

ALGEBRAIC GEOMETRY 2023-2024

| | DAY | TIME | WHERE | TYPE | TOPICS |
|------------------|--------|-------|----------|-----------|---|
| LECTURE 1 | 3 oct | 9:00 | ROOM 134 | THEORY | Presheaves, sheaves, morphisms, constant presheaves, sheaf condition via equalisers. Examples. |
| LECTURE 2 | 5 oct | 11:00 | ROOM 134 | THEORY | Stalks, compatible germs. Surjectivity of maps of sheaves. Sheaf isomorphisms via stalks (proof). Existence of sheafification (proof). Skyscrapers. Exact sequences of sheaves. |
| LECTURE 3 | 10 oct | 9:00 | ROOM 134 | THEORY | Supports of sheaves and sections. Defining sheaves on basic open sets. Direct image, inverse image, their adjunction. Sheaves supported on a closed subset. |
| LECTURE 4 | 12 oct | 11:00 | ROOM 134 | THEORY | Locally ringed spaces, their morphisms. Immersions. Closed immersions = ideal sheaves. Zariski topology on Spec A and its quasicompactness. Closed points, closure of a subset of Spec A. “Functions” on Spec A. |
| LECTURE 5 | 17 oct | 9:00 | ROOM 134 | THEORY | Localisation of a module. Structure sheaf of Spec(A). Definition of affine schemes. Schemes. Affine varieties. |
| LECTURE 6 | 19 oct | 11:00 | ROOM 134 | THEORY | Quasicompact, connected, irreducible schemes. $V(I)$ irreducible iff $\text{rad}(I)$ is prime. Generic points on irreducible schemes. Morphisms of affine schemes. Spec is an equivalence $\text{Rings}^{\text{op}} \rightarrow \text{Aff}$. |
| LECTURE 7 | 24 oct | 9:00 | ROOM 134 | THEORY | Examples of affine (and not affine) schemes and morphisms. Schemes over a base, closed subschemes. $\text{Hom}(-, Y)$ is a sheaf. Morphisms to an affine scheme (adjunction). Affinisation. |
| LECTURE 8 | 26 oct | 11:00 | ROOM 134 | THEORY | Proj of a graded A-algebra: Zariski topology and structure sheaf. Projective varieties. Projective A-schemes. |
| LECTURE 9 | 27 oct | 9:00 | ROOM 134 | EXERCISES | Exercises on Spec and Proj. |
| LECTURE 10 | 31 oct | 9:00 | ROOM 134 | EXERCISES | Exercises on projective varieties. |
| LECTURE 11 | 7 nov | 9:00 | ROOM 134 | THEORY | Irreducible components. Locality Lemma. Reduced schemes. Integral schemes. |
| LECTURE 12 | 9 nov | 11:00 | ROOM 134 | | |
| LECTURE 13 | 14 nov | 9:00 | ROOM 134 | | |
| LECTURE 14 | 16 nov | 11:00 | ROOM 134 | | |
| LECTURE 15 | 17 nov | 9:00 | ROOM 134 | | |
| LECTURE 16 | 21 nov | 9:00 | ROOM 134 | | |
| LECTURE 17 | 23 nov | 11:00 | ROOM 134 | | |
| LECTURE 18 | 28 nov | 9:00 | ROOM 134 | | |
| LECTURE 19 | 30 nov | 11:00 | ROOM 134 | | |
| LECTURE 20 | 5 dec | 9:00 | ROOM 134 | | |
| LECTURE 21 | 7 dec | 11:00 | ROOM 134 | | |
| LECTURE 22 | 12 dec | 9:00 | ROOM 134 | | |
| LECTURE 23 | 14 dec | 11:00 | ROOM 134 | | |
| LECTURE 24 | 19 dec | 9:00 | ROOM 134 | | |
| LECTURE 25 (PHD) | | | ROOM 134 | | |
| LECTURE 26 (PHD) | | | ROOM 134 | | |
| LECTURE 27 (PHD) | | | ROOM 134 | | |
| LECTURE 28 (PHD) | | | ROOM 134 | | |
| LECTURE 29 (PHD) | | | ROOM 134 | | |
| LECTURE 30 (PHD) | | | ROOM 134 | | |