• Answer to question:
— *Is there a connection between ideals and classes*?

• Background on algebra: groups, subgroups, classes, normal subgroups, quotient of a group by a normal subgroup, canonical surjection.

Commutative rings, ideals, quotient. Examples: $\mathbb{Z}$, $F[X]$. When is the quotient a field in these two examples?
Cyclic groups, subgroups, quotient. Product of cyclic groups.
Groups of order a prime number. Groups of order ≤ 6.

• Corollary 3.12: if E/F is separable there is a finite extension of E which is Galois over F.

• Corollary 3.13. Let $E \supset M \supset F$ be finite extensions. If E/F is Galois, then E/M is Galois.
Examples where
– E/F is Galois and M/F is not Galois
– E/M and M/F are Galois and E/F is not Galois.

• The splitting field E of $X^3 - 2$ over $\mathbb{Q}$: $\mathrm{Gal}(E/\mathbb{Q})$ as a permutation group of the roots.

`Reference`: J.S. Milne, Fields and Galois Theory Version 4.52 March 17, 2017.