

# Algebraic Geometry

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**Prerequisites:** Familiarity with projective geometry and the use of ideals in algebra,

The goal of the course will be to provide a fast introduction to the geometry of projective varieties, based mostly on examples. In principle, the course will be organized in the following weekly distribution:

1. Introduction to projective sets: Graded ring, components, Nullstellensatz, Hilbert polynomial, invariants (degree and dimension), first examples (points, rational curves, Segre and Veronese varieties,...).
2. Morphisms of projective sets: Product of varieties, projections, closedness of the morphisms.
3. Parameter spaces: Grassmannians, Chow varieties, Hilbert schemes,...
4. Classical examples: Fano varieties, hypersurfaces containing linear spaces, hypersurfaces containing rational curves,...
5. Special varieties: Varieties of minimal degree, secant and dual varieties, open problems.

## Bibliography:

The spirit and most of the examples are extracted from the textbook:

J. Harris, *Algebraic Geometry: A first Course*, Graduate Texts in Mathematics, Springer 1992.

Many details will also be found in sections 1-13 of the teacher notes available at [www.mat.ucm.es/~arrondo/projvar.pdf](http://www.mat.ucm.es/~arrondo/projvar.pdf).

**Language:** English.

**Nota per gli studenti di lingua italiana:** Anche se il corso si svolgerà interamente in inglese (salvo nell'improbabile caso che tutti gli studenti sappiano l'italiano), si potrà usare l'italiano sia nel ricevimento studenti che per rispondere agli esami.