

MASS-Algebra FALL 2009
MWF 11:15am

Anatole Katok

GROUPS AND THEIR CONNECTIONS TO GEOMETRY

In the introductory part of this course we will introduce principal classes of groups, both abstractly and as coming from various constructions in algebra, geometry and analysis, and develop basics of group theory. After that we will develop two principal themes:

- *Groups related to geometric objects,* and
- *Geometric objects related to groups.*

Within the current mathematical landscape the course will provide introduction into several aspects of three major areas:

- (1) Algebraic topology,
- (2) Theory of transformation groups,
- (3) Geometric group theory.

TEXTS: There will be no single text for the course. The principal source will be lecture notes which will be developed and made available to students in real time. A variety of supplementary sources covering the background, various course topics, and directions for projects and future research, will be provided.

PROJECTS: The course will present ample opportunities for students going more deeply into the subject, especially in area (3), where a variety of open problems exist, many of them accessible to researchers with limited background and to ambitious students. There is also a great variety of opportunities for computer-related projects.