

ALGEBRAIC GEOMETRY 2024-2025

	DAY	TIME	WHERE	TOPICS
LECTURE 1	1 October	11-13	ROOM 134 (SISSA)	Intro to the course. Presheaves, sheaves, morphisms, constant presheaves, sheaf condition via equalisers. Stalks, compatible germs.
LECTURE 2	1 October	14-15	ROOM 136 (SISSA)	Characterisation of surjectivity and of isomorphisms via stalk. Existence of sheafification. Skyscrapers. Exact sequences of sheaves.
LECTURE 3	2 October	13-16	ROOM 136 (SISSA)	Supports of sheaves and sections. Sheaves on a base. Direct/inverse image sheaf, adjunction. Locally ringed spaces. Immersions.
LECTURE 4	8 October	11-13	ROOM 134 (SISSA)	Zariski topology on Spec A. Examples. Affine schemes.
LECTURE 5	8 October	14-15	ROOM 136 (SISSA)	Construction of the structure sheaf of Spec A.
LECTURE 6	9 October	13-16	ROOM 136 (SISSA)	Irreducibility, connectedness, quasicompactness. Morphisms of affine schemes and examples.
LECTURE 7	15 October	11-13	ROOM 134 (SISSA)	S-schemes, algebraic varieties. Gluing schemes. Morphisms to an affine scheme.
LECTURE 8	15 October	14-15	ROOM 136 (SISSA)	Proj of a graded ring and its Zariski topology.
LECTURE 9	16 October	13-16	ROOM 136 (SISSA)	Structure sheaf of Proj B. Projective varieties
LECTURE 10	22 October	11-13	ROOM 134 (SISSA)	Projective closure. Exercises on affine and projective schemes.
LECTURE 11	22 October	14-15	ROOM 136 (SISSA)	Exercises on projective schemes.
LECTURE 12	23 October	13-16	ROOM 136 (SISSA)	Irreducible components. Local properties. Reduced and integral schemes. Locally noetherian schemes.
LECTURE 13	29 October	11-13	ROOM 134 (SISSA)	Noetherian schemes. Dimension, codimension, main properties.
LECTURE 14	29 October	14-15	ROOM 136 (SISSA)	Dimension of algebraic varieties. 0-dimensional schemes.
LECTURE 15	30 October	13-16	ROOM 136 (SISSA)	Fibre product and base change. Permanence properties of morphisms. Local properties of morphisms. Finite type/presentation.
LECTURE 16	5 November	11-13	ROOM 134 (SISSA)	Finite type morphisms. Separated and quasiseparated morphisms.
LECTURE 17	5 November	14-15	ROOM 136 (SISSA)	Proper morphisms. Functions on proper integral varieties are constant.
LECTURE 18	6 November	13-16	ROOM 136 (SISSA)	Rational maps, birational morphisms.
LECTURE 19	12 November	11-13	ROOM 134 (SISSA)	Tangent spaces Regular schemes
LECTURE 20	12 November	14-15	ROOM 136 (SISSA)	Flatness.
LECTURE 21	13 November	13-16	ROOM 136 (SISSA)	Blowups and exercises on rational maps.
LECTURE 22	19 November	11-13	ROOM 134 (SISSA)	Dimension of fibres. Smooth, unramified, étale morphisms.
LECTURE 23	19 November	14-15	ROOM 136 (SISSA)	Infinitesimal criteria.
LECTURE 24	20 November	13-16	ROOM 136 (SISSA)	Affine and projective dimension theorems. No maps from P^n to P^1 .