

ALGEBRAIC GEOMETRY. PLAN OF THE COURSE

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1. Introduction: affine varieties, projective varieties. Advertisement: Bézout theorem, 27 lines on a cubic surface.
2. Spaces with functions as a language of algebraic geometry (in this course). Affine varieties. Algebraic varieties. Existence of affine varieties.
3. Hilbert basis theorem. Nullstellensatz. Normalization lemma. Dimension. Irreducible components. Dimension.
4. Modules. Rings and modules of fractions. Nakayama lemma.
5. Affine and finite maps. Closed embedding. Projective varieties. Hyper-surfaces and Principal ideal theorem.
6. Tensor product of modules and algebras. Product of algebraic varieties. Algebraic groups.
7. Separatedness, properness. Chow lemma.
8. Tangent space at a point. Smoothness.
9. Basics of algebraic curves.
10. Sheaves, quasicoherent sheaves. Invertible sheaves. Divisors on curves.
11. Riemann-Roch theorem for curves.

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