Algebra II: Commutative Algebra

4h lecture, TU Berlin, SS 2020, Prof. P. Bürgisser

Chap. 3. Rings and Modules of Fractions

3.1 Localization of rings

3.2 Localization of modules

3.3 Local properties

3.4 Extended and contracted ideals in localizations

3.5 Spectrum of a ring and Zariski topology

3.3 Pull back of ring morphisms

Chap. 4. Integral Dependence and Valuations

3.1 Integral dependence

3.2 Going-up theorem

3.3 Integrally closed domains: going down theorem

3.4 Noether normalization lemma and Hilbert's Nullstellensatz

3.5 Valuations rings

Chap. 5. Chain Conditions

Chap. 6. Noetherian Rings

Chap. 7. Primary Decomposition

Chap. 8. Dimension Theory

8.1 Graded rings and modules

8.2 Hilbert functions

8.3 Hilbert-Samuel function of local rings

8.4 Dimension theory of local rings

Main reference

Introduction to commutative algebra
M. F. Atiyah ; I. G. Macdonald., Addison-Wesley 2018.