

Syllabus for the Qualifying Exam for Abstract Algebra I at Georgia State University

1. Groups:

Basic group theory, actions on groups and Sylow theorems.

2. Rings:

Basic ring theory, polynomial rings, Principal Ideal Domains, Unique Factorization Domains.

3. Fields:

Basic field theory, finite fields.

4. Galois theory:

Field extensions (finite, finitely generated, algebraic), algebraic closure, algebraically closed fields, splitting fields, normal extensions, separable extensions, the fundamental theorem of Galois theory, radical extensions, solvability with radicals of a polynomial equation.

5. Fundamental Symmetric Polynomials

Basic facts, the main theorem on symmetric polynomials, the fundamental theorem of algebra.