

**Math 2318 Syllabus**  
**Linear Algebra**  
**Fall 2022 Sul Ross State University**

<b>Secs. 001, HMC:</b>	Mon, Wed, Fri: 11:00-11:50a in ACR 206
<b>Instructor:</b>	Dr. Kris Jorgenson
<b>Office:</b>	ACR 109D
<b>E-mail:</b>	kjorgenson@sulross.edu
<b>Office Hours:</b>	M, Tu, W, Th, F: 10-11a; M, Tu: 3:30-4:30p; W, Th: 3:30-5p;
	also available by appointment

**Course Description:** The prerequisite is Trigonometry (Math 1316). The course will cover the topics of linear equations, matrices, vectors and vector spaces, matrix inversions, linear transformations, determination of eigenvalues and eigenvectors. Applications to topics including computer graphics, discrete dynamical systems, and finding curves of best fit will be discussed as well. Use of a programmable graphing calculator or mathematical software may be required.

**Student Learning Objectives:** Successful students will demonstrate correct understanding and knowledge of the linear algebra topics including but not limited to those listed in the previous paragraph through use of correct terminology, conceptual reasoning, and computation. Students will translate, extend, and apply knowledge of concepts and problem-solving methods to new contexts and problem-solving situations. Students will demonstrate correct knowledge of the difference between numbers (perhaps in the context of other mathematical objects such as a function, algebraic expression, or a matrix) that are in exact form and numbers that are approximate and will be able to report numbers in exact form and with a correct approximation when required. Students will express their solutions clearly in writing and use complete sentences when appropriate.

This course is supportive of the

Student Learning Outcomes for the Bachelor of Science degree in Mathematics:

- 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.

**Required Textbook:** Linear Algebra and Its Applications, 4th Edition by David C. Lay ISBN-13: 978-0-321-38517-8, many sections from Chaps. 1-6. You may find it handy to have a scientific calculator to check basic math calculations. Late in the semester,

(beginning around Nov.), you will be allowed use a calculator capable of matrix operations (such as a graphing calculator). Therefore I recommend a graphing calculator (at most) since this will handle any of the above calculations you may need.

### **Pandemic Restrictions**

It is strongly encouraged that students get a vaccination and a booster and wear a proper face covering in class and observe social distancing. “Proper face covering” does not include a mask with an air valve or a single-layer, cloth handkerchief. Cloth handkerchiefs can be used if they are folded to create a double-layer (or more) or have another mitigating layer such as a coffee filter inserted underneath. “Social distancing” means a 6-foot (or more) distance between people with proper face coverings.

**Grading and Assignments:** The assignments discussed below will help students achieve all of the Learning Objectives mentioned previously through active learning and assessment. Your total grade will break down as follows:

**Grade:** A **Homework (HW)** grade will count for **20%** of your grade. I will assign homework problems in almost every class to be handed in approximately a week later. The wisest strategy is to work these problems as soon as possible after the class in which they are assigned to allow more time to get your questions answered on an assignment. The homework grades will be divided up into problems graded as in a take-home quiz and those graded as a completion grade based on your effort. Sometimes there will be a short quiz over the assigned homework approximately a week later. It is important that you correctly complete all of the HW assignments before the test with comprehension since this is what the test will cover.

Ten percent (**10%**) of your grade will be based on a **Class Study Grade**, which will be recorded in every class after the 1st class day in which there is no in-class quiz or test.

There will be **3 test grades** that count for a total of **70%** of your final grade. The 1st two tests will be given over two class periods: at least one-half of a Wednesday class followed by the entirety of a Friday class to allow students at least 75 minutes to take each test.

The three test dates are as follows:

<b>Test 1</b>	<b>Wed, Fri, Sep. 21, 23</b>
<b>Test 2</b>	<b>Wed, Fri, Oct. 26, 28</b>
<b>Test 3</b>	<b>Tue, Dec. 6: 10:15a-12:15p</b>

Individual Project Problem: I will give students a chance to raise their test average by doing an Individual Project Problem (IPP) that will count as 10% of your grade with the

Test Average counting 60%. The IPP must be an applied problem from the textbook from a topic we discussed of your choosing but approved by me. Different students must do different problems, so the first to choose an IPP will have more choices. The due date for choosing an IPP and getting it approved is Friday Nov. 18.

**Late Work, Rescheduled Quizzes/Tests** To ensure you receive full credit on a homework assignment you hand in, an in-class quiz, or a test that you miss due to your absence for a personal event, such as a university organization trip, or a personal medical issue, you must be sure to do ALL of the following:

- \* Let me know of your impending absence before or by the day of your absence.
- \* Supply documentation for your school trip (if this is the case), or a note from a medical professional (in the case of a medical absence) soon after your absence if not prior. In the case of a university organization-related absence, you must notify me of this authorized absence in writing with your name, the name of your organization and the date(s) of your absence prior to your absence, and your name must appear on a published explained absence list that I am provided (or this is verified by a faculty sponsor).
- \* You and I must set up a time for you to make up the quiz or test within a reasonable time period (not more than 1 to 3 days) before or after the time of the missed grade.

Note: Usually I will let you make up a grade according to the above conditions if it is due to another one-time occurrence, such as the care of someone else in your family or a friend, or for a work-related excuse as long as you can document your absence and you let me know BY THE DAY OF THE ABSENCE AT THE LATEST.

**Attendance** I will be taking attendance as university policy precludes you from missing 3 weeks or more of classes for anything other than authorized university activities. To excuse an absence for a university activity, in addition to letting me know of the absence by the day of the absence (as explained previously) you must also spend at least 45 minutes outside of class on this course with me. Also I will allow you to excuse a test day for a documented medical absence as long as you also make up the test. If you have 3 weeks or more of unexcused absences, I reserve the right to drop you from this class with a grade of 'F', which is university policy.

**Good Advice** Concentrate on learning the material of the course rather than worrying about your grade. Your time is best spent concentrating on the material to be learned in the impending assignments, asking questions, and devoting yourself to activities that will help you learn the material and do better in the course. I will worry about the details of your grade since you doing so does not help you earn a higher grade. But learning the material and doing well on the tests *will* help your grade. **Remember that math is not a spectator sport**, so the more problems you work yourself, the more

practice you will get, the more confident you will be, and the better you will do in this course. Working on the problems helps you to figure out what your specific questions are. Remember an individual homework or quiz grade may not count for a lot in your overall grade, but working and learning from the homework is **essential** because this is where you learn the topics that will appear on the tests, which do count for a lot of your grade. The best lessons learned often come from correcting a quiz or homework problem in which you have made a mistake.

**More Good Advice** Keep absences to a minimum. You never know when you might miss something you will find important either from the lecture or class discussion such as questions other students ask. Remember: **YOU ARE RESPONSIBLE FOR EVERYTHING THAT IS DISCUSSED DURING CLASS WHETHER YOU ARE PRESENT OR NOT.**

Also do not allow yourself to develop bad habits such as missing classes. It's human nature to be controlled by our habits, so once you develop a weekly habit for the semester, it can be hard to break this habit. So be sure that you allow the necessary time for this course, **FROM THE BEGINNING OF THE TERM, ESPECIALLY** if you consider mathematics to not be your best subject. If you have trouble in math, then you should attend **EVERY** class of a college mathematics course. Not showing up to class or not doing the required work will not cause this class to magically go away. If you are not understanding the material and/or have fallen behind in your work, missing class will not help. **IF YOU FALL BEHIND, PLEASE DO NOT DROP THIS COURSE WITHOUT TALKING TO ME FIRST.** Making mistakes or falling behind is natural, so it is best to talk to me about this. If you do have to miss class, let me know beforehand. Discuss with me what you are not understanding. It is essential to get your questions answered. But meeting with me outside of class is not a substitute for attending class.

Ask questions no matter how easy or trivial they may seem. There is no such thing as a bad or silly question. Questions result when you are interested and have been thinking about areas, such as mathematics, in which you have some limitations in your educational background. Being in a college mathematics course means you will have questions both obvious and more subtle. Asking questions is a very important part of the learning process.

Study and work problems regularly—every day or every other day. Work on assignments discussed in class as soon as you can after class while the methods discussed are still fresh in mind. You can't expect to succeed in a math course by waiting till the last minute to only study and cram prior to a test. If you promise yourself you will study for ½-hour, get into the work, forget the clock, then the next thing you know, you've studied and worked for one to two hours.

Remember that

LEARNING FROM MISTAKES + PERSISTENCE = SUCCESS!

**Classroom Conduct** It is important to conduct yourself in a college classroom so that everyone can benefit from good communication between instructor and students. My goal is to create an environment in which everyone can do their best work, learn, and make the best grades possible.

I think you will find that I am a very friendly, sympathetic, and generous instructor as long as you are sincerely working to succeed in this course and certain guidelines for classroom behavior are followed to allow a sanctity of study for your fellow students. Habits such as holding conversations during class, or being engaged in activities not related to this course such as working on a different course or reading your cell-phone will work against the goal of this course and cause you to be counted absent and you will lose Daily Grade credit. Also engaging with electronic communication devices of any kind during class or coming into class more than 5 minutes late or leaving early before class is dismissed circumvent the goals of this course and cause you to lose credit. My sympathy and generosity will quickly evaporate if I find that you are working against the goals of the course or that you are simply trying to get a good grade without learning or without honestly doing the required work. I want you to have every opportunity to learn and succeed in this course.

Please be aware of the rules for Academic Honesty that you will find in the Sul Ross Student Handbook. Use commonsense to think of anything else that will allow you to learn and do the best work that you can in this class, and for me to better help you do your best work. Remember that being registered for this course does not allow you to behave in any manner you wish during class. You must keep other people in mind. It is within university policy for me to send a student out of this class on a temporary or permanent basis if disruptions or interruptions like the types listed above persist.

**SRSU Alpine 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 Schwartz 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](mailto: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.

**Program Marketable Skills:**

Marketable Skill (MS) 1: Students Demonstrate Logical and Analytical Skills.

MS 2: Students Demonstrate Problem-Solving Using Analytic and Algebraic Methods.

MS 3: Students Use Technology in Problem-Solving and Presentation.

MS 4: Students Use Communication and Pedagogical Skills.

**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.

**Diversity Statement**

"I aim to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, socioeconomic class, age, nationality, etc.). I also understand that the crisis of COVID, economic disparity, and health concerns, or even unexpected life events could 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 an inclusive 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

Mon, Aug 22	First day of classes; late registration, schedule changes begin
Thu, Aug 25	Last day for late registration and schedule changes
Fri, Aug. 26	Last day to receive 80% refund for students withdrawing from university
Fri, Sept. 2	Last day to receive 70% refund for students withdrawing from university
Mon, Sept 5	Labor Day Holiday, No Classes
Wed, Sept 7	12th class day: last day to drop without creating an academic record
Mon, Sept 12	Last day to receive 50% refund for students withdrawing from university
Mon, Sept 19	Last day to receive 25% refund for students withdrawing from university
Fri, Nov 11	Veteran's Day Holiday, No Classes
Mon, Nov 14	Last Day to Drop with a 'W' by 4 pm in Registrar's Office
Wed-Fri, Nov 23-25	Thanksgiving Holidays, No Classes
Wed Nov 30	Last Day of Classes Before Finals
Thu, Dec 1	Dead Day, No Classes
Fri, Dec 2,	Final Exam Week
Mon-Wed Dec 5-7	
Fri, Dec 9	Fall Commencement, 5:30pm

<b>Math 2318 Tentative Course Outline Fall 2022</b>			
<b>X = No Classes</b>	<b>Mon</b>	<b>Wed</b>	<b>Fri</b>
Aug. 22, 24, 26	1st Day of Classes Systems of equations	augmented matrices	Echelon Forms Vectors
Aug. 29, 31 Sep. 2	Vectors Matrix Equations	Matrix Equations Homogenous Systems	Homogenous Systems Applications
Sep. 7, 9	Labor Day <b>X - No Classes</b>	Applications	Linear Independence
Sep. 12, 14, 16	Linear Independence	Linear Transformations	Linear Transformations
Sep. 19, 21, 23	Review for Test 1	Review <b>Test 1, Part 1</b>	<b>Test 1, Part 2</b>
Sep. 26, 28, 30	Matrix Arithmetic	Matrix Arithmetic Matrix Inverses	Matrix Inverses
Oct. 3, 5, 7	Invertible Matrix Thm	Invertible Matrix Thm Computer Graphics	Computer Graphics
Oct. 10, 12, 14	Vector Spaces	Dimension and Rank	Determinants
Oct. 17, 19, 21	Properties of Determinants	Markov Chains	Eigenvalues Characteristic Eqn.
Oct. 24, 26, 28	Review for Test 2	Review <b>Test 2, Part 1</b>	<b>Test 2, Part 2</b>
Oct. 31, Nov. 2, 4	Diagonalization	Diagonalization Discrete Dynamical Systems	Discrete Dynamical Systems
Nov. 7, 9	Vectors, Dot Products Norms	Vectors, Dot Products Norms	<b>X - Veteran's Day, No Classes</b>
Nov. 14, 16, 18	Orthogonal Vectors	Orthogonal Vectors Orthogonal Bases	Orthogonal Vectors Orthogonal Bases
Nov. 21	Least Squares	<b>Thanksgiving Holiday</b> <b>Nov. 23-25 -----&gt;</b> <b>X - No classes</b>	<b>X</b>
Nov. 28, 30	Curves of Best Fit	Review for Test 3	<b>1st Day of Final Exams</b>
Dec. 6	<b>Tues. Dec. 6: Test 3</b> <b>10:15a-12:15p</b>	<b>Last Day of Final Exams</b>	<b>Dec. 9 - Commencement</b> <b>5:30 PM</b>