



The Graduate Center of CUNY

Ph.D. Program in Mathematics

Course Description

Spring 2022

Course Title: **Knots and 3-manifolds**

Course #: **Math 87100**

Day & Time: **Thursdays, 11:45am - 1:45pm, In person**

Instructor Name: **Abhijit Champanerkar**

Contact Information: **abhijit@math.csi.cuny.edu**

Prerequisites: **Point-set topology, familiarity with fundamental group and covering spaces.**

Office Hours: **Thursday 10:30am - 11:30am**

Mode: In Person Hybrid

Course Description (If Hybrid, include details on when in person vs. remote)

This course will cover different aspects of knot theory and 3-manifold topology and the deep interactions between the two fields. We will cover the following topics: 3-manifold topology and geometry including Dehn surgery, Heegaard Splittings, Seifert Fibered Spaces, Prime Decomposition, JSJ decomposition, Eight 3-dimensional geometries, hyperbolic 3-manifolds. Knot diagrams, Reidemeister moves, diagrammatic invariants, popular knot families, Braids, Alexander and Markov theorems, Seifert surfaces and classical invariants, Alexander and Jones polynomials, Quantum invariants of knots, Hyperbolic knots and geometric invariants, Representation of knot groups, leading conjectures in knots and 3-manifolds.

This course will be held in person throughout the semester.