

COMPREHENSIVE EXAMINATION SYLLABUS
ALGEBRAS, LATTICES, VARIETIES
MATH 743 AND MATH 748V
AUGUST 2007

This comprehensive examination will cover the material in the chapters and sections of the books listed below.

- ALGEBRAS, LATTICES, VARIETIES by McKenzie, McNulty, and Taylor
 - Chapter 1: Basic Concepts
 - Chapter 2: Lattices
 - Chapter 4: Fundamental Algebraic Results (Except §4.8)
- A COURSE IN UNIVERSAL ALGEBRA by Burris and Sankapannavar
 - Chapter I: Lattices
 - Chapter II: The Elements of Universal Algebra (Except §§4 and 14)
 - Chapter IV §6: Ultraproducts and Congruence Distributive Varieties.
- THE COMMUTATOR IN CONGRUENCE MODULAR VARIETIES by Freese and McKenzie
 - Chapter 1: The Commutator in Groups and Rings
 - Chapter 2: Universal Algebra
 - Chapter 3: Several Commutators
 - Chapter 4: One Commutator in Modular Varieties; Its Basic Properties
 - Chapter 5: The Fundamental Theorem of Abelian Algebras
 - Chapter 6: Permutability and a Characterization of Modular Varieties
 - Chapter 7: The Center and Nilpotent Algebras
 - Chapter 10 §3: Residually Small Varieties
- NOTES ON LATTICE THEORY by J. B. Nation
 - Chapter 2: Semilattices, Lattices, and Complete Lattices
 - Chapter 3: Algebraic Lattices
 - Chapter 4: Representation by Equivalence Relations
 - Chapter 5: Congruence Relations
 - Chapter 7: Varieties of Lattices
 - Chapter 8: Distributive Lattices
 - Chapter 9: Modular Lattices

This looks like a lot, but there is considerable overlap in these four books. MATH 743 was based on the material in J.B. Nation's Notes on Lattice Theory and on the material in Chapter 2 of the McKenzie, McNulty, Taylor book. MATH 748V was based on the material in Chapters 1 and 4 of the McKenzie, McNulty, Taylor book and on the material in the Freese and McKenzie book on the Commutator in Congruence Modular Varieties. The book by Burris and Sankapannavar gives another presentation of a lot of the material in MATH 748V. All these books have exercise sets to help you prepare for the comprehensive examination. The Commutator book even provides detailed solutions for its exercises (but try your hand first).

Some Advice:

- (1) The most important thing is to know the definitions of the key concepts.
- (2) The next most important thing is to know some informative examples.
- (3) After that, know the fundamental facts and principles that get used over and over.
- (4) After that, know the big theorems.
- (5) After that, learn some of the proofs.

While I will be gone in the middle of June and in the middle of July, other times I will be around the Department. You are more than welcome to drop by and discuss things. I can also be reached by email most of the time.

George F. McNulty