

**King Fahd University of Petroleum & Minerals**

**Department of Mathematics and Statistics**

**Comprehensive Exam Syllabus**

**MATH 551: Abstract Algebra**

**Topics:**

- Rings, Homomorphisms, and Ideals (III.1, III.2)
- Modules, Exact Sequences, Sums and Products (IV.1)
- Hom and Tensor, Adjoint Isomorphism (IV.4, IV.5)
- Free Modules (IV.2)
- Projective and Injective Modules (IV.3)
- Chain conditions (VIII.1)
- Prime and Primary Ideals (VIII.2)
- Primary decomposition (VIII.3)
- Noetherian Rings and Modules (VIII.4)
- Artinian Rings and Structure Theorems (IX.1)

[The roman numbers refer to Hungerford's book.]

**Textbooks:**

Algebra, by T. Hungerford, Graduate Text in Mathematics 73, Springer.

Abstract Algebra, by P. Grillet, Graduate Text in Mathematics 242, Springer.