MODERN ALGEBRA 1 MWF 8:40-9:40AM FALL 2020 ARC 219A

Instructor:	Jonathan White, jwhite@coe.edu
Chair:	Gavin Cross, gcross@coe.edu
Web Page:	public.coe.edu/~jwhite/
Office:	Stuart 316
Office Hours:	10-11am Tuesdays and Thursdays (link on Web Page), and by appointment
Office Phone:	399-8280
Text:	*Modern Algebra, An Introduction*, 6th Edition, by John R. Durbin, Wiley
Quests:	Quests (something between a quiz and a test, get it?) will be given frequently. Details about submission format and terms will be included when each is distributed. Combined these will be worth 175 points.
Math Culture Points:	Math Culture Points will constitute 25 points. These will be earned through participation in various activities outside of class, as detailed elsewhere.
Exams:	There will be four exams during the course of the semester, administered during class time. The dates of these are indicated in the schedule on the back side of this sheet. These exams will be worth 100 points each. The final exam will be held during finals week at the date and time indicated on the back side of this sheet. The final will be worth 200 points.
Grading:	Grading will approximately follow a $[92.0\%, \infty) \to$ A, $[90\%, 92\%) \to$ A–, $[87\%, 90\%) \to$ B+, $[82\%, 87\%) \to$ B, $[80\%, 82\%) \to$ B–, $[77\%, 80\%) \to$ C+, $[72\%, 77\%) \to$ C, $[70\%, 72\%) \to$ C–, $[67\%, 70\%) \to$ D+, $[62\%, 67\%) \to$ D, $[60\%, 62\%) \to$ D–, $(-\infty, 60\%) \to$ F scale. Current grade information will be available online via Moodle.
Late Work:	For the sake of fairness to those who follow the schedule, makeups for exams will be allowed only under extenuating circumstances, with documentation and advance notice when humanly possible.

An abstract algebra course is generally a student's first real exposure to rigorous, axiomatic mathematics. This represents a bigger transition than any other in the educational system. While the primary subject matter of the course is basic group theory, with brief introductions to rings and fields, it is the intellectual transition that presents the biggest challenges. Don't be surprised if you find this very unsettling at times.

Said differently, algebra is the study of structures and operations, which turns out to encompass topics like symmetry, among others. Although it is often researched for very pure reasons, there are surprisingly frequent applications, including topics like data compression and encryption, among many others. This course will not directly address those topics, but will include a reasonably complete development of the properties of the familiar number systems: the natural numbers, integers, rationals, reals, and complex numbers.

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Tentative Schedule

	Wednesday 8/26 §1 Mappings	Friday 8/28 §2 Composition & Inverses
Monday 8/31 §3 Operations	Wednesday 9/2 §4 Composition as Operation	Friday 9/11 §5 Groups
Monday 9/7 No Class – Labor Day	Wednesday 9/9 §6 Permutations	Friday 9/7 §7, 8 Subgroups, Symmetry
Monday 9/14 Review	Wednesday 9/16 **Exam 1**	Friday 9/18 §9 Equivalence Relations
Monday 9/21 §10 Congruence & Division Algorithm	Wednesday 9/23 §11 Integers Modulo *n*	Friday 9/25 §12 GCDs, Euclidean Algorithm
Monday 9/28 §14 Groups Axiomatically	Wednesday 9/30 §15 Generators, Direct Products	Friday 10/2 §16 Cosets
Monday 10/5 §17 Lagrange's Theorem, Cyclic Groups	Wednesday 10/7 Review	Friday 10/9 **Exam 2**
Monday 10/12 §18 Isomorphism	Wednesday 10/14 §19 More on Isomorphism	Friday 10/16 §21 Homomorphisms
Monday 10/19 §22 Quotient Groups	Wednesday 10/21 §23 The Fun. Homomorphism Theorem	Friday 10/23 §24 Rings
Monday 10/26 §25 Integral Domains, Subrings	Wednesday 10/28 Review	Friday 10/30 **Exam 3**
Monday 11/2 §26 Fields	Wednesday 11/4 §27 Isomorphism	Friday 11/6 §27 Characteristic
Monday 11/9 §28 Ordered Integral Domains	Wednesday 11/11 §29 The Integers	Friday 11/13 §30 Rationals
Monday 11/16 §31 Reals	Wednesday 11/18 §32 Complexes	Friday 11/20 **Exam 4**
Monday 11/23 §34 Polynomials	Wednesday 11/25 No Class – Thanksgiving	Friday 11/27 No Class – Thanksgiving
Monday 11/30 Review		
Final Exam – 10:00am Thursday, 12/3		

Any students with disabilities which might affect their performance in this class should contact me as soon as possible to arrange accommodations.

The faculty has adopted a policy on academic integrity. It is your responsibility to understand and follow it.

Diversity, in all its forms, is valuable.

Learning Outcomes

By the end of this class each student should be able to demonstrate:

- rigorous understanding of groups and their basic properties.
- rigorous understanding of subgroups and their basic properties.
- rigorous understanding of rings and their basic properties
- rigorous understanding of fields and their basic properties.
- understanding of the familiar number systems as sets with axiomatically developed properties.

The Provost has mandated that the material below this line appear on all syllabi:

Mission Statement:
Coe College is a national, residential liberal arts college offering a broad array of programs in the arts, sciences, and professions. Our mission is to prepare students for meaningful lives and fulfilling careers in a diverse, interconnected world. Coe's success will be judged by the success of our graduates.

Academic Integrity
At Coe College, we expect academic integrity of all members of our community. Academic integrity assumes honesty about the nature of one's work in all situations. Such honesty is at the heart of the educational enterprise and is a precondition for intellectual growth. Academic dishonesty is the willful attempt to misrepresent one's work, cheat, plagiarize, or impede other students' academic progress. Academic dishonesty interferes with the mission of the College and will be treated with the utmost seriousness as a violation of community standards. Please refer to the Coe College Academic Catalog for complete information regarding Academic Integrity: www.coe.edu/academics/academic-resources/provosts-office/academic-integrity-policy

FERPA
Students should be aware of their rights regarding the privacy of their educational records. Detailed information about your rights can be found under the FERPA (Family Educational Rights and Privacy Act of 1974) section in the Academic Catalog and online here: https://www.coe.edu/academics/academic-resources/registrar/ferpa
In line with FERPA restrictions, students should be aware that an instructor cannot publicly post grades by student name, institutional student identification number, or social security number without first having obtained students' written permission.

The Definition of a Course Credit & Expected Workload
One course credit at Coe College constitutes 180 hours' worth of student work over the course of the term. "The Department of Education has defined one hour to be 50 minutes, so 150 60-minute hours is equivalent to 180 50-minute hours." This figure includes both the time spent in class and out of class completing course work. In other words, students are expected to devote a considerable amount of time outside of class to this course. For courses that meet in a standard MWF or T-Th slot, students should be expected to work seven hours a week outside of the three hours in class. Even with the 13.3 week term, the same number of contact hours (in person or remote) will be achieved with longer class meetings. Contact hours are per credit and do not change with modality. A credit is a credit.

Students with Disabilities: Request for Accommodation
Coe College, in compliance with equal access laws, will make reasonable accommodations for persons with ADA qualifying disabilities. If you have a hidden or visible disability, or believe you may have a disability that affects your learning and may require classroom or test accommodations I encourage you to visit my office during office hours (in person or remote) or email to schedule an appointment at a mutually suitable time so we can discuss ways to support your learning within our class. Additionally, in order to receive accommodations in higher education, students must

communicate with Laura Hayes, the Accessibility Services Coordinator, to verify the disability and establish appropriate accommodations . The Accessibility Services Office is located in the Learning Commons in the lower level of Stewart Memorial Library (near the Testing Center desk). This office is responsible for coordinating accommodations and services for students with disabilities. Please call 319-399-8844 or email accessibility@coe.edu to schedule an appointment.

Reporting of Sexual Assault or Misconduct
As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in any one-on-one meetings. I will keep the information you share with me private to the greatest extent possible. However, I am required to share information regarding sexual misconduct or students who may be in danger to themselves or to others. Students may speak to someone confidentially by contacting Student Life at 319-399-8843 or emailing titleix@coe.edu, Safety, and Security at 319-399-8888, Emily Barnard (college counselor) at 319-399-8843, or visit Coe's Title IX website for more information.

Face coverings will be required in all indoor public spaces, which includes the classrooms, labs, and between classes. Any students without a face covering will be asked to leave the classroom or lab. " Anyone who is not compliant with the classroom and lab protocols will be asked to leave the classroom until compliance can be maintained. If a student refuses to follow college guidelines upon request, the
faculty member should cancel class and contact the Provost immediately. Refusal to comply with classroom protocols will be considered as deliberately impeding other students' work and will be addressed by the Provost's Office."