

Tennessee Technological University
Mathematics Department

MATH 4010-4020/5010/5020: Modern Algebra I-II

- I. COURSE DESCRIPTION FROM CATALOG: Lec. 3-3. Cr. 3-3.
Groups and subgroups including cyclic, abelian, finite; permutation groups, group homomorphisms, cosets and Lagrange's Theorem, normal subgroups and factor groups. Rings including integral domains, unique factorization domains and Euclidean domains, ideals and factor rings, ring homomorphisms, fields and their extensions, geometric constructions.
- II. PREREQUISITE(S):
MATH 4010/5010: C or better in MATH 2010 and/or better in MATH 3400.
MATH 4020/5020: C or better in MATH 4010/5010.
- III. COURSE OBJECTIVE(S):
To enable the student to obtain a broad overview of the most common algebraic systems and to begin attaining a working knowledge of groups, rings, fields, and integral domains.
- IV. STUDENT LEARNING OUTCOMES:
MATH 4010/5010:
Upon successful completion of the course students will state the standard axioms of a group and be able to use these axioms to prove simple results about groups; develop a working knowledge of important types of groups including Abelian group, cyclic group, permutation group, factor group, and direct product, along with a working knowledge of important concepts related to groups, including order, homomorphism, isomorphism, subgroup, and normal subgroup; and be familiar with important theorems, including Lagrange's Theorem, Cayley's Theorem, and the First Isomorphism Theorem for Groups, and be able to apply these theorems to prove simple results about groups.

MATH 4020/5020:
Upon successful completion of the course students will understand the standard axioms of a ring and be able to use these axioms to prove simple results about rings; develop a working knowledge of important types of rings, including integral domain, field, factor ring, polynomial ring, and direct product, along with a working knowledge of important concepts related to rings, including order, c

