# MATH 311 — INTRODUCTION TO LINEAR ALGEBRA

**Instructor:** Kenneth Corea kcorea@hawaii.edu

**Lectures:** TR 10:30-11:45 Keller 301

**Office Hours:** MTWR 3-4 Keller 402E

**Book:** *Elementary Linear Algebra with Applications*, 9th Edition, by Kolman and Hill.

**Course description:** Algebra of matrices, linear equations, real vector spaces and transformations. There is an emphasis on concepts and abstraction and instruction of careful writing.

**Prerequisites:** Math 242 or 252A or consent.

**Course management:** Course announcements and materials will be available on our course page: `https://math.hawaii.edu/~kcorea/courses/fall_2024/311/`

**Grades:** Your grade is broken down as follows:

|          |              |
|----------|--------------|
| Homework | 30%          |
| Exams    | 40% (2x20%)  |
| Final    | 30%          |

The standard letter grade scale will be used.

**Homework:** There will be weekly written homework assignments, due every Thursday during lecture. No electronic submissions will be accepted. All assignments are weighed equally. A subset of each problem set will be graded.

**Exams:** There will be three exams, two midterm exams and a final. You may use a scientific calculator for numerical computations, no other devices are authorized. For each exam you may bring a two-side 3x5 notecard "cheat-sheet" which can be turned in for extra credit.

|        |                           |
|--------|---------------------------|
| Exam 1 | Thursday 10/3 lecture time |
| Exam 2 | Thursday 11/14 lecture time |
| Final  | Tuesday 12/17 9:45-11:45  |

All exams will be in our usual lecture room unless we get moved for some reason.

**Make-up Policy:** In general, homework will not be excused as you have more than a week to complete each assignment. Examinations can be made up with a valid excuse.

**Calculators and CAS:** I highly encourage you to use sophisticated computational software like Maple, Mathematica, or MATLAB. I will occasionally make use of MATLAB during lectures since it is free for UH faculty and students! Visit `https://www.hawaii.edu/sitelic/matlab/matlab.html` for more information.

**Academic integrity:** Cheating, plagiarism, and academic dishonesty will not be tolerated.

**KOKUA:** I am happy to work with you and the KOKUA Program (Office for Students with Disabilities), if you need course accommodations. For more information visit their webpage `https://hawaii.edu/kokua/`.

**Tentative Schedule:** We will cover chapters 1-7 from the assigned text. The following is a rough timeline of what we are covering each week.

| Week | Topic |
|------|-------|
| 1  | Systems of Linear Equations, Matrix Operations |
| 2  | Special Matrices, Matrix Transformations, *Labor Day* |
| 3  | Row-Echelon Form, Row Reduction, Inverse Matrices |
| 4  | Inverse Matrices Continued, Determinants |
| 5  | Properties of Determinants, Cofactor Expansion |
| 6  | Adjoint and Cramer's Rule, **Exam 1** |
| 7  | Vector Spaces, Subspaces |
| 8  | Span and Linear Dependence |
| 9  | Bases and Dimension, Coordinates, Isomorphisms |
| 10 | Rank, Inner Product Spaces |
| 11 | Geometry of Inner Product Spaces, *Election Day* |
| 12 | Gram-Schmidt Process, *Veteran's Day*, **Exam 2** |
| 13 | Orthogonal Complement, Linear Transformations, Kernel and Range |
| 14 | Matrix of a Transformation, *Thanksgiving* |
| 15 | Eigenvectors and Eigenvalues, Diagonalization |
| 16 | Diagonalization of Symmetric Matrices |
| 17 | **Finals week** |