
ALGEBRA

A Graduate Course

I. Martin Isaacs

University of Wisconsin, Madison



Brooks/Cole Publishing Company
Pacific Grove, California

Contents

PART ONE
Noncommutative Algebra 1

CHAPTER 1
Definitions and Examples of Groups 3

CHAPTER 2
Subgroups and Cosets 14

CHAPTER 3
Homomorphisms 30

CHAPTER 4
Group Actions 42

CHAPTER 5
The Sylow Theorems and p -groups 55

CHAPTER 6
Permutation Groups 70

CHAPTER 7	
<i>New Groups from Old</i>	83
CHAPTER 8	
<i>Solvable and Nilpotent Groups</i>	99
CHAPTER 9	
<i>Transfer</i>	115
CHAPTER 10	
<i>Operator Groups and Unique Decompositions</i>	129
CHAPTER 11	
<i>Module Theory without Rings</i>	142
CHAPTER 12	
<i>Rings, Ideals, and Modules</i>	159
CHAPTER 13	
<i>Simple Modules and Primitive Rings</i>	177
CHAPTER 14	
<i>Artinian Rings and Projective Modules</i>	194
CHAPTER 15	
<i>An Introduction to Character Theory</i>	213

PART TWO
Commutative Algebra 231

CHAPTER 16	
<i>Polynomial Rings, PIDs, and UFDs</i>	233

CHAPTER 17	
<i>Field Extensions</i>	254

CHAPTER 18	
<i>Galois Theory</i>	274

CHAPTER 19	
<i>Separability and Inseparability</i>	293

CHAPTER 20	
<i>Cyclotomy and Geometric Constructions</i>	307

CHAPTER 21	
<i>Finite Fields</i>	326

CHAPTER 22	
<i>Roots, Radicals, and Real Numbers</i>	342

CHAPTER 23	
<i>Norms, Traces, and Discriminants</i>	359

CHAPTER 24	
<i>Transcendental Extensions</i>	379

CHAPTER 25	
<i>The Artin-Schreier Theorem</i>	401
CHAPTER 26	
<i>Ideal Theory</i>	418
CHAPTER 27	
<i>Noetherian Rings</i>	433
CHAPTER 28	
<i>Integrality</i>	453
CHAPTER 29	
<i>Dedekind Domains</i>	474
CHAPTER 30	
<i>Algebraic Sets and the Nullstellensatz</i>	493
<i>Index</i>	507