

# MATH 3415: Calculus III

Sul Ross State University  
Fall 2022

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**Course Description** MTH 3301 is intended as an introduction to calculus of functions of several variables, including partial derivatives, multiple integrals, and vector calculus.

**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.

**Class Meetings** Tuesday and Thursday, 6:00 – 7:15 (lecture) and 7:30 – 8:30 (lab)

**Class Location** Del Rio 103; Eagle Pass B113; Uvalde B108; Alpine ACR 206

**Optional Text** Stewart, *Multivariable Calculus*.

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## Course Policies

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### 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

I will post course documents, reminders, announcements, and assignments on the Blackboard system. 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 e-mail, telephone, or text me. However you chose to contact me, please make sure to state your name at the beginning of any message.

You are welcome to stop by my office if you wish to speak about the content or your progress in the course. Sometimes meetings come up, so it's best to contact me ahead of time if you intend to travel to Uvalde to see me in person.

I am here to help you! Ask questions in class, call me, e-mail me, text me, or come to my office. If you don't communicate with me, then I can't help you.

### **Grading Policy**

Your grades will be weighted as follows:

Lab Work	30%
Homework Folder	10%
Midterm Exam	25%
Final Exam	35%

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.

### **Lab Work and Homework**

For each section that we cover, you will receive a homework set. The homework should be prepared as neatly as possible, in order, to be checked for completeness at the end of the semester. Pages should not be bound in any way so that they can be fed into a scanner and submitted electronically to me by yourself or an administrative assistant.

In addition, we will spend our lab time working problems together. Sometimes they will be drawn from the homework. Sometimes they will be new to you. Your lab work grade will depend on your performance during these periods.

### **Exams**

There will be one midterm exam. Its tentative date is Tuesday, October 25. This is subject to change. 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 from December 2 – 7.

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## Subject Outline

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*Below is a tentative outline of the subjects we will cover in this course. As time allows, we will also make excursions into the practical aspects of mathematics education among underserved populations in a region with limited access to educational resources.*

- I. Parametric Equations and Polar Coordinates: *curves defined by parametric equations – calculus with parametric curves – polar coordinates – areas and lengths in polar coordinates – conic sections – conic sections in polar coordinates*
- II. Vectors and the Geometry of Space: *three-dimensional coordinate systems – vectors – the dot product – the cross product – equations of lines and planes – cylinders and quadric surfaces*
- III. Vector Functions: *vector functions and space curves – derivatives and integrals of vector functions – arc length and curvature – motion in space*
- IV. Partial Derivatives: *functions of several variables – limits and continuity – partial derivatives – tangent planes and linear approximations – the chain rule – directional derivatives and the gradient vector – maximum and minimum values – Lagrange multipliers*
- V. Multiple Integrals: *double integrals over rectangles – iterated integrals – double integrals over general regions – double integrals in polar coordinates – surface area – triple integrals – triple integrals in cylindrical coordinates – triple integrals in spherical coordinates – change of variables in multiple integrals*

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## Schedule

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

Unit I	August 23 – September 15
Unit II	September 15 – October 1
Unit III	October 1 – 20
<b>Midterm Exam</b>	<b>October 25</b>
Unit IV	October 25 – November 10
Unit V	November 10 – 29
<b>Final Exam</b>	<b>December X</b>

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## University Statements

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**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](mailto: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](http://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](mailto: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](http://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.*