Math 503   Galois Theory   Winter 2013

Instructor   Amites Sarkar

Text   Elements of Algebra
                        John Stillwell

Course content

At the heart of Galois theory is a beautiful and surprising connection between field theory and group theory. This connection, the *Galois correspondence*, is the key to the solution of some famous problems in algebra and geometry, such as the construction of regular polygons and the solution of equations by radicals. Galois himself had a particularly short and tragic life, which ended in a mysterious pistol duel. The version of his theory that we shall study dates from around 100 years after his death.

Most of the course content is covered in Chapters 6, 8 and 9 of the book, although I will briefly review the material on polynomials, fields and groups (in Chapters 4, 5 and 7) during the first few classes. I also hope to cover some additional topics, such as:

• The solution of cubic and quartic equations using Galois theory

• Finite fields

• Galois' own version of his theory

• Abel's theorem on natural irrationalities

Final   Wednesday 20 March 3:30–5:30 pm

Grading

I will base the grade on **homework** (there will be 3 homework assignments), **presentations** (you will each participate in one of 4 30-minute presentations at the end of the quarter) and the final (which will be worth about 30%). The presentation topics will be:

• The fundamental theorem on symmetric polynomials

• The construction of the regular heptadecagon

• The transcendence of π

• Computing the Galois group of a quartic

Office hours

My office hours are 10–10:50 on Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, in 216 Bond Hall. My phone number is 650 7569 and my e-mail is amites.sarkar@wwu.edu