

CONTENTS

SERIES PREFACE v

PREFACE vii

CHAPTER 1 : Finitely Generated Algebras

1.A	Algebras over a Ring	1
1.B	Factorization in Rings	2
1.C	Noetherian Rings and Modules	4
1.D	Graded Rings and Modules	7
1.E	Integral Extensions	8
1.F	Noether's Normalization Lemma and Its Consequences	12

CHAPTER 2 : The K -Spectrum and the Zariski Topology

2.A	The K -Spectrum of a K -Algebra	19
2.B	Affine Algebraic Sets	21
2.C	Strong Topology	32

CHAPTER 3 : Prime Spectra and Dimension

3.A	The Prime Spectrum of a Commutative Ring	41
3.B	Dimension	48

CHAPTER 4 : Schemes

4.A	Sheaves of Rings	61
4.B	Schemes	68
4.C	Finiteness Conditions on Schemes	75
4.D	Product of Schemes	77
4.E	Affine Morphisms	83

CHAPTER 5 : Projective Schemes

5.A	Projective Schemes	87
5.B	Main Theorem of Elimination	102
5.C	Mapping Theorem of Chevalley	107

CHAPTER 6 : Regular, Normal and Smooth Points

6.A	Regular Local Rings	111
6.B	Normal Domains	118
6.C	Normalization of a Scheme	125
6.D	The Module of Kähler Differentials	128
6.E	Quasi-coherent Sheaves and the Sheaf of Kähler Differentials	139

CHAPTER 7 : Riemann–Roch Theorem

7.A	Coherent Modules on Projective Schemes	153
7.B	Projective Curves	158
7.C	The Projective Line	163
7.D	Riemann–Roch Theorem for General Curves	167
7.E	Genus of a Projective Curve	175
References		201
List of Symbols		203
Index		205
Biography of Authors		211