

ALGEBRA SYLLABUS

Linear Algebra, including:

- (1) Vector spaces, linear independence, bases, dimension.
- (2) Linear Transformations, matrices, change of basis, eigenvalues and eigenvectors, diagonalization, *Jordan canonical forms*.

Groups, including:

- (1) Subgroups, normal subgroups, quotient groups, and homomorphism theorems
- (2) Standard examples (e.g. cyclic groups, symmetric groups)
- (3) Direct products, structure of finite abelian groups.

Rings, including:

- (1) Ideals, quotient rings, homomorphism theorems.
- (2) UFD's, PID's, Euclidean domains, polynomial rings.
- (3) Maximal ideals, prime ideals, fields, integral domains.
- (4) Field extensions, algebraic elements, finite fields.

References:

Each of the following books has all the material required for the examination.

1. Fraleigh, John B., A First Course in Abstract Algebra, Addison Wesley.
2. Herstein, I.N., Topics in Algebra, Wiley.
3. Beachy, John, and Blair, William, Abstract Algebra with a Concrete Introduction, Prentice Hall.
4. Durbin, John, Modern Algebra - An Introduction, Wiley.