

Contents

Preface	vii
Notations	xi
1 Coalgebras and comodules	1
1 Coalgebras	1
2 Coalgebra morphisms	8
3 Comodules	20
4 \mathcal{C} -comodules and \mathcal{C}^* -modules	41
5 The finite dual of an algebra	55
6 Annihilators and bilinear forms	62
7 The rational functor	66
8 Structure of comodules	75
9 Coalgebras over QF rings	80
10 Cotensor product of comodules	93
11 Bicomodules	101
12 Functors between comodule categories	110
2 Bialgebras and Hopf algebras	129
13 Bialgebras	129
14 Hopf modules	134
15 Hopf algebras	144
16 Trace ideal and integrals for Hopf algebras	158
3 Corings and comodules	169
17 Corings and their morphisms	170
18 Comodules over corings	180
19 \mathcal{C} -comodules and \mathcal{C}^* -modules	195
20 The rational functor for corings	212
21 Cotensor product over corings	217
22 Bicomodules over corings	223
23 Functors between comodule categories	230
24 The category of corings	240
4 Corings and extensions of rings	251
25 Canonical corings and ring extensions	251
26 Coseparable and cosplit corings	256
27 Frobenius extensions and corings	264
28 Corings with a grouplike element	276

29	Amitsur complex and connections	288
30	Cartier and Hochschild cohomology	299
31	Bialgebroids	308
5	Corings and entwining structures	323
32	Entwining structures and corings	323
33	Entwinings and Hopf-type modules	335
34	Entwinings and Galois-type extensions	342
6	Weak corings and entwinings	357
35	Weak corings	357
36	Weak bialgebras	366
37	Weak entwining structures	382
	Appendix	395
38	Categories and functors	395
39	Modules and Abelian categories	409
40	Algebras over commutative rings	416
41	The category $\sigma[M]$	425
42	Torsion-theoretic aspects	435
43	Cogenerating and generating conditions	445
44	Decompositions of $\sigma[M]$	451
	Bibliography	457
	Index	471