Syllabus for Preliminary Exam for 631-632 Algebra I, II

Linear algebra: vector spaces, linear transformations, eigenvectors and diagonalization, Jordan canonical form, bilinear forms and inner product spaces, normal operators.

Groups: cosets, quotient groups, isomorphism theorems, group actions, Sylow theorems, finitely generated abelian groups.

Rings: ideals, quotients, isomorphism theorems, principal ideal domains, unique factorization domains, Euclidean domains, integers and polynomials.

Modules: isomorphism theorems, finitely generated modules over principal ideal domains.

Fields: field extensions, algebraic and transcendental elements and extensions, Galois theory.

Suggested textbook: M. Artin, *Algebra*
Chapter 2, 3, 4(sections 1-4, 6), 5(sections 5-7), 6(sections 1, 3-6), 7(sections 1-5), 10(sections 1-7), 11(sections 1-4), 12(sections 1-7), 13(sections 1-3,5,6), 14 (sections 1-5).