MATH 4320: Real Analysis

Sul Ross State University
Spring 2023

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Course Description	MTH 4307 is intended as an intended as an introduction to the modern theory of real analysis.
Mathematics Program Outcomes	(1) The student will be able to demonstrate content knowledge of basic mathematical principles. (2) The student will be proficient in logic, able to negate statements, provide counterexamples to false statements, and determine the validity of arguments. (3) The student will be able to communicate mathematical content clearly and with valid reasoning.
Marketable Skills	(1) Logical and analytical skills. (2) Problem-solving using analytic and algebraic methods. (3) Use of technology in problem-solving and presentation. (4) Communication and pedagogical skills.
Mathematics Program Outcomes	The graduating student will be able to demonstrate content knowledge in mathematics including arithmetic, algebra, geometry, probability, statistics, and calculus.
Class Meetings	Tuesday and Thursday, 4:30 – 5:45
Class Location	Del Rio 103; Eagle Pass B113; Uvalde B108; Alpine ACR 206
Required Texts	Kenneth A. Ross, *Elementary Analysis: The Theory of Calculus*, Second Edition, ISBN 9781461462705

Course Policies

Attendance Policy

Attendance is mandatory. Students are expected to attend class in person in their classroom of registration unless permission is given for extenuating circumstances. You will be held responsible for all material covered in class or in the reading assignments. If you have to miss a class, it is your responsibility to obtain all notes, assignments, and announcements from someone else in the class. Make-up exams will be given only in the event of an emergency, in which case written justification and/or documentation must be provided and approved.

Communication

The Blackboard system will be used to provide course materials, submit assignments, and post grades. You are welcome to e-mail, call, or text me at any time. My cell number is **(830) 333-0164**. Please identify yourself in your text or voicemail. Please make sure to check the e-mail address associated with Blackboard on a regular basis.

Grading Policy

Your grades will be weighted as follows:

Participation	30%
Homework	40%
Final Exam	30%

A student who averages at least 90% will receive an A; at least 80% will receive at least a B; at least 70% will receive at least a C; at least 60% will receive at least a D.

Participation

Your participation grade will be assigned depending on your class attendance and participation in class activities. For each homework assignment we will work through proofs together as a class using smartboard technology. You will be graded in part on your participation in these exercises.

Homework

For each section you will be asked to complete an assignment. Assignments will be made available on Blackboard. Homework can be submitted in a variety of formats, but each assignment must be submitted as a single file that I can view and grade on Blackboard.

One possibility would be to type up your homework using the Equation Editor on Microsoft Word and save it as a PDF. Another would be to capture high-quality images of your homework using a phone or other device and combine into a single file, e.g. by pasting each image into a word processor file. Feedback will be provided in the form of comments your Blackboard file.

All work must be shown for full credit. Try to be as tidy as possible so that I can understand your work. I'm flexible as to file format provided I can view your submission on Blackboard. Submissions consisting of multiple image files will not be graded as it's too easy for me to lose my place and miss something. If I have trouble seeing your file, I will let you know and give you a chance to resubmit.

Each problem will be worth 4 points unless otherwise noted.

ALWAYS TURN IN THE HOMEWORK, EVEN IF IT'S INCOMPLETE.

YOU WILL NOT PASS THE CLASS IF YOU DON'T SUBMIT HOMEWORK.

I'm flexible about due dates if something comes up, but unexcused late work may receive a zero.

Feedback will be provided in the form of notes on your submitted file. It is your responsibility to carefully view all feedback and contact me if you have any questions or concerns.

Exams

The final exam will take place at the time scheduled by the university. The final exam will be comprehensive.

Subject Outline

Below is a tentative outline of the subjects we will cover in this course.

I. Number Systems: *sets and set notation – the set ℕ of natural numbers – the set ℚ of rational numbers – the set ℝ of real numbers – the Completeness Axiom*

II. Sequences: *basic notions – limit theorems – monotone sequences and Cauchy sequences – subsequences – lim sups and lim infs – series – decimal expansions*

III. Continuity: *continuous functions – properties – uniform continuity – limits of functions*

IV. Differentiation: *the derivative and its properties – the Mean Value Theorem – Taylor's Theorem*

Schedule

This schedule is tentative only. The section numbers refer to the outline above.

Unit I	January 19 – February 16
Unit II	February 16 – March 9
Spring Break	*March 13 – 17*
Unit III	March 21 – April 19
Unit IV	April 19 – May 9

University Statements

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.*

Americans with Disabilities Act: *Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Kathy Biddick in Student Services, Room C-102, Uvalde campus. The mailing address is 2623 Garner Field Road, Rio Grande College-Sul Ross State University, Uvalde, Texas 78801. Telephone: 830-279-3003. Email: kbiddick@sulross.edu.*

University Libraries: *The Sul Ross Library 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. SRSU RGC students may request InterLibrary Loans (ILLs) and book check*

outs from the Sul Ross Library to be picked up at the SWTJC library that is most convenient. Access requires your LoboID and password. Librarians are a tremendous resource for your coursework and can be reached in person, by email (srsulibrary@sulross.edu), or phone (432-837-8123).

The Southwest Texas Junior College (SWTJC) Library is also available on each campus for your physical use of the space or checking out books. Del Rio, Eagle Pass, and Uvalde students may use online resources available through SWTJC website, library.swtjc.edu. These libraries serve as pickup locations for your ILL or Document Delivery or book requests; to do so, choose the appropriate pick-up location when requesting materials from the Alpine campus.