Math 60330 Fall 2019

Basic Geometry and Topology

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This course will cover three related topics:

1. a rapid introduction to point set topology (one or two weeks)

2. the fundamental group and covering spaces (four weeks)

3. smooth manifolds and vector bundles (the rest of the semester)

I will draw from different sources for these topics, so there no required book for this course. Any point set topology book (e.g., Munkres' book *Topology*) is a good source for (1). Part (2) is covered e.g. in Hatcher's book *Algebraic Topology* which is freely available online at

http://www.math.cornell.edu/ hatcher/AT/ATpage.html

This book is also often used for the subsequent Spring class on Algebraic Topology. For part (3) I will again use a variety of sources, among them Lee's book *Introduction to smooth manifolds*. A collection of books will be made available for this course in the math library.

This course is suitable for beginning graduate students or strong honors math majors in their junior or senior year. It might be of interest to anybody who will be dealing with *manifolds* and/or *vector bundles*, basic notions that play a role in many areas of mathematics. It is particularly advised for students interested in geometry/topology. There will be two subsequent courses in the Spring on *Algebraic Topology* and *Differential Geometry* which build on the material of this course.