California Baptist University, Spring 2024
MAT 403
Linear Algebra

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lnstructor and Course Information

Instructor: Robert Willett, Ph.D.
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Office Hours: MWF 10:00-11:30 am, TTh 12:30-1:30 pm, or by appointment

Course Time and Location: MWF 12:00-1:00pm HSCC V295

Textbook: *Linear Algebra with Applications*, 10th edition, by Steven J. Leon

Purpose of this Course

The purpose of this course is to learn the basics of linear algebra, including solving systems of equations, matrix arithmetic and algebra, determinants, and linear transformations. The properties of vector spaces, subspaces, spanning sets, linear independence, rank, nullity, and bases will be covered. Inner product spaces, the Gram-Schmidt orthogonalization process, eigenvalues and eigenvectors, diagonalization, and applications to other disciplines will also be studied. Being an upper-division mathematics course, much of this will occur through completing proofs.

Course Description

Vector spaces; matrices, rank and systems of linear equations; linear transformation; similarity and diagonalization theorems; eigenvectors and eigenvalues. Prerequisite: MAT 313.

Course Objectives

1. Students will learn the basics of systems of equations and matrices, including row echelon form, matrix arithmetic and algebra, and elementary and partitioned matrices.
2. Students will study determinants of matrices and their properties.
3. Students will study the concept of a vector space and its associated ideas, including subspaces, linear independence, bases, dimension, change of basis, and row and column space.
4. Students will cover the basics of linear transformations, including the definition and basic examples, matrix representation, and similarity.
5. Students will study the concept of orthogonality, including inner product spaces, orthogonal subspaces, orthonormal sets, and the Gram-Schmidt Orthogonalization Process.
6. Students will study eigenvalues and eigenvectors and apply these concepts to solving systems of differential equations and diagonalization.
7. Students will learn to apply linear algebra to the study of electric circuits, cryptography, solving least-squares problems, and Markov chains.

Grading Policy and Evaluation Criteria

The students' progress in this course will be measured by homework assignments, weekly quizzes, exams, and one comprehensive final examination. They will each constitute the following percentage of the overall total grade:

Grading Breakdown

Homework:	25%
Quizzes:	15%
Exams:	40%
Final Exam	25%

1. Homework: Homework will count for 25% of the total grade and will be assigned on a weekly basis. It will be posted under "Homework" in the course Blackboard page. I will grade homework upon completion and will select 2 problems from the homework set to grade. For late homework to be accepted at full credit, the reason must either be a university-related activity, a documented medical reason, or a documented emergency situation. The 2 lowest homework scores will be dropped. Completing and understanding the homework is crucial for success in this course, since it constitutes 25% of the total grade and is the basis for quiz, exam, and final exam problems. Homework will be due almost every Friday, and their due dates will be stated on Blackboard with the assignment.

2. Quizzes: A quiz will be given every Friday (except on Exam days) in class at the beginning of class and will count for 15% of the overall grade. It will be on the material that is covered by the homework assignment that has the same due date. The quiz will consist of answering true and false questions, computations, and/or proofs. The lowest two quiz scores will be dropped. The late quiz policy is the same as the late homework policy.

3. Exams: There will be two exams throughout this course, each counting for 20% of the overall grade. See the course schedule for the dates of each exam. The exams will not be cumulative and will cover the course material that has come after the previous exam.
   For a missed exam to be made up at full credit, the reason must either be a university-related activity, a documented medical reason, or a documented emergency situation. For any other reason, a missed exam may be made up, but at a penalty of 10% per day and will be scored '0' if it hasn't been made up a week from the original examination date.

4. Final Exam: There will be one comprehensive final exam. The student must take the final exam to pass the course.

5. Attendance/Participation: Attendance will be taken every time the class meets. Attending class regularly is vital to success in this course and is expected of every student. It is important that not only you are present but are actively engaged with the material.

The instructor will use the following grading scale in assigning letter grades:

Grading scale

92.5% - 100%	A
89.5% - 92.4%	A-
87.5% - 89.4%	B+
82.5% - 87.4%	B
79.5% - 82.4%	B-
77.5% - 79.4%	C+
72.5% - 77.4%	C
69.5% - 72.4%	C-
67.5% - 69.4%	D+
62.5% - 67.4%	D
59.5% - 62.4%	D-
Below 59.5%	F

Academic Honesty

Any incident of academic dishonesty (cheating and copying) must be reported to the Student Services Office. A first incident is handled at the discretion of the professor, in consultation with the Dean of Students. Penalties may include, but are not limited to, failure of the respective assignment/examination, a loss of letter grade, failure in the course in which the offense occurred, suspension, and/or expulsion from the University. See the CBU student handbook for more information.

Course Support and Disability Services

The Office of Student Success (OSS) offers free tutoring. If you are interested, you may stop by their office in the Lancer Arms Apts. during normal business hours or call (951) 343-4349 to set up an appointment. Students who have qualified disabilities and wish to arrange the appropriate accommodations should contact the Disability Services Office or Julie Discenza at (951) 343-4962.

Schedule (Tentative)

Week	Monday	Wednesday	Friday
1	Intro/ 1.1	1.1	1.2
2	Holiday	1.2	1.3
3	1.4	1.4	1.5
4	1.5	2.1	2.1
5	2.2	Review	Exam 1
6	3.1	3.1	3.2
7	3.3	3.3	3.4
8	3.5	3.5	3.6
9	3.6	Review	Exam 2
10	Spring Break	Spring Break	Spring Break
11	4.1	4.2	4.2
12	5.2	5.2	Easter Break
13	Easter Break	5.3	5.4
14	5.5	6.1	6.2
15	Review	Final Exam 12-2pm	