Salisbury University Department of Mathematical Sciences

MATH 442/562 : Abstract Algebra II
Syllabus (Tentative)

Description: Modern abstract algebra including such topics as rings, polynomials and fields. Other topics may include algebraic coding, Boolean algebras, symmetry and mathematical crystallography, applications of finite fields to computer science. 4 Hours Credit: Meets four hours per week.

Prerequisites: C or better in MATH 441.

Intended Audience: All majors in the mathematical sciences and any students who wish to pursue graduate study in mathematics or its applications, physics or computer science.

Objective: To develop the foundations for modern algebra. The primary focus will be on constructing proofs and writing in mathematics. The standard theory of a second semester algebra course will be presented.

Textbooks: *Abstract Algebra: An Introduction*, 3rd Edition by Thomas W. Hungerford

Topic	Weeks
Review of Groups	1
Definition; subgroups; symmetric group; examples.	
Structure of Groups	4
Cayley's Theorem; cosets; Lagrange's Theorem; Fundamental Theorem of Finite Abelian Groups; homomorphisms; isomorphisms; normal subgroups and kernels of homomorphisms; automorphisms; quotient groups; homomorphism theorem for groups; direct products.	
Field Extensions	3
Abstract vector spaces; extension fields; finite fields.	
Galois Theory	4
Introduction to Galois theory; applications to solvability of polynomials; solvability by radicals; the insolvability of the quintic; impossible geometric constructions.	
Addition Topics	1
Additional topics may include Galois theory, module theory, computational algebraic geometry, Sylow theorems, group actions, and other related topics.	
Tests	1
Total	**14**

Evaluation

Tests	30 – 40%
Homework	30 – 40%
Final exam	20 – 30%

- Graduate students will be assigned special homework/test problems or projects.
- Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work.
- **Writing Across the Curriculum:** Students will be expected to communicate mathematics and mathematical ideas effectively in speech and writing. At the University Writing Center, trained consultants are ready to help you at any stage of the writing process. In addition to the important writing instruction that occurs in the classroom and during professors' office hours, the Center offers another site for learning about writing. **All students are encouraged to make use of these important services.**
- **NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.