

MATH 2413: Calculus I

Sul Ross State University

Fall 2026

Instructor/Professor: Mohammad Shah Alam, Ph.D.

E-mail: msa24gn@sulross.edu , shahalam.mju@gmail.com

Course Description MATH 2413 (or MTH 2413) (Calculus I) introduces the fundamental concepts of differential and integral calculus. Topics include limits and continuity, derivatives and their applications, the definite and indefinite integrals, the Fundamental Theorem of Calculus, and applications of integration.

TEKS Information on the Texas Essential Knowledge and Skills can be found on the TEA website: <http://www.tea.state.tx.us>

Marketable Skills Students will develop logical and analytical reasoning skills, problem-solving skills using algebraic, graphical, and calculus-based methods, proficiency in applying calculus concepts to real-world problems, the ability to use technology and computational tools to analyze and present mathematical solutions, and effective communication of mathematical ideas and quantitative information.

Class Meetings Monday and Wednesday: 11:00 AM - 12:15 PM (Class)
Monday and Wednesday: 12:30 PM - 1:30 PM (Lab)

Required Text Calculus: Concepts and Contexts, 6th Edition by James Stewart.
ISBN-13: 978-0-495-01166-8

Office Hours Monday-Thursday: 8:00 am - 10:30 am; or by appointment.

Course Policies

Communication

I will post course documents, reminders, announcements, and assignments on Blackboard. You will also submit homework on Blackboard. I may also occasionally send announcements via e-mail. You should make sure you know how to access and use these tools. You are welcome to email, telephone, or text me. However, if you choose to contact me, please state your name at the beginning of any message. I am here to help you!

Grading Policy

Your grades will be weighted as follows:

Discussion / Participation	10%
Quiz	20%
Homework	20%
Midterm Exam	20%
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.

Discussion/ Participation

This course is fully asynchronous, so participation will be based on your engagement with course materials and online activities rather than physical attendance. To receive full credit, you should regularly watch recorded lectures, review uploaded materials, complete quizzes and assignments on time, and actively participate in discussion posts and class activities. There will be online quizzes and discussion activities throughout the semester, so please stay engaged and avoid missing deadlines.

Homework

Homework will be assigned for each section covered in the textbook. It is a vital component of the course. Completing each assignment before the next class is essential for meaningful participation and overall success. If you encounter difficulties, be sure to ask questions; mastery of the homework material is necessary for exam readiness. As a guideline, you should expect to spend approximately 9 hours per week on coursework outside of class.

Quiz

There will be online quizzes throughout the semester, and you should expect at least one quiz per unit. These quizzes are designed to help prepare you for the exams by providing practice with similar types of questions and problem-solving skills. Quizzes will be posted after selected topics are completed, so it is important to stay current with the lectures, notes, and course materials. You will receive automatic feedback after each quiz for both correct and incorrect responses to help strengthen your understanding of the material.

Exams

There will be **one midterm exam**. You will be notified of a change at least one week in advance. 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. **The comprehensive final exam** will take place at the time scheduled by the university, during the final exam period at the end of the semester. Official time and date to be announced once the university publishes the final exam schedule.

Subject Outline

Below is a tentative subject outline and schedule for this course. The sections mentioned here are the corresponding sections from the textbook

Weeks	Sections	Monday	Wednesday
Week 1	1.1-1.3, 2.1	Functions: definition of a function, domain and range, function notation, evaluating functions, graphs of functions, and transformations of functions	Limits: intuitive idea of a limit, estimating limits from graphs and tables, evaluating limits algebraically, and limits of polynomial and rational functions
Week 2	2.2-2.5	Left-hand and right-hand limits, infinite limits, limits at infinity, and limits involving trigonometric functions	Definition of continuity, continuity at a point and on an interval, types of discontinuities, continuity of common functions
Week 3	2.7-2.8, 3.1	Average and instantaneous rates of change, tangent lines, derivative as a rate of change, and derivative from a graph	Definition of the Derivative: derivative using the limit definition, difference quotient, finding derivatives from first principles
Week 4	3.2-3.3	Constant rule, power rule, constant multiple rule, sum and difference rules, and derivatives of polynomial functions	Derivatives of trigonometric functions, higher-order derivatives, equations of tangent lines, and basic derivative applications
Week 5	1.3, 3.4	Composite functions; inner and outer functions; decomposition of functions	Chain Rule; differentiating basic composite functions
Week 6	3.2-3.4	Chain Rule with power, exponential, logarithmic, and trigonometric functions	Combining Chain, Product, and Quotient Rules; multiple-step differentiation
Week 7		October 5, 2026 Review	October 7, 2026 Midterm Exam
Week 8	3.5	Implicit differentiation; finding dy/dx ; derivatives of implicitly defined functions	Implicit differentiation with algebraic and trigonometric equations; higher derivatives

Week 9	3.9	Related rates; setting up related-rate problems; identifying changing quantities	Applications of related rates; geometry, motion, and real-world problems
Week10	4.1-4.3	Maximum and minimum values; Mean Value Theorem; increasing and decreasing functions	First Derivative Test; local and absolute extrema; optimization problems
Week 11	4.4-4.7	Concavity; inflection points; Second Derivative Test; curve sketching	Indeterminate forms and L'Hospital's Rule; applied optimization
Week 12	3.6-3.7	Derivatives of inverse functions; derivatives of inverse trigonometric functions	Hyperbolic functions and their derivatives
Week 13	3.8, 4.6	Related differentiation techniques; logarithmic differentiation	Newton's Method; applications of derivatives; mathematical modeling
Week 14	4.9, 5.1-5.2	Antiderivatives; introduction to area and accumulation; indefinite integrals	The Definite Integral; Riemann sums; area under a curve; properties of the definite integral
Week 15	5.3-5.5	Fundamental Theorem of Calculus; evaluating definite integrals; connection between derivatives and integrals	Indefinite integrals and the Net Change Theorem; substitution; basic applications
Week 16		Review	Final Exam

QEP Mapped Course

Course Design: Communication Infused

To be successful in college and beyond, many sources (e.g., Morreale & Pearson, 2008) indicate that communication competencies are essential. Sul Ross recognizes that the current generation of undergraduate university students should receive training to navigate a global world as competent communicators in various contexts and channels of communication.

Through our Quality Enhancement Plan (QEP) called Compass, Sul Ross aims to equip you to navigate excellence in the 21st century by developing your communication skills across multiple courses. This

mathematics course is designed to enhance your communication skills. Therefore, this course has the following QEP Student Learning Outcome:

QEP Student Learning Outcome

The student will create works that exhibit skill in prepared and purposeful communication (written, oral, or visual).

University Statements

Distance Education Statement: *Students enrolled in distance education courses have equal access to the university's academic support services, such as 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. 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. Directions for filing a student complaint are located in the student handbook.*

SRSU Disabilities 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. RGC students seeking accessibility services should contact Paulette Harris, Executive Assistant to the Vice President and Dean, at 830-279-3023 or email pharris@sulross.edu. Ms. Harris's office is at 2623 Garner Field Road, Uvalde, TX 78801 (this is the mailing address, too).*

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.*