Math 361: Topics in Mathematics – Undergraduate Topology
**MWF 11-11:50am, Spring 2012**
Dr. Jason Parsley

This course introduces students to the exciting world of modern *topology*, which is the study of shapes and objects without regard to their geometry. To a topologist, all matter is flexible and can be bent or stretched (without tearing) – so a doughnut, a keyring, and a coffee mug are all same topologically, since they each have one hole – the coffee mug's handle counts as its hole; the 'hole' where the coffee goes can be stretched away.

After a quick study of topology definitions, we will study four important topics in modern topology. Each has numerous applications and leads to current research in mathematics.
1. Knots and links
2. Surfaces, such as a sphere, torus, Mobius band, and Klein bottle (a 1-sided bottle)
3. 3-dimensional manifolds (the analog of surfaces, one dimension higher)
4. the fundamental group

There is no prerequisite for this course. Students should be prepared to think visually (math 113 can help with visualization) and to write logical arguments (either math 117, 121, or any 300-level can aid this). This course is not intended for students who have taken Math 731: Graduate Topology.
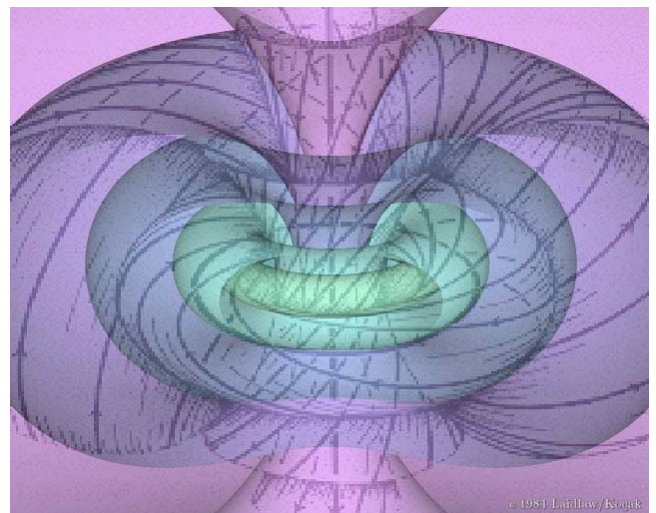
The text for the course is [Topology Now!](#) (~$60). As a topics course, Math 361 will be more focused upon independent learning and discovery; students will have opportunities to present their work. In lieu of a final exam, each student will complete a final project of their own choosing. Please contact me with questions (`parslerj AT wfu.edu`).
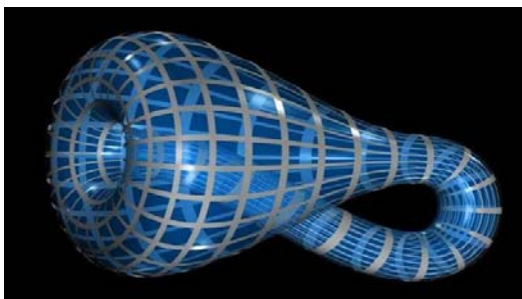
Klein bottle

Knot 8_6

the three-dimensional sphere in $\mathbf{R}^4$ viewed as the union of tori