## TABLE OF CONTENTS

VI. VALUATION THEORY	PAGE
§ 1. Introductory remarks	1
§ 2. Places	3
§ 3. Specialization of places	7
§ 4. Existence of places	11
§ 5. The center of a place in a subring	15
§ 5bis The notion of the center of a place in algebraic geometry	21
§ 6. Places and field extensions	24
§ 7. The case of an algebraic field extension	27
§ 8. Valuations	32
§ 9. Places and valuations	35
§ 10. The rank of a valuation	39
§ 11. Valuations and field extensions	50
§ 12. Ramification theory of general valuations	67
§ 13. Classical ideal theory and valuations	82
§ 14. Prime divisors in fields of algebraic functions	88
§ 15. Examples of valuations	99
§ 16. An existence theorem for composite centered valuations	106
§ 17. The abstract Riemann surface of a field	110
§ 18. Derived normal models	123
VII. POLYNOMIAL AND POWER SERIES RINGS	
§ 1. Formal power series	129
§ 2. Graded rings and homogeneous ideals	149
§ 3. Algebraic varieties in the affine space	160
§ 4. Algebraic varieties in the projective space	168
§ 4bis Further properties of projective varieties	173
§ 5. Relations between non-homogeneous and homogeneous ideals	179
§ 6. Relations between affine and projective varieties	187
§ 7. Dimension theory in finite integral domains	192
§ 8. Special dimension-theoretic properties of polynomial rings	203
§ 9. Normalization theorems	209
·	

CHAPTER	PAGE
§ 10. Dimension theory in power series rings	217
§ 11. Extension of the ground field	221
§ 12. Characteristic functions of graded modules and	
homogeneous ideals	230
§ 13. Chains of syzygies	237
VIII. LOCAL ALGEBRA	
§ 1. The method of associated graded rings	248
§ 2. Some topological notions. Completions	251
§ 3. Elementary properties of complete modules	258
§ 4. Zariski rings	261
§ 5. Comparison of topologies in a noetherian ring	270
§ 6. Finite extensions	276
§ 7. Hensel's lemma and applications	278
§ 8. Characteristic functions	283
§ 9. Dimension theory. Systems of parameters	288
§ 10. Theory of multiplicities	294
§ 11. Regular local rings	301
§ 12. Structure of complete local rings and applications	304
§ 13. Analytical irreducibility and analytical normality	
of normal varieties	313
APPENDIX	
1. Relations between prime ideals in a noetherian domain o and in	
a simple ring extension $o[t]$ of $o$ .	321
2. Valuations in noetherian domains	330
3. Valuation ideals	340
4. Complete modules and ideals	347
5. Complete ideals in regular local rings of dimension 2	363
6. Macaulay rings	394
7. Unique factorization in regular local rings	404
INDEX OF DEFINITIONS	400