## **Contents**

	Introduction	ix
1	Group cohomology	1
	Preliminaries	1
	Low-dimensional interpretation	6
	Homology groups	8
	Complete resolutions and the Tate groups	9
	Notes and references	11
	Problems	12
2	Products and change of group	14
	Definition of the cup product	14
	Change of group	18
	Notes and references	24
	Problems	24
3	Relations with subgroups and duality	25
	Relations between subgroups	25
	Duality	28
	Periodicity	31
	Notes and references	36
	Problems	36
4	Spectral sequences	38
	The spectral sequence of an extension	38
	An application – split metacyclic groups	43
	Notes and references	47

ix

## viii Contents

	Problems	48
5	Representations and vector bundles	49
	Representations	49
	Coordinate bundles	55
	Classifying spaces	62
	Notes and references	63
6	Bundles over the classifying space for a discrete group	64
	Flat bundles	64
	First calculations	73
	Extra-special p-groups	75
	Notes and references	77
	Problem	78
7	The symmetric group	79
	Notation	79
	Chern classes of the representation $\pi_n$	80
	Linear groups over rings of algebraic integers	8.
	Notes and references	89
8	Finite groups with <i>p</i> -rank ≤ 2	9:
	Abelian groups	9
	Groups with p-periodic cohomology	92
	<i>p</i> -groups of rank 2, $p \ge 5$	9:
	Notes and references	10
9	Linear groups over finite fields	102
	SL(n,q)	102
	Characteristic classes for modular representations	100
	Notes and references	113
	Appendix 1: The Riemann-Roch formula	114
	Appendix 2: Integral cohomology of non-abelian groups	
	of order $p^3, p \ge 3$	120
	Appendix 3: Non-abelian groups of order $p^4$ , $p \ge 5$	12
	References	12
	Index of symbols	120
	Index	12