Nepal Algebra Project(NAP)
Central Department of Mathematics
Tribhuvan University,Kirtipur, Kathmandu,Nepal
Fields and Galois Theory

Course Instructor: Prof. Roger Wiegand and Prof. Sylvia Wiegand

Summary of NAP: Module -1, Lecture 5, On Tuesday May 17 2016

Discussed extension fields, notation, as on page 13 of Milne, including "F-homomorphism", and examples.

We added the fact, which we proved later, that, if α and β are roots of the same irreducible polynomial there exists an F–homomorphism from $F[\alpha]$ to $F[\beta]$

Proved Proposition 1.20 Multiplication of degrees, part 2. (Will go over part 1 in lecture 4 today.)

Proved Lemma 1.2.3: For $F \subseteq R$, where F is a field and R is an integral domain that has finite dimension over F as a vector space, R is a field.

Discussed constructing an extension field where an irreducible polynomial has a root. Proved it is a field.

Discussed examples such as building the complex numbers from the reals.

Proved the finiteness Theorem: For $F \subseteq E \subseteq K$ fields, these are equivalent:

1. E/F is finite (vector space dimension).

2. E/F is finitely generated as a field extension and is algebraic over F.

3. There exist algebraic elements α_1, α_2, $\ldots$, α_n of E, such that $E = F(\alpha_1, \alpha_2, \ldots, \alpha_n)$.