

# Math 3301

## Linear Algebra

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### Instructor: Dr. Susan Abernathy-Taylor

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Phone: 325-486-5442

Office: MCS 220i

**Office Hours:** MF 11am-12pm, TR 9:15am-11:45am. See Blackboard for links to online office hours.

## Course Information

### Time/Place

TR MCS 212 8:00-9:15am

### Course Description

Linear Algebra is the study of matrices and their applications to systems of linear equations. We'll discuss how to solve linear systems using matrices and how to interpret matrices to get information about systems of equations and vector spaces.

### Prerequisite and Co-requisite Courses

Math 2413 or equivalent.

### Course Delivery

This is a face-to-face course with online components that students are expected to access via [Blackboard](#).<sup>1</sup>

### Required Texts and Materials

*Linear Algebra and Its Applications*, Fifth Edition, by David Lay, Steven Lay, Judi McDonald. ISBN: 978-0321982384

## Technology Requirements

To successfully complete this course, students need to have access to Blackboard. Office hours may be conducted online, which will require a phone or device that can use Blackboard Collaborate.

## Communication

You may email me at any time. In general, I try to respond to messages within one business day.

**Written communication via email:** All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

**Virtual communication:** Office hours and/or advising may be done with the assistance of the telephone, Collaborate, etc.

## Grading and Assessment

### Tests

There will be three traditional in-class exams as well as two vocabulary tests. Dates are listed below. If you have a conflict with a test date, please let me know ahead of time if possible. If an emergency comes up, please let me know as soon as is reasonable. If you miss a non-vocabulary test, your final exam will replace it. Make up tests will be given at the discretion of the instructor. Your final exam will replace your lowest non-vocabulary test grade assuming this benefits you. You will be permitted to use a scientific calculator on non-vocabulary exams.

Test 1 - Tuesday February 15

Vocabulary Test 1 - Thursday March 3

Test 2 - Tuesday March 29

Vocabulary Test 2 - Tuesday April 12

Test 3 - Tuesday April 26

Final Exam - Tuesday, May 10, 8-10am

### Homework

Written homework will be assigned over each section we cover. These assignments will be submitted as physical copies in class (or in the box outside my office door) before the end of class on the day the assignment is due. Homework must be legible and include work justifying your answers. Your lowest three homework grades will be

dropped. Not every problem on every assignment will be graded – only a selection of the problems assigned will be graded for correctness.

## Overall Grade

Grades will be determined as follows:

Homework: 10%

Vocabulary Tests (2): 15% (7.5% each)

Tests (3): 57% (19% each)

Final Exam: 18%

This course uses the following grading scale:

A = 89.5-100 points

B = 79.5-89.49 points

C = 69.5-79.49 points

D = 59.5-69.49 points

F = 0-59.49 points (Grades are not rounded up)

## General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)<sup>2</sup>
- [Angelo State University Catalog](#)<sup>3</sup>

## Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the university's [Statement of Academic Integrity](#)<sup>4</sup> (Page 97).

## Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at [ADA@angelo.edu](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the [Student Disability Services website](#).<sup>5</sup> The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dr. Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
[dallas.swafford@angelo.edu](mailto:dallas.swafford@angelo.edu)  
Houston Harte University Center, Room 112

## **Incomplete Grade Policy**

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 [Grading Procedures](#)<sup>6</sup> for more information.

## **Plagiarism**

Plagiarism is a serious topic covered in ASU's [Academic Integrity Statement](#)<sup>7</sup> in the Student Handbook. Plagiarism is the action or practice of taking someone else's work, idea, etc., and passing it off as one's own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the [ASU Writing Center](#).<sup>8</sup>

## **Student Absence for Observance of Religious Holy Days**

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 [Student Absence for Observance of Religious Holy Day](#)<sup>9</sup> for more information.

## **Title IX at Angelo State University**

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)<sup>10</sup>

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: [michelle.miller@angelo.edu](mailto:michelle.miller@angelo.edu)

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).<sup>11</sup>

## **Information About COVID-19**

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)<sup>12</sup> web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

## **Modifications to the Syllabus**

This syllabus, including grade evaluation and course schedule, is subject to modification on potentially short notice based on developing circumstances.

# Course Schedule

The following schedule is tentative and subject to change.

1. 1.1-1.2
2. 1.3-1.4
3. 1.6-1.8
4. 1.9-2.1
5. Test 1, 2.2
6. 2.3, 3.1
7. 3.2, 4.1, Vocab Test 1
8. 4.2, 4.3
9. 4.3, 4.5
10. 4.6, Test 2
11. 5.1, 5.2
12. 5.3, 6.1, Vocab Test 2
13. 6.2, 6.3
14. Test 3
15. Special Topics, Review
16. Final Exam

## Student Learning Outcomes – Math 3301

- 1. Students will demonstrate factual knowledge including the mathematical notation and terminology used in this course.** Students will learn the vocabulary, symbolism and basic definitions used in linear algebra, including vectors, matrices, vector spaces, subspaces, linear independence, span, basis, dimension, linear transformation, inner product, eigenvalue and eigenvector.
- 2. Students will describe the fundamental principles including the laws and theorems arising from concepts covered in this course.** Students will become familiar with the theorems about and the characteristics of linear spaces and linear transformations. Students will determine bases, compute dimensions, evaluate linear transformations, solve systems of linear equations and find determinants.
- 3. Students will apply course material along with procedures and techniques covered in this course to solve problems.** Students will apply properties and theorems about linear spaces to specific mathematical structures that satisfy the linear space axioms.
- 4. Students will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields.** Students will acquire a level of proficiency in the fundamental concepts and applications necessary for further study in academic areas requiring linear algebra as a prerequisite or for work in occupational fields requiring a background in linear algebra. These fields might include the physical sciences and engineering as well as mathematics.

## Course Content

**Textbook:** *Linear Algebra and Its Applications*, Fifth Edition, by David Lay, Steven Lay, Judi McDonald. The following chapters including the particular sections listed are covered. (See textbook “Contents”)

1. **Linear Equations in Linear Algebra:** Systems of Linear Equations; Row Reduction and Echelon Forms; Vector Equations; The Matrix Equation  $Ax = b$ ; Solution Sets of Linear Systems; Linear Independence; Introduction to Linear Transformations; The Matrix of a Linear Transformation.
2. **Matrix Algebra:** Matrix Operations; The Inverse of a Matrix; Characterizations of Invertible Matrices.
3. **Determinants:** Introduction to Determinants.
4. **Vector Spaces:** Vector Spaces and Subspaces; Null Spaces, Column Spaces, and Linear Transformations; Linearly Independent Sets, Bases; Coordinate Systems; The Dimension of a Vector Space; Rank.
5. **Eigenvalues and Eigenvectors:** Eigenvectors and Eigenvalues; The Characteristic Equation; Diagonalization.

Additional topics will be chosen from among the following: more on determinants, partitioned matrices, matrix factorizations, change of basis, topics from Chapter 6 (Orthogonality and Least Squares), topics from Chapter 7 (Symmetric Matrices and Quadratic Forms), and applications.

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<sup>1</sup> <https://blackboard.angelo.edu/>

<sup>2</sup> <https://www.angelo.edu/current-students/student-handbook/>

<sup>3</sup> <https://www.angelo.edu/academics/catalog/>

<sup>4</sup> <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=97>

<sup>5</sup> <https://www.angelo.edu/current-students/disability-services/>

<sup>6</sup> <https://angelo.policystat.com/policy/10659448/latest/>

<sup>7</sup> <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=97>

<sup>8</sup> [https://www.angelo.edu/current-students/writing-center/academic\\_honesty.php](https://www.angelo.edu/current-students/writing-center/academic_honesty.php)

<sup>9</sup> <https://angelo.policystat.com/policy/10659368/latest/>

<sup>10</sup> <https://www.angelo.edu/incident-form>

<sup>11</sup> <https://www.angelo.edu/title-ix>

<sup>12</sup> <https://www.angelo.edu/covid-19/>