Linear Algebra

Example Syllabus

Course Description:

An introduction to the theory and applications of linear algebra. Topics include systems of linear equations, vector spaces, matrices, linear transformations, determinants, eigenvalues and eigenvectors.

Prerequisite(s): Calculus I. A course which has covered proof writing is recommended.

Credit Hours: 1

Course Objectives:

At the completion of this course, students will be able to:

1. Solve systems of linear equations
2. Perform arithmetic with vectors and matrices
3. Understand the basics of vector spaces
4. Understand the computation and applications of determinants
5. Understand the use of eigenvalues and eigenvectors
6. Understand the basics of linear transformations

Course Structure:

Each day students will be assigned problems to work, which will be presented at the board. Students may volunteer to present, but no student may volunteer twice until each student has volunteered once. Students will bring written versions of their work to class, to be annotated as correct solutions are presented. More difficult problems will be assigned weekly. These must be typed and submitted. Two in-class midterms and an in-class final exam will be administered.

There are three in-class midterms in the course, and one comprehensive in-class final exam. Exam questions will be mapped to specific learning objectives. The final exam will cover all learning objectives in the course. Each exam question will be worth one point. A correct answer on the final exam for an objective that was previously missed on a midterm will replace the earlier exam score. Students who are satisfied with their exam average prior to the final exam do not need to take the final exam.

Grading Contract

This contract gives the necessary conditions to receive a grade of **A**, **B**, or **C** in this course. All course work will be graded as Proficient (✓) or Unsatisfactory (×). This contract is based on the minimum expected proficiency show by a student in the course. Failure to meet these requirements will result in a grade penalty of one letter grade per missed requirement.

Students who wish to contract for a C

- In-Class Participation

    1. Students will be asked to volunteer to present their work. If no student volunteers, a student may be randomly called upon to present a problem.
    2. A **C** student will pass no more than 2 times during the term. Attempting to present without preparation will count as a pass.
    3. Absences are considered *excused* if the instructor is notified in advance that the student will be gone, or if there is a documented emergency.
    4. If a student is called on to present when absent, this will count as a pass unless the absence is excused.

- Daily Homework Submission

1. A few problems will be assigned daily. These are the problems which student may present in class. Students are expected to arrive in class with written attempts at each problem. The attempts need not be typed.
2. Pens will be provided by the instructor to annotate the daily homework during the presentations. This ensures that all students have the complete and correct solutions to these problems.
3. A **C** student will receive a maximum of 4 daily homework assignments graded $\times$ during the semester. Daily homework assignments are not eligible for resubmission.

- Weekly Homework Submission
  1. One or two difficult problems will be assigned each week. These will be submitted, typed in LaTeX, via Overleaf.com.
  2. A score of $\times$ on a weekly homework assignment may be resubmitted once, within a week of receiving the grade.
- Exam Performance
  1. A **C** student will score $\checkmark$ on 70% of weekly homework and exam problems.

Students who wish to contract for a B

- All requirements for a **C** contract must be met.
- No more than 1 pass used.
- No more than 2 daily homework assignments graded $\times$.
- $\checkmark$ on 80% of weekly homework problems and exam problems.

Students who wish to contract for a A

- All requirements for a **C** contract must be met.

- No more than 1 pass used.
- No more than 1 daily homework assignments graded $\times$.
- $\checkmark$ on 90% of weekly homework problems and exam problems.