

MATH 595 Group Cohomology

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Instructor:

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Course description:

Cohomology of groups is a ubiquitous and informative invariant with applications in algebraic topology, number theory, representation theory, and any other area where group actions play a role. In this course, we will mostly focus on the cohomology of finite and profinite groups. We will devote a good portion of time on developing computational tools.

Beyond the basics, such as definitions and interpretation of the lower-dimensional cohomology groups, topics will include:

- Tate cohomology, groups with periodic cohomology;
- The Hochschild-Serre spectral sequence, with interesting and explicit applications;
- Group actions on topological spaces, and equivariant cohomology;
- Duality in the continuous cohomology of some profinite groups, such as the absolute Galois groups of local and global fields, or the Morava stabilizer group.

Students will have opportunities for active engagement, through individual or group presentations and/or projects.

Prerequisites: Some algebraic topology, especially homology and cohomology, such as covered in Math 525 and 526.

Useful texts:

[1] Adem and Milgram, *Cohomology of Finite Groups*. [Library Link](#)

[2] Brown, *Cohomology of Groups*. [Library Link](#)

[3] Neukirch, Schmidt, and Wingberg, *Cohomology of Number Fields*. [Library Link](#)

[4] Serre, *Galois Cohomology*. [Library Link](#)