

## Paris Math Spring 2015 Course Offerings

### **Course 1 (Weeks 1-3): Introduction to Fourier Analysis**

Instructor: Robert Fefferman

This will be an elementary introduction to the study of Fourier Series and integrals. We shall ask, "When do Fourier Series converge?" If they do not converge, (and they don't always) we shall ask whether there is some notion that is more general than ordinary convergence, according to which Fourier series represent the function they are supposed to represent. We shall study special cases of Fourier Series that are particularly interesting, such as lacunary series, and random series. We shall cover the relationship between the size of a function and the size of its Fourier coefficients (or, in the non-periodic case) the Fourier Transform. We shall also investigate the relationship between Fourier analysis and partial differential equations, as well as other interesting topics as time permits.

### **Course 2 (Weeks 4-6): Iteration: an invitation to dynamics**

Instructor: Shmuel Weinberger

We will discuss what happens when functions are repeated many times -- why the number 1 is the most common first digit of a power of 2, what can happen to a stable ecosystem when it's perturbed, and how chaos can be stable. Topics to be illustrated include differential equations, linear algebra, basic ideas of measure theory, and Fourier series.

### **Course 3 (Weeks 7-9): Introduction of p-Groups**

Instructor: Diane Herrmann

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 25600 or Math 25900 in the BS program. Prerequisite: Math 25500 or Math 25800.

**To apply**, go to the foreign studies website (<http://study-abroad.uchicago.edu/>) and fill out the on line form for Paris Math Spring 2015. There is no need to get a recommendation; we do not require them for this program. We will evaluate your application by considering your math background and your overall transcript. To be eligible to take these math courses, you must have completed any analysis sequence and either Math 25800 or Math 25500.