

7 Reading Courses

7.1 Reading 1: Introduction to Algebraic Geometry

1	Title of the course: Introduction to algebraic geometry
2	Course Code: HRI-MM-641-R
3	Total Contact hours: At least 75 hours of interaction with the instructor
4	Course Credit: 4
5	Course Prerequisites: Commutative algebra (Algebra II) and basic topology.
6	Assessment (Evaluation Procedure): Oral Examination 80% + Presentation 20%
7	Course Outcome: • Understanding of the algebraic techniques to solve geometric problems. • Computations with concrete varieties and morphisms. • Algebraic analogues of the classical study of complex manifolds. • Acquire an understanding to pursue further courses/research in arithmetic and algebraic geometry.
8	Syllabus: • Affine algebraic sets, Hilbert Nullstellensatz, Function field, Krull dimension • Graded rings, (quasi-)projective Varieties, rational functions • Algebraic plane curves, morphism, product, finite maps • Normality, Noether normalisation, Birational morphism • Tangent spaces, non-singularity, resolution of singularities, blowing up points • Divisors, Bezut's theorem on curves, Class group • Intersection numbers, Riemann-Roch theorem
9	References: 1. I. Shafarevich, <i>Basic Algebraic Geometry I</i>, (Second Edition) Springer-Verlag (1988). 2. M. Reid, <i>Undergraduate Algebraic Geometry</i>, Cambridge University Press (1988). 3. W. Fulton, <i>Algebraic Curves</i>, Addison-Wesley Publishing Company, Advanced Book Program (1969). 4. U. Görtz, T. Wedhorn, <i>Algebraic Geometry I</i>, Vieweg+Teubner Verlag (2010).