Nepal Algebra Project(NAP)
Fields and Galois Theory “multiple hands" course in Nepal
Central Department of Mathematics
Tribhuvan University,Kirtipur, Kathmandu, Nepal
Course Instructor: Roger and Sylvia Wiegand

NAP: Module -2, Lecture -4, Tuesday, 23 May, 2017

1. Finishing up Section 2
   - Finish up Proposition 2.7 (the case of an extension that is not simple).
   - Do Milne, Proposition 2.13, define *separable* polynomial, and warn students that some books define separability in terms of the irreducible factors. (For us, $X^2 \in \mathbb{Q}[X]$ is *not* separable, but in other books all polynomials are separable if the field has characteristic 0.)
   - Define *perfect field* and do Milne, Proposition 2.16 (characterization of perfect fields).
2. Continuing with Section 3
   - Define *fixed field* E^G. Point out that every automorphism of a field fixes the prime field; so, for example, $\mathrm{Aut}(\mathbb{Q}(\sqrt[4]{2})/\mathbb{Q}) = \mathrm{Aut}(\mathbb{Q}(\sqrt[4]{2})$.
   - **Examples**: $\mathrm{Aut}(\mathbb{Q}(\sqrt[3]{2})) = \{1\}$. $\mathrm{Aut}(\mathbb{Q}(\sqrt{2+\sqrt{2}}))$ is cyclic of order 4. (Reminder that there are only two groups of order 4, up to $\cong$)
   - State and prove Artin's Theorem (3.4): $[E : E^G] \leq |G|$ for G finite. (Proof to be finished next time.)