

**1. Department, Course Number, and Course Title:**

**MECHANICAL ENGINEERING**

**CE/ME210 MATRIX ALGEBRA FOR ENGINEERS**

**2. Designation:** Required  Elective   
Lower Division  Upper Division

**3. Course Description:** Introduction to calculations using vectors; matrix operations; solutions of linear simultaneous equations; coordinate transformations; application to engineering problems

**4. Prerequisites:** MATH 208, Calculus III; PHYS 201, General Physics I

**5. Text and Materials:** Elementary Linear Algebra, Fourth Edition, Stewart Venit and Wayne Bishop, Brooks/Cole Publishing Co., 1996

**6. Course Objectives:** This course teaches and prepares engineering student the techniques for analyzing and solving engineering problems involving vectors and matrices.

Course Outcomes

- an ability to apply linear algebra to the solution of engineering problems.
- the introductory knowledge of the theory of vector and matrix algebra and the ability to perform operations and calculations using these quantities.
- the analytical and computational skills to solve systems of linear equations.
- the ability to use suitable computer software to perform matrix operations and solve system of linear equations.

**7. Topics Covered:** (in Order of Presentation)

- Two and Three-dimensional Vectors and Vector operations (Ch. 1)
- Linear Equations, Application to Engineering Systems (Ch. 2)
- Matrices, Operations and Application to Engineering (Ch. 3)
- Determinants, Cramer's Rule (Ch. 4)
- Linear Dependence and Independence (Ch. 5)
- Eigenvalues and Eigenvectors (Ch. 8)

**8. Class Schedule:** Number of Sessions per week: 1  
Duration of each session: 1 hour 40 minutes

**9. Contribution of course to meeting the professional component:**

This course is part of the lower division major requirement for the civil and mechanical engineering programs.  
Mathematics 2 units

**10. Relationship of course to program objectives:**

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)

Skill outcomes:

- an ability to communicate effectively (abet g)
- an ability to think in a logical sequential process

Attitudes Outcome:

**11. Prepared by:**

Maj Mirmirani

12/2005