

FALL SEMESTER 2021
MATH 369.001
Introduction to Abstract Algebra

Topics: Elementary number theory; congruences, groups up to and including the isomorphism theorems, commutative rings, polynomials, unique factorization, irreducibility, finite fields. Prerequisites: [MATH 265](#), [MATH 267](#), and [MATH 274](#).

Learning Outcomes:

1. Students will understand the importance of definitions.
2. Students will be able to construct proofs of theorems in Abstract Algebra and understand more complicated proofs.
3. Students will understand the definition of a group, of a ring and of a field.
4. Students will be familiar with a number of examples of groups, rings and fields and will understand how to do calculations in these examples.

Instructor: Dr. Jay Zimmerman

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Office Hours: MoWe 4:00 – 4:50, TuTh 3:00 – 3:50 and by Appointment.

Exams: There will be three in-class exams and a comprehensive Final Exam. No make-up exams will be given. If a strongly documented excuse is presented, then the Final Exam will be used to make up the excused exam.

Quizzes: Quizzes and In-class homework assignments may be given at any time covering material on the homework.

Grading:	3 Hour Exams	15% each
	Homework and Quizzes	25%
	Final Exam (12/21/2021 @ 12:30 pm)	30%

The corresponding letter grades are based on the final course score as follows:

<u>Range</u>	<u>Grade</u>	<u>Range</u>	<u>Grade</u>
93-100	A	77-79	C+
90-92	A-	70-76	C
87-89	B+	67-69	D+
83-86	B	60-66	D
80-82	B-	00-59	F

The instructor reserves the right to lower the grading scale, if he deems it necessary. For example, 88% can be made an A- at the instructor's discretion, but not a B.

Cheating: This course is conducted in accordance with the "[Student Academic Integrity Policy](#)". Cheating or plagiarism in any form is unacceptable. Use of internet sites such as Chegg or Course Hero is forbidden. A first instance will result in failure of the course. Students are encouraged to collaborate on homework problems and as long as the homework paper submitted is written by a single student without copying or looking at another student's work, this is not considered cheating.

Disabilities: This course is in compliance with Towson University policies for students with disabilities. Students with disabilities are encouraged to register with Accessibility and Disability Services (ADS), 7720 York Road, <https://www.towson.edu/accessibility-disability-services/gettingstarted/>. Students who suspect that they have a disability but do not have documentation should contact ADS for advice on how to obtain appropriate evaluation. A memo from ADS authorizing your accommodation is needed before any accommodation can be made.

Diversity: In accordance with the Towson University Strategic Plan, the FCSM Diversity Action Plan, and the Department of Mathematics Diversity Action Plan, everyone participating in this course is expected to be respectful of each other without regard to race, class, linguistic background, religion, political beliefs, sex, gender identity or expression, sexual orientation, ethnicity, age, veteran's status, or physical ability. If you feel these expectations have not been met, please speak with Dr. Goode at egoode@towson.edu.

Withdrawal: The last day to withdrawal with a grade of 'W' is Monday, November 8, 2021.

Attendance Policy: Students are expected to attend all classes. The class sessions offer the opportunity for students to ask questions about the concepts and to get help solving the problems. In class exercises can be given at any time and will NOT be made up, unless an excused absence is obtained ahead of time. Excused absences will not negatively affect your grade, but students remain responsible for all instructional activity conducted in each class.

I believe that a student who asks questions is worth her/his weight in gold. There is NO dumb question. So ask questions when you don't understand something.

Course Outline

Topics	# of weeks
Chapter 1 - INTEGERS: (Sections 1, 2, 3, 4) Students should be familiar with divisibility, congruences, and modular arithmetic	0.0
Chapter 2 - FUNCTIONS: (Sections 1, 2 as needed and Section 3) Brief review of Equivalence Relations. Permutations and Cycle Notation.	1.0
Chapter 3 - GROUPS: (Sections 1, 2, 3, 4, 5, 6, 7, 8) Definition of a group, examples, subgroups, cyclic groups, Lagrange's Theorem, Isomorphisms, homomorphisms, cosets, normal subgroups and factor groups.	4.5
Chapter 4 - POLYNOMIALS: (Sections 1, 2, 3, 4) Fields, roots of polynomials, factors, Division Algorithm, extension fields Emphasize examples of extension fields related to finite fields.	3.5
Chapter 5 - COMMUTATIVE RINGS: (Sections 1, 2, 3, 4) Definition of a ring, examples, integral domains, ideals, prime and maximal ideals, fields of quotients. Emphasize examples of quotient rings related to finite fields. Time permitting, discuss irreducible polynomials over \mathbb{Z}_p and construction of finite fields.	4.0
Exams	1.0

Textbook: Abstract Algebra, Third Edition, by John Beachy and William Blair.

Adopted: September 2013.