ALGEBRAIC GEOMETRY 2022–2023

	DAY	TIME	WHERE	TYPE	TOPICS
LECTURE 1	11 October 2022	16:00 - 18:00	Room 134 (SISSA)	Theory	Presheaves, sheaves, morphisms, constant presheaves, sheaf condition via equalisers.
LECTURE 2	13 October 2022	16:00 - 18:00	Room 134 (SISSA)	Theory	Stalks, compatible germs. Surjectivity of maps of sheaves. Characterisation of isomorphisms via stalks (proof). Existence of sheafification (proof).
LECTURE 3	18 October 2022	9:00 - 11:00	Room 136 (SISSA)	Theory	Skyscrapers. Exact sequences of sheaves. Defining sheaves on basic open sets. Direct image sheaf. Supports of sheaves and sections.
LECTURE 4	18 October 2022	16:00 - 18:00	Room 128 (SISSA)	Theory	Inverse image sheaf and the adjunction with direct image. Locally ringed spaces, their morphisms. Closed immersions = ideal sheaves.
LECTURE 5	20 October 2022	16:00 - 18:00	Room 137 (SISSA)	Theory	Spectrum of a ring, Zariski topology. Closed points. First examples of Spec(A).
LECTURE 6	25 October 2022	9:00 - 11:00	Room 136 (SISSA)	Theory	Localisation of a module. Structure sheaf of Spec(A). Definition of affine schemes. Schemes. Quasicompact, connected, irreducible schemes.
LECTURE 7	25 October 2022	16:00 - 18:00	Room 005 (SISSA)	Exercises	Local ring of Spec(A) at at prime ideal. Connectedness and idempotents. Localisation. Residue field of local ring at a maximal ideal of a ring.
LECTURE 8	27 October 2022	16:00 - 18:00	Room 005 (SISSA)	Theory	Definition of affine schemes and schemes. Morphisms of affine schemes. Spec is an equivalence Rings^op —> Aff.
LECTURE 9	8 November 2022	9:00 - 11:00	Room 136 (SISSA)	Theory	More on structure sheaf of Spec(A). Irreducible schemes have a unique generic point. Examples of affine (and not affine) schemes and morphisms.
LECTURE 10	8 November 2022	16:00 - 18:00	Room 005 (SISSA)	Theory	Schemes over a base. Hom(-,Y) is a sheaf. Morphisms to an affine scheme (adjunction). Glueing schemes (no proof). Projective space over a ring.
LECTURE 11	10 November 2022	16:00 - 18:00	Room 005 (SISSA)	Theory	Proj of a graded A-algebra and its scheme structure. Second definition of projective space. Projective A-schemes. Projective varieties
LECTURE 12	15 November 2022	16:00 - 18:00	Room 005 (SISSA)	Exercises	The rational normal curve in P^e. Veronese embedding. Plane conics, twisted cubic.
LECTURE 13	22 November 2022	16:00 - 18:00	Room 134 (SISSA)	Theory	More on the twisted cubic. (De)homogeneisation. Affine cones. Irreducible components. Locality lemma. Noetherian schemes. Examples.
LECTURE 14	24 November 2022	16:00 - 18:00	Room 134 (SISSA)	Theory	Reducedness is a local property. Reduced schemes. Reduced induced closed subscheme structure. Integral scheme = reduced + irreducible.
LECTURE 15	29 November 2022	9:00 - 11:00	Room 136 (SISSA)	Theory	Dimension of schemes and rings and main properties. Dimension theory for varieties. Krull's theorem (no proof) and consequences
LECTURE 16	29 November 2022	16:00 - 18:00	Room 005 (SISSA)	Theory	Base change. Properties stable under base change, local on the target. The diagonal. Separated morphisms. Affine morphisms are separated.
LECTURE 17	1 December 2022	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 18	6 December 2022	16:00 - 18:00	Room 134 (SISSA)		
LECTURE 19	13 December 2022	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 20	15 December 2022	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 21	20 December 2022	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 22	22 December 2022	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 23	10 January 2023	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 24	12 January 2023	16:00 - 18:00	Room 005 (SISSA)		
LECTURE 25 (PHD)			Room 005 (SISSA)	Theory	
LECTURE 26 (PHD)			Room 005 (SISSA)	Theory	
LECTURE 27 (PHD)			Room 005 (SISSA)	Theory	
LECTURE 28 (PHD)			Room 005 (SISSA)	Theory	
LECTURE 29 (PHD)			Room 005 (SISSA)	Theory	
LECTURE 30 (PHD)			Room 005 (SISSA)	Theory	