Syllabus
MATH 2418 - STEM
Linear Algebra

Western Texas College

1. Basic Course Information
    a. MATH 2418 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; determinates; linear transformations; quadratic forms; eigenvalues and eigenvector; and applications in science and engineering.
    b. Any required prerequisites: Students must make a C or better in MATH 2414.
    c. Advancement Via Individual Determination (AVID) learning strategies will be implemented periodically throughout the course.
    d. This course has been designed to prepare students whose chosen field of study requires a STEM mathematical pathway.
    e. Project Base Learning (PBL) is an active learning method in which students gain knowledge and skill by investigating and responding to a tangible, engaging and complex question, problem or challenge.
    f. Online course content is administered through the college's learning management system (LMS), Moodle, also called eCampus. A link to eCampus can be found on mywtc.edu and to Moodle (the big M with a graduation cap) on the college's home page, www.wtc.edu.

2. Student Learning Outcomes
    a. Be able to solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion.
    b. Be able to carry out matrix operations, including inverses and determinates.
    c. Demonstrate understanding of the concepts of vector space and subspace.
    d. Demonstrate understanding of linear independence, span, and basis.
    e. Be able to determine eigenvalues and eigenvectors and solve problems involving eigenvalues.
    f. Apply principles of matrix algebra to linear transformations.
    g. Demonstrate application of inner products and associated norms.

3. Course Requirements
    a. Major Requirements—All major requirements must be proctored.
        I. Midterm Exam
        II. Final Exam
    b. Minor Requirements
        I. Homework

II. Quizzes
III. Projects

4. Testing Requirements
    a. Students are NOT allowed to use their book or notes of any kind while completing major requirements.

5. Information on Books and Other Course Materials
    a. Optional Book: Elementary Linear Algebra 8th Edition by Larson. Book ISBN: 978-1-30565800-4
    b. Required Access Code: Online Students must purchase a WebAssign Access Code. WebAssign ISBN: 978-1-33765224-7
    c. Calculators: A TI-84 or higher is strongly recommended. The TI-89, TI-Inspire with CAS or any other calculator with CAS capability are not permitted.

6. Other Policies, Procedures and important dates. Please refer to the WTC Catalog for the following:

    a. Campus Calendar
    b. Final exam schedule
    c. How to drop a class.
    d. Withdrawal information
    e. Student Conduct/Academic Integrity
    f. Class Attendance
    g. Students with disabilities

7. Planned Course of Study

Chapters and Sections to be covered throughout the semester	
Chapter 1—System of Linear Equations	Section 1.1—Introduction to Systems of Linear Equations Section 1.2—Gaussian Elimination and Gauss-Jordan Elimination Section 1.3—Applications of Systems of Linear Equations
Chapter 2—Matrices	Section 2.1—Operations with Matrices Section 2.2—Properties of Matrix Operations Section 2.3—The Inverse of a Matrix Section 2.4—Elementary Matrices Section 2.6—More Applications of Matrix Operations

Chapter 3—Determinants	Section 3.1—The Determinant of a Matrix Section 3.2—Determinants and Elementary Operations Section 3.3—Properties of Determinants Section 3.4—Applications of Determinants
Chapter 4—Vector Spaces	Section 4.1—Vector in R^n Section 4.2—Vector Space Section 4.3—Subspaces of Vector Spaces Section 4.4—Spanning Sets and Linear Independence Section 4.5—Basis and Dimension Section 4.6— Rank of a Matrix and Systems of Linear Equations Section 4.7—Coordinates and Change of Basis Section 4.8—Applications of Vector Spaces
Chapter 5—Inner Product Spaces	Section 5.1—Length and Dot Product in R^n Section 5.2—Inner Product Spaces Section 5.3— Orthonormal Bases: Gram-Schmidt Process Section 5.5—Applications of Inner Product Spaces
Chapter 6—Linear Transformations	Section 6.1—Introduction to Linear Transformations Section 6.2—The Kernel and Range of Linear Transformation Section 6.3—Matrices for Linear Transformations Section 6.4—Transition Matrices and Similarity Section 6.5—Applications of Linear Transformations
Chapter 7—Eigenvalues and Eigenvectors	Section 7.1—Eigenvalues and Eigenvectors Section 7.2—Diagonalization Section 7.3—Symmetric Matrices and Orthogonal Diagonalization Section 7.4—Applications of Eigenvalues and Eigenvectors

*This schedule is subject to change at the discretion of the instructor.

Last Modified: October 2020