

# Abstract Algebra I (3)

(Effective Fall 2016)

**Prerequisite:** Math 310 and Math 314.

**Catalog Description:** Equivalence relations and partitions. Properties of the integers. Elementary theory of groups and rings. Polynomial rings, integral domains, divisibility, unique factorization domains, fields, vector spaces, and linear transformations. Students are required to submit written work and make an oral presentation.

**Learning Outcomes for Major:** This course addresses one or more of the student learning outcomes for the major. Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn mathematics and/or statistics independently.

**Teaching Objectives:** The student will:

1. Understand and apply knowledge of basic set theory, mappings, properties of integers, and mathematical induction.
2. State and apply Lagranges theorem, Cauchys theorem, and the homomorphism theorems.
3. Distinguish the similarities and differences among various types of groups.
4. Identify and compare the properties of rings, ideals, quotient rings, integral domains, principal ideal domains, unique factorization domains, and fields.
5. Investigate various properties of factor groups and direct products.
6. Understand the relationships among polynomial rings, roots of polynomials, and field extensions.

**Text(s):** Contemporary Abstract Algebra, Joseph Gallien, 9th Edition, 2016, Cengage Learning, ISBN-10: 1-305-65796-9.

Chapter	Title (Sections)	Days
1–10	Groups (Review Chapter 0 as needed)	24
12–16	Rings and Fields	13
	One period tests	4
	Total days	41

**Disability  
Services:**

The University of Tennessee provides reasonable accommodations (academic adjustments and auxiliary aids) to ensure equal access to educational content and university programs for students with disabilities. Any student eligible for and requesting accommodations due to a disability must provide instructors with a letter of accommodation from Disability Services. For additional information, please contact the Disability Services office at 209 Clement Hall, (731) 881-7605.