

Syllabus: M595 Hyperbolic Knot Theory - Spring 2021

Instructor:

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Office hours: Contact me to set up a ZOOM.

Course Overview

Because of William Thurston's geometrization conjecture (proved by Grigori Perelman in 2003), understanding hyperbolic 3-manifolds is fundamental in understanding compact locally Euclidean 3-dimensional spaces. In fact, hyperbolic manifolds have been intently studied before Perelman and even before Thurston. Part of the reason for this is that many fundamental questions lead to deep connections to a staggering variety of other fields and questions in mathematics.

In the 1970's, work of Thurston and Robert Riley made it clear that the complements of 'most' knots in the 3-sphere are hyperbolic. At the time, this was a surprising and exciting discovery which merged the two separate but very active fields of knot theory and Kleinian groups (hyperbolic 3-manifolds). This class will introduce these ideas and connections.

Mostly we will follow Jessica Purcell's text [Hyperbolic Knot Theory](#). But in order to cover the prerequisites of her text, we will address some additional topics as they come up.

Prerequisites

The most important prerequisite for this class is a course in elementary topology. On the other hand, a strong student would likely enjoy the course even without this prerequisite provided they have enough time to study a bit extra on the side.

Text

Hyperbolic Knot Theory, by Jessica Purcell. You should visit Jessica's website

<http://users.monash.edu/~jpurcell/>

to see how to get a copy of her book.

Homework and expectations

We will discuss our options here on the first day of class.

Guidelines and policies

University dates and deadlines

You should be aware of the important dates and deadlines posted by the [Registrar's Office](#).

Academic honesty

I take academic honesty very seriously and I will act on any transgressions that I notice. Misconduct is subject to an academic penalty in this course and/or a disciplinary sanction by the university. We all know that a record of academic misconduct is a very bad thing to have documented in your academic history. All students should be familiar with the [Student Conduct Code](#).

Disability modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Disability Services for Students](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.