Department: Mathematics, Engineering, and Computer Science

Discipline: Mathematics

Course Number: MATH 2318

Course Title: Linear Algebra

Available Formats: conventional

Campuses: Levelland and Reese Center

Course Description: Introduces and provides models for application of the concepts of vector algebra. Topics include finite dimensional vector spaces and their geometric significance; representing and solving systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion; matrices; determinants; linear transformations; quadratic forms; eigenvalues and eigenvector; and applications in science and engineering.

Prerequisite: Successful completion with a grade of 'C' or better in MATH 2414.

Credit: 3 **Lecture:** 3 **Lab:** 0

Textbook: See Instructor Course Information below.

Supplies: Please see the instructor's course information sheet for specific supplies.

This course partially satisfies a Core Curriculum Requirement: None

Core Curriculum Objectives addressed:
- **Communications skills**—to include effective written, oral and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts resulting in informed conclusions

Student Learning Outcomes: Upon completion of this course and receiving a passing grade, the student will be able to:

1. Be able to solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion.
2. Be able to carry out matrix operations, including inverses and determinants.
3. Demonstrate understanding of the concepts of vector space and subspace.
4. Demonstrate understanding of linear independence, span, and basis.
5. Be able to determine eigenvalues and eigenvectors and solve problems involving eigenvalues.
6. Apply principles of matrix algebra to linear transformations.
7. Demonstrate application of inner products and associated norms.

Student Learning Outcomes Assessment: Pre- and post-test questions will be used to determine the extent of improvement that the students have gained during the semester.

Course Evaluation: There will be departmental final exam questions given by all instructors.

Attendance Policy: Attendance and effort are the most important activities for success in this course. Records of your attendance are maintained throughout the semester. Five (5) absences, *for any reason*, are allotted to the student for the semester. Tardies count as one-half (1/2) of an absence. Tardies will be applied for consistently being late to class, as deemed by the instructor and leaving class early. If this number is exceeded, the instructor has the right to drop you with a grade of F or an X, depending on their discretion.

Plagiarism violations include, but are not limited to, the following:
1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:
1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain an unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's;
9. Taking pictures of a test, test answers, or someone else's paper.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning**.** Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

Diversity Statement: In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Disability Statement: Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

Nondiscrimination Policy: South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

Title IX Pregnancy Accommodations Statement: If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will

be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Director of Health and Wellness at 806-716-2362 or email cgilster@southplainscollege.edu for assistance.

Campus Concealed Carry: Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations and Frequently Asked Questions, please refer to the Campus Carry page at: http://www.southplainscollege.edu/campuscarry.php
Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

SPC Bookstore Price Match Guarantee Policy: If you find a lower price on a textbook, the South Plains College bookstore will match that price. The difference will be given to the student on a bookstore gift certificate! The gift certificate can be spent on anything in the store.

If students have already purchased textbooks and then find a better price later, the South Plains College bookstore will price match through the first week of the semester.   The student must have a copy of the receipt and the book has to be in stock at the competition at the time of the price match.

The South Plains College bookstore will happily price match BN.com & books on Amazon noted as *ships from and sold by Amazon.com*. Online marketplaces such as *Other Sellers* on Amazon, Amazon's Warehouse Deals, *fulfilled by* Amazon, BN.com Marketplace, and peer-to-peer pricing are not eligible. They will price match the exact textbook, in the same edition and format, including all accompanying materials, like workbooks and CDs.

A textbook is only eligible for price match if it is in stock on a competitor's website at time of the price match request. Additional membership discounts and offers cannot be applied to the student's refund.

Price matching is only available on in-store purchases.   Digital books, access codes sold via publisher sites, rentals and special orders are not eligible. Only one price match per title per customer is allowed.

Note: The instructor reserves the right to modify the course syllabus and policies, as well as notify students of any changes, at any point during the semester.

Instructor Course Information: Spring 2020

Instructor: Jay Driver	**Office Hours:** MW 10:45-11:45am, 1:30-2:30pm
Office: M114 (mathematics building)	TR 1:30-2:30pm
Telephone: (806) 716-2780	F 9:00-11:00am
Email: jdriver@southplainscollege.edu	And by appointment!

Textbook: Textbook references for this course may be any one of the following:
- Larson, R., Edwards, B. H. & Falvo, D. C. (2004). Elementary Linear Algebra, Fifth ed. Boston, MA: Houghton Mifflin Company. ISBN 0-618-33567-6.
- Larson, R. & Falvo, D. C. (2009). Elementary Linear Algebra, Sixth ed. Boston, MA: Houghton Mifflin Company. ISBN 0-618-78376-8.
- Larson, R. (2013). Elementary Linear Algebra, Seventh ed. Boston, MA: Brooks/Cole. ISBN 978-1-133-11087-3.
- Larson, R. (2017). Elementary Linear Algebra, Eighth ed. Boston, MA: Cengage Learning. ISBN 978-1-305-65800-4.

Supplies: You will need a calculator capable of matrix algebra (a TI-graphing calculator such as the TI-84 works well), a minimal supply of graph paper, and a 3-ring binder. Calculators on cell phones or other electronic devices are strongly discouraged and will <u>not</u> be allowed during testing without permission.

Assignments & Grading: Homework assignments will be made at each class meeting. Quizzes may be administered at any time. Keep all class materials (notes, handouts, homework, quizzes, and exams) organized in a notebook (3-ring binder). These materials are subject to be turned in for grading at any time. Please make certain all materials accompany you to each class meeting. <u>No late assignments will be accepted.</u> Daily work (homework, quizzes, notebook) will count for 20% of the final grade, while all exams count for 80% of the final grade. Expect four major exams (15% each) throughout the course and a cumulative final exam (20%) at the end of the course. Your final average in the course will determine the letter grade posted on your transcript. This grade is determined by the following scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), F (0-59%).

> <u>Format for submitting all homework assignments:</u>
> 1. Write the problem on your own paper.
> 2. Show all necessary work.
> 3. Clearly mark your answer.
> 4. Check your answers on Blackboard to make certain you are practicing correctly.

Blackboard: Blackboard is the online course management system that will be utilized for this course. This course syllabus, as well as any class handouts can be accessed through Blackboard. Login at https://southplainscollege.blackboard.com/. The user name and password should be the same as the MySPC and SPC email.

> User name: first initial, last name, and last 4 digits of the Student ID
> Password: Original CampusConnect Pin No. (found on SPC acceptance letter)

Questions regarding Blackboard support may be emailed to blackboard@southplainscollege.edu or by telephone to 806-716-2180.

Linear Algebra Tentative Course Outline
MATH 2318.001 (TR 11:00 – 12:15pm)
Spring 2020

Week	Day	Date	Lesson Topic
1	Tue	Jan 14	*Assignment 1:* Linear Systems
	Thur	Jan 16	*Assignment 2:* Gauss-Jordan Elimination (GJE)
2	Mon	Jan 20	*Martin Luther King, Jr. Holiday*
	Tue	Jan 21	*Assignment 3:* Applications of Linear Systems
	Thur	Jan 23	*Assignment 4:* Summations
3	Tue	Jan 28	*Assignment 5:* Matrix Operations & Properties
	Thur	Jan 30	*Assignment 6:* Matlab #1
4	Tue	Feb 4	**Exam 1 (15%)**
	Thur	Feb 6	*Assignment 7:* Matrix Inverses
5	Tue	Feb 11	*Assignment 8:* Special Matrices
	Thur	Feb 13	*Assignment 9:* Determinants
6	Tue	Feb 18	*Assignment 10:* Determinant Properties
	Thur	Feb 20	*Assignment 11:* Determinant Applications
7	Tue	Feb 25	**Exam 2 (15%)**
	Thur	Feb 27	*Assignment 12:* Vector Spaces
8	Tue	Mar 3	*Assignment 13:* Linear Independence
	Thur	Mar 5	*Assignment 14:* Basis / Dimension
9	Tue	Mar 10	*Assignment 15:* Rank / Change of Basis
	Thur	Mar 12	*Assignment 16:* Vector Operations (part 1 of 2)
	Mon-Fri	Mar16-20	*Spring Break Holiday*
10	Tue	Mar 24	*Assignment 17:* Vector Operations (part 2 of 2)
	Thur	Mar 26	*Assignment 18:* Matlab #2
11	Tue	Mar 31	**Exam 3 (15%)**
	Thur	Apr 2	*Assignment 19:* Linear Transformations & Matrices of Linear Transformations
12	Tue	Apr 7	*Assignment 20:* Transition Matrices & Similarity
	Thur	Apr 9	*Assignment 21:* Eigenvalues / Eigenvectors
13	Mon	Apr 13	*Easter Holiday*
	Tue	Apr 14	*Assignment 22:* Diagonalization & Orthogonal Diagonalization
	Thur	Apr 16	*Assignment 23:* Matlab #3
14	Tue	Apr 21	**Exam 4 (15%)**
	Thur	Apr 23	*Assignment 24:* Applications of Eigenvalues and Eigenvectors (part 1 of 2)
15	Tue	Apr 28	*Assignment 25:* Applications of Eigenvalues and Eigenvectors (part 2 of 2)
	Thur	Apr 30	Review for the comprehensive final exam
16	Tue	May 5	**Final Exam (20%)** from 10:15am-12:15pm