MATH 3301 – 010 – Linear Algebra – Spring 2021

Contact Information:

- Instructor: Jesse Taylor
- Office: MCS 219E
- Email: jesse.taylor@angelo.edu
- Our Classroom: MCS 110
- Meeting Times: 11:00am-12:15pm TR
- Office Hours:
  - Due to COVID-19, all office hours will be held virtually this semester using Blackboard Collaborate.
  - 2:00pm – 4:00pm on Mondays and Wednesdays
  - 10:00am – 11:00am on Tuesdays and Thursdays
  - 12:15pm – 1:00pm on Tuesdays and Thursdays
  - Other times available by appointment (email me to set something up)

Required Textbook


Course Content

Selected sections from chapters 1-6 will be covered.

Attending Class

Our class is face-to-face and in person attendance is expected. However, it is likely that at some point during the semester you may need to quarantine or otherwise miss class. Each class lecture will be recorded and posted in Blackboard.

If you do not attend class in person, there will be a short online assignment in Blackboard to replace taking attendance. To “attend” class on a day when you do not come in person requires you to complete a short virtual assignment.

Attendance will be taken regularly and each student’s absences will be reported with their final grade at the end of the semester. Note that on some days, attendance may be recorded virtually by means of completing an assignment, rather than attending class in-person.

Homework/Quizzes

Homework will be assigned regularly throughout the semester. In general, I will assign problems after each section and will only grade a selection of them (about 5 or so). These homework assignments will be submitted through Blackboard.

I strongly encourage you to download a scanner app (such as the free apps Adobe Scan or Scannerly) to convert pictures into scanned documents for your homework submissions.
We will also have quizzes throughout the semester, including the possibility of pop quizzes or online quizzes. Generally, quizzes will consist of a couple of problems and will not take more than 15 minutes to complete.

No late quizzes or homework will be accepted, regardless of whether or not you attend class. It is always your responsibility to know when an assignment is due and to make sure it is turned in or taken on time.

Tests

We will have three tests and a cumulative final exam. Below is a table containing the schedule for our tests, which is subject to change. If you have a conflict with one of the tests you must let me know at least one week before the test is taken to ensure that you receive a make-up exam. The earlier you let me know, the better.

<table>
<thead>
<tr>
<th>Test</th>
<th>Material Covered</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>Chapters 1 and 2</td>
<td>Thursday, February 25</td>
</tr>
<tr>
<td>Test 2</td>
<td>Chapters 3 and 4</td>
<td>Thursday, April 1</td>
</tr>
<tr>
<td>Test 3</td>
<td>Chapters 5 and 6</td>
<td>Thursday, April 29</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Cumulative</td>
<td>10:30am-12:30pm, Tues May 11</td>
</tr>
</tbody>
</table>

It is expected that you will take your tests in person. However, in the event that you need to take a test online (for health reasons, quarantining, etc) you will need to do so using Respondus Lockdown Browser and must be video recorded via Respondus Monitor. Respondus requires a desktop computer or laptop (not a Chromebook) and a webcam. It is your responsibility to get this equipment if you need it. For best results, use an ethernet cable to connect to your Internet source instead of relying on Wifi (there are ethernet ports available to students in the campus library, for instance, or on your home router). There are instructions linked in the Blackboard course for details regarding Respondus (how to download, what to expect, etc).

Grading

Your grade in this class will be determined based on the following grading rubric.

- Homework/Quizzes: 15%
- Three regular exams: 20%
- Final Exam: 25%

Your final letter grade in this class will be determined based on a ten-point grading scale.
Technology

Unless you have special accommodations documented with the Student Life office, no cell phones, tablets, laptops, games, or other electronic devices may be used at any time during in-person class.

If ASU has to move to all online delivery due to a COVID-19 outbreak

In the event that ASU is forced to move online due to a COVID-19 outbreak, all lectures will be given as video recordings posted to our Blackboard course. Homework will remain unchanged and will still be submitted via Blackboard, and all tests will be taken through Respondus. See the “Tests” section of the syllabus for more information regarding Respondus.

Study Aids

• The Math Lab offers free math help to all students enrolled in mathematics courses at or below the level of Calculus. The Math Lab is located on the third floor of the library (C302) and its times are listed below.
  o Monday – Thursday: 9:00am – 8:00pm
  o Friday: 9:00am – 12:00pm
  o Sunday: 4:00pm – 8:00pm

• The mathematics department maintains a list of students who are interested in tutoring privately. Students who are interested in obtaining private tutoring or serving as private tutors should visit the math department’s office for more information.

• Feel free to contact me for help. I will host virtual office hours regularly and am also available for one-on-one meetings if you have questions or want to discuss anything.

Notes

• In accordance with ASU’s face covering policy (see section later in the syllabus), all students attending in-person classes must wear a face covering AT ALL TIMES.

• All electronic correspondence will be sent to your ASU email account unless other arrangements are made.

• If you do not receive a graded homework assignment, quiz, or test on the day they are returned, please contact me to pick the assignment up.

• Good luck. I want you to succeed in this course. If at any point during the semester you feel as if you do not understand the material, please come talk with me as soon as possible. An ounce of prevention is worth a pound of cure.

• All items and dates in this syllabus are subject to change as the semester progresses. Students will be notified in class of any changes, and the changes will not be updated within this syllabus.
Mathematics 3301 – Linear Algebra

Student Learning Outcomes

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.

**Anticipated Schedule**

Below is a table containing an approximate guide to what we will cover during each week of the semester. These topics are subject to change.

<table>
<thead>
<tr>
<th>Course Week</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sections 1.1, 1.2, and 1.3</td>
</tr>
<tr>
<td>2</td>
<td>Sections 1.4, 1.5, and 1.6</td>
</tr>
<tr>
<td>3</td>
<td>Sections 1.7, 1.8, and 2.1</td>
</tr>
<tr>
<td>4</td>
<td>Sections 2.2 and 2.3</td>
</tr>
<tr>
<td>5</td>
<td>Section 2.7 and Test 1</td>
</tr>
<tr>
<td>6</td>
<td>Sections 3.1 and 3.2</td>
</tr>
<tr>
<td>7</td>
<td>Sections 4.1 and 4.2</td>
</tr>
<tr>
<td>8</td>
<td>Section 4.3</td>
</tr>
<tr>
<td>9</td>
<td>Sections 4.4 and 4.5</td>
</tr>
<tr>
<td>10</td>
<td>Section 4.6 and Test 2</td>
</tr>
<tr>
<td>11</td>
<td>Sections 5.1 and 5.2</td>
</tr>
<tr>
<td>12</td>
<td>Sections 5.3 and 6.1</td>
</tr>
<tr>
<td>13</td>
<td>Sections 6.2 and 6.3</td>
</tr>
<tr>
<td>14</td>
<td>Test 3</td>
</tr>
<tr>
<td>15</td>
<td>Review</td>
</tr>
<tr>
<td>16</td>
<td>Final exam: 10:30am-12:30pm, Tuesday, May 11</td>
</tr>
</tbody>
</table>
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
- Angelo State University Catalog

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.

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. For more information about the application process and requirements, visit the Student Disability Services website. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
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 for more information.
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 for more information.

Title IX at Angelo State University
The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU’s Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Miller, J.D.
Special Assistant to the President and Title IX Coordinator
Mayer Administration Building, Room 210
325-486-6357
michelle.boone@angelo.edu

You may also file a report online 24/7.

If you are wishing to speak to someone about an incident in confidence you may contact the University Health Clinic and Counseling Center at 325-942-2173 or the ASU Crisis Helpline at 325-486-6345.

For more information, visit the Title IX website.

Required Use of Masks/Facial Coverings by Students
As a member of the Texas Tech University System, Angelo State University has adopted the mandatory Facial Covering Policy to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-compliance with the Texas Tech University System Policy may result in disciplinary action through the Office of Student Conduct.
Modifications to the Syllabus

This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.

i https://www.angelo.edu/current-students/student-handbook/
ii https://www.angelo.edu/academics/catalog/
iii https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=96
iv https://www.angelo.edu/current-students/disability-services/
v https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
vi https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of
vii http://www.angelo.edu/incident-form
viii https://www.angelo.edu/title-ix
ix http://www.texastech.edu/downloads/ttus-policy-face-coverings.pdf