אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2024–25–A term

Course Name Introduction to Algebraic Geometry

Course Number 201.1.6171

Course web page
https://math.bgu.ac.il//en/teaching/fall2025/courses/introduction-to-algebraic-g

Office Hours https://math.bgu.ac.il/en/teaching/hours

Abstract

Requirements and grading[1]

Course topics

.1 Affine and projective spaces, affine and projective maps, Segre and Veronese embeddings, Desargues's Theorem, Pappus's Theorem, cross-ratio, projective duality

.2 Plane curves: rational curves, linear systems of curves, conics and the Butterfly Theorem, Pascal's Theorem, Chasles's Theorem, the group structure on a planar cubic, Bezout's Theorem

.3 Affine algebraic varieties: Hilbert's Basis Theorem, Zariski topology, irreducible components, Hilbert's Nullstellensatz, the correspondence between the ideals and the algebraic sets, morphisms and rational maps between affine algebraic varieties

.4 Projective varieties: graded rings and homogeneous ideals, the projective correspondence, morphisms, blow-ups, birational equivalence and rational varieties, Grassmannians

.5 The basics of dimension theory

.6 The basics of smoothness

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[1]Information may change during the first two weeks of the term. Please consult the webpage for updates

.7 Cubic surfaces and 27 lines. If time permits, other topics will be discussed such as abstract algebraic varieties, Chevaley's Theorem, Riemann-Roch Theorem and its applications.