MATH 2212 - Introduction to Knot Theory
3:30-4:35 MWF. Room: Sci 2200

Instructor: Chris Atkinson
Course Webpage: https://ckatkinson.github.io/2212/
Email: catkinso@morris.umn.edu
Office: Science 2065
Phone: 589-6327
Office Hours: M 11-12, T 10-11, W 2:15-3:15, R 1-2, F 11-12

Textbook: The required textbook for the course is "The Knot Book," by Colin A. Adams. I will also be giving additional readings from the literature throughout the semester.

Materials: A medium for tying knots will be very useful. A piece of rope, about two feet in length, will work.

Prerequisites: The official prerequisite for this course is Math 1101. In addition, you should be prepared to think deeply about the topics and to have an open mind with respect to learning new mathematics and mathematical ways of thinking.

Course goals: We will cover most of chapters 1-6 of the textbook. The topics will be supplemented with surveys of what has been discovered since the textbook was published. Time permitting, we will delve deeper into various selected topics.

One major goal of this course is to expose students to some modern mathematics. Many of the topics discussed are topics of current research and were developed while you or your parents were alive. This is likely a new thing for you.

Time commitment: University policy says "one credit is defined as equivalent to an average of three hours of learning effort per week (over a full semester) necessary for an average student to achieve an average grade in the course". Our course is a four–credit course, meeting approximately three hours per week. Hence the university policy indicates that you are expected to spend 9 hours per week working outside of class, reading the textbook and working problems. Since no one wants to be average, you should expect to spend more than 9 hours per week thinking about class.
Details of the class:

- **Reading:** Our textbook was written to be self–contained and very readable. To learn the material, you need to read the textbook very closely. You should read with paper and writing implement nearby to doodle along with the text.

  You should note that reading mathematics is very dissimilar to reading a novel, twitter, or a publication like Teen People. You need to think about every sentence and statement made by the author. Ask yourself: why is this true? Do I understand how this follows from previous ideas? OK, I understand this, but why is the author telling me this? Take your time. Don't be afraid to pause in the middle of a page to stare off into space and think about the big picture and how what you're reading fits in. When you've finished a section, can you concisely

describe the main idea? What were the main results discussed? How does this fit into what you already know?

When the book works through an example, you should carefully think through each step. If you don't understand how to get from one line to the next, figure it out before moving on! If you feel there is a missing step, you should try to fill it in.

As you encounter exercises, you should work or at least think through as many as you have time for.

- **In class:** Class will be mostly lecture. To get the most out of class, you must read the section to be covered before class. My goal in lecture is to add detail to the topics that arise in the readings. I will be your guide for how to think about the topics and how to fit all of the pieces together.

- **Homework:** Homework assignments will be given approximately weekly. Problems will be drawn from the book and my imagination. You should start these assignments early; I promise that some of the problems will be difficult! The solutions to the written homework must be carefully written up. They should be written legibly with diagrams, graphs, tables, and whatever else seems appropriate to support your solutions. The problem should be stated. The method of solution should be explained fully, using English sentences to guide the reader.

  Mathematically correct solutions with deficient exposition will not receive full credit. I reserve the right to refuse to grade unacceptably disorganized or sloppy homework.

  On collaboration: I encourage you to work with your classmates on the homework. The work that you turn in should be in your own words and style. In practice, what this means is that if working with others, you should first talk and use scratch paper to figure out the problem at hand. After figuring out how to do the problems, your work should be independently written up without the help of others. The point of this is that when you write up your understanding of what was collaboratively figured out, you can be sure that you understand it and have internalized it.

  On any work where you worked in a group, **be sure to write the names of your collaborators**, as is commonly done when working with others in any scientific field. Copying homework directly from someone else is academically dishonesty and will be treated as such.

- **Project:** There will be a project that you complete in groups consisting of a paper and an in–class presentation. I will provide detailed guidelines for the project very early in the semester.

- **Exams:** There will be two in–class exams and a final exam.

  The exams are tentatively scheduled as in the table below. The dates of Exams 1 and 2 are subject to change depending on the dynamics of the class. You will be given sufficient advanced notice if any of the dates change.

	Date
Exam 1	Friday, 2/23 (Sixth week)
Exam 2	Friday, 3/30 (Eleventh week)
Final Exam	Tuesday, 5/8 from 4-6PM

- **Grading:** The university's policy for grades can be found at: http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html

  I grade homework assignments and exams with the above guidelines in mind using the following numerical scheme. I reserve the right to change the grading scale at any point, but will not increase the requirements for any letter grades.

Letter	Percentage
A	95-100
A-	90-95
B+	86-89
B	83-86
B-	80-83
C+	76-69
C	73-76
C-	70-73
D+	65-69
D	60-64
F	< 60

  The components of the course will be combined to calculate your grade as follows:

Homework	30%
Project	15%
Unit Exams	30%
Final Exam	25%

  Although I will not be posting grades online, feel free to ask at any point about where you stand in the course.

- **Extra Credit:** There will be no extra credit.

Univeristy policies: See http://policy.umn.edu/education for the official university policies on education. I will adhere to these policies.

Late work and missed exams: I will only accept late work under exceptional circumstances. Please talk to me as soon as possible if you miss a deadline.

Makeup exams will only be given in the case of legitimate absences as defined by the official university policy: http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html. Legitimate absenses must be supported by appropriate documents unless otherwise specified by university policy.

If you have a scheduling conflict and will miss an exam for a documented reason, let me know as far in advance as possible so that we can make arrangements for you to take the exam at another time.

Disability Accommodations:

The University of Minnesota views disability as an important aspect of diversity, and is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you have, or think you have, a disability in any area such as, mental health, attention, learning, chronic health, sensory, or physical, please contact the DRC office on your campus (UM Morris 320.589.6178) to arrange a confidential discussion regarding equitable access and reasonable accommodations.
- Students with short-term disabilities, such as a broken arm, should be able to work with instructors to remove classroom barriers. In situations where additional assistance is needed, students should contact the DRC as noted above.
- If you are registered with the DRC and have a disability accommodation letter dated for this semester or this year, please contact your instructor early in the semester to review how the accommodations will be applied in the course.
- If you are registered with the DRC and have questions or concerns about your accommodations please contact the Coordinator of the Disability Resource Center.

  Additional information is available on the DRC website: http://www.morris.umn.edu/academicsuccess/disability/, or e-mail hoekstra@morris.umn.edu

Here is a link to more policy statements about syllabi: www.policy.umn.edu/Policies/Education/Education/SYLLABUSREQUIREMENTS_APPA.html

Student Learning Outcomes This course is designed to partially satisfy the following *UMM Student Learning Outcomes*: 1a, 1b, 1c, 2a, 2b, 2g, 4b, 4c
See http://www.morris.umn.edu/committees/Curriculum/Learning_Outcomes_Approved.pdf