PMATH 441/641: Algebraic Number Theory

We study rings of integers in algebraic number fields (extension fields of finite degree over $\mathbb{Q}$). We will cover the following material.

We will start with Galois theory, such as simple extension, normal extension. Next, we will study algebraic numbers and introduce the standard tools of algebraic number theory, including, trace, norm, discriminants, integral bases, and lattices. Then we introduce Dedekind domain and ideal class groups. We will prove the finiteness of the class number, Dirichlet's Unit Theorem, and the class number formula. We plan to cover extra topics if the time is permitted.