Mathematics Department Paris Program
Spring 2019

Math 29525 (Weeks 1–3): Diophantine Equations

Instructor: Frank Calegari

The study of Diophantine equations is the study of solutions to polynomial equations in integers, from Pythagorean triples to Fermats last theorem and many things in between. This course will introduce techniques for proving that some Diophantine equations have infinitely many solutions and techniques for showing that other Diophantine equations dont have any solutions at all, as well as discussing the history from Babylonian and Greek times to 17th century France and the modern day.

Math 29512 (Weeks 4–6): Introduction to p-Groups

Instructor: Jitka Stehnova

This course is an introduction to p-groups, which play an important role in solvable groups and Lie Algebras. Beginning from the Sylow structure of groups, we will study commutators, the Frattini subgroup, automorphisms, and central products. The course will include a project. The level of difficulty of the project chosen will determine whether this course may be substituted for Math 25500 or Math 25800 in the B.S. degree program.

Math 29526 (Weeks 7–9): Random Walks, the Heat Equation, and Fourier Series

Instructor: Greg Lawler

This course will focus on "diffusion," the movement of heat or other random particles. There are many ways to describe this motion: one can use discrete or continuous models and one can use deterministic or random models. We will do all of these. In the discrete we will see random walk, difference equations, and linear algebra. Going to the continuous we get Brownian motion, partial differential equations, and Fourier series.