The Department of Mathematics
2020–21–A term

Course Name  Introduction to Algebraic Geometry
Course Number  201.1.6171
Course web page  https://www.math.bgu.ac.il/en/teaching/fall2021/courses/introduction-to-algebraic-geometry
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Office Hours  https://www.math.bgu.ac.il/en/teaching/hours

Abstract
Requirements and grading

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

Information may change during the first two weeks of the term. Please consult the webpage for updates.
5. The basics of dimension theory

6. The basics of smoothness

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