

Sul Ross State University
MATH/MTH 3306-W01 Syllabus
Special Topics: Knot Theory
Summer 2025

Instructor: Dr. Angela M. Brown

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Office Hours: 11 am-12 pm MTWR. These will be virtual meetings unless requested of me ahead of time.

Time and Place of Class Meetings: Online

Description of Course Content: Knot theory topics including knot projections, Reidemeister moves, links, knot invariants, polynomials, surfaces, and types of knots. Applications of knots will also be looked at.

Required Textbooks: The Knot Book by Colin Adams

Other Equipment Needed: Paper and pencils. You may want to have access to colored pencils and/or highlighters as well.

Mathematics Program Learning Objectives: The graduating student should be able to

- The student will be able to demonstrate content knowledge of basic mathematical principles.
- The student will be proficient in logic, able to negate statements, provide counterexamples to false statements, and determine the validity of arguments.
- The student will be able to communicate mathematical content clearly and with valid reasoning.

Marketable Skills-Mathematics BS:

- Students Demonstrate Logical and Analytical Skills.
- Students Demonstrate Problem-Solving Using Analytic and Algebraic Methods.
- Students Use Technology in Problem-Solving and Presentation.
- Students Use Communication and Pedagogical Skills.

Grading Policy: The grade weighting will be as follows:

Homework/In Class Assignments 50%

Projects: 40%

Presentations: 10%

Grading Scale: 90-100 A, 80-89 B, 70-79 C, 60-69 D, 59-Below F

Homework: Homework will be assigned from the textbook and potentially additional problems from other sources. All assignments will be posted to Blackboard.

Projects: Two projects will be assigned throughout the course.

The first will be to find an article related to knot theory and present this to the class, preferably when we can all meet together, or if you cannot meet, record this material, post the article up for your classmates to read, and then answer questions about the article through the discussion boards. Each student will need to ask at least one question of their fellow classmates' presentations.

The second project will entail picking a knot theory topic to present on. We will cover chapters 1-6 together, so topics from the last 4 chapters are up for grabs. You can also choose a different topic outside of these if you find one that is interesting, but all topics have to be approved by me and once a topic is chosen, it can not be chosen by another student. With this project, it can also be a recorded presentation or live online with the whole class. You will also need to complete at least 5 problems relating to this topic to turn in after your presentation is complete. This presentation should be 15-30 minutes long and should include at least 4 other sources not all of which can be web sources.

Presentations: Presentations will come from the homework problems. Everyone must present at least 5 problems throughout the semester. It is preferable that these presentations are with the whole class as well, but can be presented individually to me if needed.

Attendance Policy: Students are expected to attend every class. If class must be missed, the student is expected to get the notes from a classmate, and to check with me or on Blackboard for announcements and updated assignments. Since this is an online class, this means keeping up with the assignments for the course as assigned.

You are expected to check your Sul Ross e-mail account. Absences due to school functions should be discussed with me ahead of time.

It is policy of the university to drop a student with a grade of "F" if 9 hours or more of class are missed. For this course that would be 5 or more class sessions missed.

Americans With Disabilities Act: SRSU Disability Services. Sul Ross State University (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request each semester for each class. Alpine students seeking accessibility/accommodations services must contact Mary Schwartze Grisham, M.Ed., LPC, SRSU's Accessibility Services Coordinator at 432-837-8203 (please leave a message and we'll get back to you as soon as we can during working hours), or email mschwartz@sulross.edu. Our office is located on the first floor of Ferguson Hall (Suite 112), and our mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas, 79832.

Counseling: Sul Ross has partnered with TimelyCare where all SR students will have access to nine free counseling sessions. You can learn more about this 24/7/356 support by visiting [Timelycare/SRSU](https://www.timelycare.com/sulross). The SR Counseling and Accessibility Services office will continue to offer in-person counseling in Ferguson Hall room 112 (Alpine campus),

and telehealth Zoom sessions for remote students and RGC students.

Library Services: The Bryan Wildenthal Memorial Library in Alpine offers FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, library.sulross.edu/. Off-campus access requires logging in with your LobolD and password. Librarians are a tremendous resource for your coursework and can be reached in person, by email (srsulibrary@sulross.edu), or by phone (432-837-8123).

No matter where you are based, public libraries and many academic and special libraries welcome the general public into their spaces for study. SRSU TexShare Cardholders can access additional services and resources at various libraries across Texas. Learn more about the TexShare program by visiting library.sulross.edu/find-and-borrow/texshare/ or ask a librarian by emailing srsulibrary@sulross.edu.

Mike Fernandez, SRSU Librarian, is based in Eagle Pass (Building D-129) to offer specialized library services to students, faculty, and staff. Utilize free services such as InterLibrary Loan (ILL) and ScanIt to get materials delivered to you at home or via email.

Distance Education Statement: Students enrolled in distance education courses have equal access to the university's academic support services, such as Smarthinking, library resources, online databases, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires secure login information to verify students' identities and to protect students' information. The procedures for filing a student complaint are included in the student handbook. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website.

Academic Integrity: Students in this class are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. A scholar is expected to be punctual, prepared, and focused; meaningful and pertinent participation is appreciated. Examples of academic dishonesty include but are not limited to: Turning in work as original that was used in whole or part for another course and/or professor; turning in another person's work as one's own; copying from professional works or internet sites without citation; collaborating on a course assignment, examination, or quiz when collaboration is forbidden.

Classroom Climate of Respect: Importantly, this class will foster free expression, critical investigation, and the open discussion of ideas. This means that all of us must help create and sustain an atmosphere of tolerance, civility, and respect for the viewpoints of others. Similarly, we must all learn how to probe, oppose and disagree without resorting to tactics of intimidation, harassment, or personal attack. No one is entitled to harass, belittle, or discriminate against another on the basis of race, religion, ethnicity, age, gender, national origin, or sexual preference. Still, we will not be silenced by the difficulty of fruitfully discussing politically sensitive issues.

Supportive Statement: I am to create a learning environment for my students that supports various perspectives and experiences. I understand that the recent pandemic, economic disparity, and health concerns, or even unexpected life events may impact the conditions necessary for you to succeed. My commitment is to be there for you and help you meet the learning objectives of this course. I do this to demonstrate my commitment to you and to the mission of Sul Ross State University to create a supportive environment and care for the whole student as part of the Sul Ross Familia. If you feel like your performance in the class is being impacted by your experiences

outside of class, please don't hesitate to come and talk with me. I want to be a resource for you.

Important Dates:

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| May 28 | First day of classes |
| May 30 | Last day for late registration and schedule changes Payment deadline for students, 4 p.m. |
| June 2 | Census day |
| June 13 | Mid-term |
| June 20 | Last day to drop a session I course with a 'W'. Drops must be processed and in the University Registrar's |
| July 2 | Midterm |
| July 4 | Independence Day holiday |
| July 21 | Last day to drop a course with a 'W', full term. Drops must be processed and in the University Registrar's |
| July 29 | Deadline to apply for Summer 2025 Graduation-WITH LATE FEE |
| August 13 | Final Examinations, end of term, full term and session II |

Tentative Schedule-Subject to Change

| Week | Topics | Assignments |
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| Week 1 | Intro, Composite knots, Reidemeister moves | Read Chapter 1 |
| Week 2 | Links, Tricoloring, Stick knots | Ch 1 Homework due |
| Week 3 | Knot tabulation | Read Chapter 2 |
| Week 4 | Knots and graphs | Chapter 2 homework due |
| Week 5 | Knot Invariants, | Read Chapter 3 and present project 1 |
| Week 6 | Knot invariants | Chapter 3 Homework Due |
| Week 7 | Surfaces | Read Chapter 4 |
| Week 8 | Genus and surfaces | Chapter 4 homework due |
| Week 9 | Torus and Satellite knots | Read Chapter 5 |
| Week 10 | Hyperbolic knots, braids, almost alternating knots | Chapter 5 homework due |
| Week 11 | Polynomials | Read Chapter 6 |
| Week 12 | Polynomials | Chapter 6 homework due |
| Week 13 | Presentations | Chapter presentations due |