

DEPARTMENT OF MATHEMATICS

ORAL EXAMINATION

Major area: ALGEBRAIC GEOMETRY

Basic Material:

Hartshorne Chapters I, II (up to & incl. §8), Chapter III (up to & incl. §8). Easy on foundations in Chapter III, but solid knowledge of the cohomology of \mathbf{P}^n and projective varieties and the Serre Duality Theorem.

Curves: Riemann-Roch, Riemann-Hurwitz, embeddings and linear systems, special divisors and Clifford's Theorem, Petri's Theorem.

Surfaces (from Griffiths & Harris, Chapter IV): §§1-4. Solid knowledge of the method of linear systems, computations with cohomology and applications to quadrics and cubics.

Zariski factorization and Grauert's Ampleness Criterion. (Statements and how to use - skip the memorization of proofs);

Statement and use of:

- a) Castelnuovo's contractibility theorem
- b) Castelnuovo's rationality criterion
- c) Enriques' ruledness criterion
- d) Enriques' classification theorem

Knowledge of special examples as in d)

- i) Abelian surfaces
- ii) Elliptic surfaces (incl. Kodaira's degenerate fibre theorem)
- iii) K3
- iv) Enriques' surfaces
- v) F_n

References: Hartshorne, Algebraic Geometry
Griffiths & Harris, Principles of Algebraic Geometry