

Math 4750: Introduction to Knot Theory

Spring 2023

Syllabus

INSTRUCTOR: Slava Krushkal, e-mail: krushkal@virginia.edu

CLASS MEETINGS: TuTh 11:00AM-12:15PM, Monroe Hall 114.

OFFICE HOURS: Wednesday 4:00-5:00, and by appointment.

Texts: There are many excellent texts in the subject of knot theory. This course will use several references; the first part of the course will be based on:

“The Knot Book”, Third Edition, by Colin C. Adams (Publisher: American Mathematical Society, 2004, ISBN: 978-0-8218-3678-1)

Prerequisites: MATH 2310: Multivariable calculus and MATH 3351: linear algebra.

Course material: Knot theory is a classical subject concerning knotting and linking in 3-space. Many new and interesting developments took place in this subject over the last 30 years. This class will give an overview of both classical and recent results: the Kauffman bracket and the Jones polynomial; the Alexander polynomial; Khovanov homology; Seifert surfaces; examples and classes of knots: torus knots, alternating knots, hyperbolic knots; intrinsic knotting of graphs; colorings and relation to combinatorics of planar graphs; knotting and linking in higher dimensions.

Homework: Homework will be assigned on a regular (biweekly) basis.

Exams: There will be a midterm (in class, on Thursday March 2nd), and a final (Tuesday, May 9, 9:00AM-12:00PM).

Grading policy :

Midterm	25%
Final Exam	30%
Homework	35%
Class participation	10%

The instructor will keep track of attendance of class meetings. The class meetings will involve lectures on new material and also discussion of problems and concepts. “*Class participation*” (which is part of the grading policy) refers both to class attendance and to active participation in the discussions.