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

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Summary of NAP: Module 5 - Lecture 2

- Proved 'The fundamental theorem of algebra' using Galois theory. Then recalled basic facts about n-th roots of unity and in particular make them familiar with primitive n-th roots of unity. Then introduced the 'cyclotomic extensions' with fair bit of motivation. Then proved the main result about these extensions by showing that if F is a field with either characteristic 0 or a prime p with p not dividing a given positive integer n and $E = F[\zeta]$ with ζ a primitive n-th root of unity then this extension is a Galois extension and the Galois group is embedded into the cyclic group $(\mathbb{Z}/n\mathbb{Z})^*$ Concluded with an example showing that this embedding need not be surjective.