

Contents

Preface

Chapter 1.	Preliminaries	1
1.	Notation and terminology	1
2.	Tensor products	4
3.	Artinian, noetherian and completely reducible modules	8
4.	The radical of modules and rings	19
5.	The Wedderburn-Artin theorem	29
6.	Group algebras and group representations	37
Chapter 2.	General properties of induced modules	45
1.	Induced modules, representations and characters	45
2.	Formal properties of induced modules	54
3.	Annihilators of induced modules	66
4.	Clifford's theorem	74
5.	Dual and contragredient modules	79
6.	Induction, restriction, and outer tensor products	87
7.	Mackey theorems and their applications	89
8.	Counting induced modules and characters	97
9.	Relative trace maps	103
10.	Induction and relative projectivity	107
11.	Unique decompositions	120
12.	Projective covers	123
Chapter 3.	Induction from normal subgroups	131
1.	Complete noetherian local rings	132
2.	Reduction to G -invariant modules	139
3.	Group-graded algebras and crossed products	141
4.	The endomorphism ring of induced modules	153
5.	Relations between the decomposition of V^G and $End_{RG}(V^G)$	159
6.	Twisted group algebras over fields	167
7.	Total and absolute indecomposability of induced modules	180
8.	Crossed products over prime rings	191
9.	Homogeneity of induced modules	208

	10.	Frobenius and symmetric algebras	210
	11.	Symmetric crossed products	220
	12.	$End_{FG}(V^G)$ is symmetric	230
	13.	Graded modules	232
	14.	Induction from irreducible modules and their projective covers	238
	15.	Inflated modules over twisted group algebras	242
	16.	Induction of absolutely irreducible modules	256
	17.	Applications	261
	18.	The Loewy length of induced modules	266
Chapter	4.	Projective summands of induced modules	273
	1.	The Reynolds ideal	273
	2.	Projective summands	280
	3.	Applications	295
Chapter	5.	Green theory	299
	1.	Vertices and sources	299
	2.	The Green correspondence	309
	3.	The endomorphism ring of the Green correspondents	318
	4.	The Green correspondence and Brauer's induction theorem	329
	5.	The Green correspondence and the Brauer lift	334
	6.	The Green correspondence and normal subgroups	337
Chapter	6.	Simple induction and restriction pairs	341
	1.	Blocks of algebras	341
	2.	Defect groups of blocks	350
	3.	Blocks and vertices	358
	4.	Simple induction and restriction pairs	365
	5.	Complete reducibility of induced modules	373
Chapter	7.	Permutation modules	383
	1.	Preliminary results	383
	2.	Hecke algebras	392
	3.	Fusion and permutation modules	403
	4.	Complete reducibility of $(1_p)^G$	409
	5.	Induction from Sylow p -subgroups	416
	6.	Loewy series for transitive permutation modules	426
	7.	Characterizations of p -permutaion modules	433

8.	The Brauer morphism	438
9.	Scott modules	448
10.	The Brauer morphism and p -permutation modules	451
Chapter 8.	Permutation lattices	459
1.	Generalized permutation lattices	459
2.	Permutation lattices and normal subgroups	473
3.	Some bimodule isomorphisms	484
4.	Applications	489
	Bibliography	499
	Notation	511
	Index	516