class and conduct your business outside the classroom.
- *Graded homework assignments* must be turned in at the prescribed times (see attached schedule) in order to be eligible for any credit. *All work on these assignments must be your own, i.e., no help from anyone, without prior permission from the instructor. Failure to abide by this policy will have serious consequences: automatic zero on the assignment in question, possible expulsion from the class, etc.*
- *Exams* must be taken at the prescribed times (see attached schedule), except by permission from the instructor. Such permission will be given only under the direst of circumstances (serious illness, e.g.) and *only if your request is granted before the exam is over. Otherwise you will receive a score of zero for that exam.*
- All electronic correspondence between student and instructor about matters pertaining to this course should be by way of your UWG e-mail account. Down-loadable documents for this course may be obtained by e-mailing the instructor.
- Please carefully read the information at the following link, as it contains important material pertaining to your rights and responsibilities in this class: <https://www.westga.edu/UWGSyllabusPolicies/>

Disabilities Act/Accessibility for the Course: If you are a student who is disabled as defined under the Americans with Disabilities Act and require assistance or support services, please notify me and provide me with a copy of your packet from Student Services. The university will provide you with resources for any audio/visual needs that you may have with the learning management system or course content. Please contact UWG Accessibility Services for more information.