MATH 180: Topics in Topology

In mathematics, topology is essentially geometry without a notion of distance. The main goal of topology is to understand properties of an object that are intrinsic to its shape—properties that occur regardless of size and are not disturbed by any amount of stretching or bending (but not breaking, tearing, or puncturing). Compare a standard coffee cup to a doughnut, and you'll notice that they both have exactly one hole through which one might stick a finger. If the coffee cup were made of some malleable material, rather than fired clay, we can imagine gently pulling the bottom of the part of the cup that holds the coffee up, and then pushing this around the handle until the cup resembled the doughnut. Because of this, a topologist sees the coffee cup and the doughnut as essentially the "same." Of course, in everyday life, the rigid shape of the coffee cup is important, since you can't very well drink from a donut, but a topologist seeks to understand the coarser qualities of shapes as a first step towards understanding their physical geometry. In this course, students will be introduced to the basic ideas and tools that topologists use to distinguish shapes.

Offered in fall 2016
4 credits