Nepal Algebra Project(NAP)
Central Department of Mathematics
Tribhuvan University,Kirtipur, Kathmandu,Nepal
Fields and Galois Theory- Short Note of Lecture Module 1 - Lecture 1
Course Instructor: Prof. Michel Waldschmidt

Summary of NAP: Module -1, Lecture 2, Wednesday May 3, 2017

- Solution of the exercises of the first course:
  - irreducible polynomials over $\mathbb{R}$
  - $\sqrt{2}$ as a limit of a Cauchy sequence of rational numbers.
- How to prove that any subgroup of $\mathbb{Z}$ is of the form $n\mathbb{Z}$?
- Euclidean algorithm for $\mathbb{Z}$; gcd, Bézout.
- Homomorphisms, image (subring), kernel (ideal).
- How to prove that any ideal $\mathcal{I} \neq R$ in a domain R is the kernel of a ring homomorphism?
- Prime ideals, maximal ideals. Examples.
- Exercises.
  - the quotient rings $\mathbb{Z}[X]/(X)$, $\mathbb{Z}[X]/(2)$, $K[X,Y]/(Y)$.
  - The characteristic of a field; the smallest subfield. The Frobenius endomorphism.
  - The ring of polynomials over a domain $\mathbb{R}$. Euclidean algorithm for the ring of polynomials in one variable over a field; division by a monic polynomial over a domain.