

18.A39: KNOT THEORY, KNOT PRACTICE

FALL 2012

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| Place: | 2-136 |
| Time: | Wed. 3 – 5 P.M. |
| Advisor: | Kyle Ormsby (ormsby@math.mit.edu) |
| Office: | 2-275 |
| Associate Advisor: | Danny Shi (dannyschi@mit.edu) |
| Textbook: | <i>The Knot Book</i> by Colin Adams |
| Website: | math.mit.edu/~ormsby/knots.html |

Summary. In this seminar, we will construct and compute knot invariants.

Most lectures will be given by two-student teams. The presentations will be informal with the goal of communicating insight rather than picking apart details. Examples, pictures, and digressions are encouraged. Presentation teams will meet with the instructor on Monday to prepare for Wednesday's presentation. Students who are not presenting will have a reading assignment and should prepare questions.

We will also schedule a couple of social diversions for the advising group throughout the term — dates and activities TBD.

Topics. Below is a list of potential topics. Student interest will largely determine the actual topics.

- (1) Links, orientations, and sums
- (2) Rational tangles
- (3) Unknotting, bridge, and crossing numbers
- (4) Surfaces, Euler characteristic, and genus
- (5) Additivity of the genus and surface knots
- (6) Hyperbolic surfaces and knot complements
- (7) Braids
- (8) Bracket and Jones polynomials
- (9) The Jones polynomial and alternating links
- (10) Knots, graphs, and the Arf invariant
- (11) Total curvature
- (12) Racks and quandles