# Math 422/501 - Fall 2025
# Fields and Galois Theory

**Time and Location:** TuTh 9:30-11, Math Building, room 225.

**Instructor:** Kalle Karu
Office: 213 Math Bldg
Phone: 822-4787
E-mail: karu@math.ubc.ca
Office hours: TBD.

**Textbook:** There is no official textbook for the course. Many algebra books cover Fields and Galois theory, as well as the background material about groups and rings. Some good books to read are:

- *Advanced Modern Algebra* by Joseph J. Rotman. This book is easy to read, with many examples and problems. It has been used as a textbook for this course before.
- *Fields and Galois Theory, Group Theory.* Online course notes by J. S. Milne. `http://jmilne.org/math/CourseNotes/`. These notes are very concise. They cover only what is needed.

**Course description.** The main topic of this course is Galois theory of fields. To prepare for this, we also cover topics from group and ring theory.

We will assume knowledge of basic group theory. We start by recalling some topics in the theory of groups, such as group actions, composition series, solvable groups. After group theory we cover basics of ring and field theory. In the main part of the course we study field extensions and their Galois groups.

**Homework.** Weekly homework assignments are due on Mondays. You are welcome to discuss the homework problems with other students, or consult textbooks, but please write up your own solutions.

**Use of AI.** No AI-generated answers to homework will be graded.

**Exams.** We will have one midterm exam during regular class hours on Tuesday, November 4, and the final exam scheduled by the university.

**Final Grade.** The first midterm exam counts for 20% of your final grade, the final exam for 40%, and the homeworks for 40%.

**Other algebra textbooks.** *Abstract Algebra* by Dummit and Foote. *Algebra* by Lang, *Algebra* by Artin.