

EK102 (B1): Introduction to Linear Algebra for Engineers

Fall 2011

Instructor: Pirooz Vakili
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Class: Wednesday 2-4 pm; **Location:** PHO 206

Discussion sections:

B2: Monday 10-11 am; **Location:** PSY B33

B3: Tuesday 3-4 pm; **Location:** SOC B57

B4: Monday 2-3 pm; **Location:** PSY B51

B5: Friday 2-3 pm; **Location:** SOC B57

B6: Friday 3-4 pm; **Location:** SOC B57

Office hours: Tuesdays 1-3 pm or by appointment

Textbook: *Elementary Linear Algebra with Applications*, (9th edition), Bernard Kolman and David R. Hill, Pearson/Prentice Hall, 2008.

Homework: Homework will be assigned weekly. It is due at the beginning of the following class. Collaboration in solving homework problems is acceptable. However you need to turn in your own work.

Grading: There will be **one midterm exam** and a **final exam**. The final grade for the course will be based on the following allocation.

Homework: 30%

Midterm: 30%

Final Exam: 40%

Midterm: **Wednesday October 19, 2-4 pm in class.** Midterm will be on material covered up to and including October 5.

Final Exam: **Scheduled during final exam period by the registrar.** Final exam will be on ALL material covered in the course.

Course learning objectives: At the end of this course, students will be familiar with basic concepts in linear algebra, such as matrices and matrix operations, linear systems and their solutions, vector spaces, inner products, eigenvalue, eigenvectors and their application.

SYLLABUS

1. *Introduction to the course; Linear Equations and Matrices* (Chapter 1): System of linear equations; Matrices; Matrix operations & special matrices. (**September 7 & September 14**)
2. *Solving Linear Systems* (Chapter 2): Solving linear systems; Inverse of a matrix. (**September 21**)
3. *Determinants* (Chapter 3): Determinants and their properties (**September 28**)
4. *Real Vector Spaces* (Chapter 4): Vector spaces; Subspace & span; Linear independence, basis & dimension; Coordinates & isomorphisms (**October 5, October 12**)

Midterm Exam: October 19

5. *Inner Product Spaces* (Chapter 5): Inner product spaces, length, & angle; Orthogonal vectors & Gram-Schmidt Process (**October 26, November 2**)
6. *Linear Transformations and Matrices* (Chapter 6): Linear Transformations & range and kernel; Matrix of a linear transformation & similarity (**November 2, November 9**)
7. *Eigenvalues and Eigenvectors* (Chapter 7): Eigenvalues and eigenvectors & diagonalization of matrices (**November 16**)
8. *Applications* (Chapter 8): Dominant Eigenvalue & Principal Component Analysis (**November 30**)
9. *Review* (**December 7**)