ACMS 20620, Applied Linear Algebra, Fall 2011

Course Information


- **Class time and place:** MWF 11:45am - 12:35pm, Pasquerilla Center 116.

- **Instructor:** Yongtao Zhang (yzhang10@nd.edu)
  - **Office location:** HAYE 242
  - **Office phone:** (574) 631-6079
  - **Office hours:** Thur, 1:30pm - 4:00pm, or by appointment

- **Grader:** Angela Kim (akim6@nd.edu)

- **Class website:** [http://www.nd.edu/~yzhang10/acms20620/index.html](http://www.nd.edu/~yzhang10/acms20620/index.html)

- **Homework Assignments:** Homework problems will be assigned in every class and are in general due every Friday in class. Homework assignments should be submitted **by the due time.** You are encouraged to work on homework problems in groups, but the assignments must be turned in individually. Remember that you will not learn anything by simply copying another student's work. The main purpose of homework assignments is to help you learn the material. Experience shows that students who take their homework seriously do very well in the course because they have a better understanding of the material.

- **Exams:** There will be two midterm exams and the final exam. Midterm exams will be the in-class exams on **Friday, October 7,** and on **Friday, Nov 18.** The final exam will be on **Monday, Dec 12, from 4:15pm – 6:15pm.** A student who misses an examination will receive **zero points** for that exam unless he or she has written permission from the Vice president for residential life. If you have a valid excuse (illness, excused athletic absence etc) for missing an exam, please see me ASAP (preferably before the exam) and a makeup exam will be scheduled.

- **Grades:** homework 100 points, midterm exams I-II 2 @ 100 = 200 points, final exam 150 points. The total course points are 450. Your final grade will be assigned on the basis of your total score out of 450:
  - A+ ≥ 97, A ≥ 93, A- ≥ 90, B+ ≥ 87, B ≥ 83, B- ≥ 80, C+ ≥ 77, C ≥ 73, C- ≥ 70, D ≥ 60. **Note:** A+ will not be shown in your transcript.

- **Honor Code:** Both examinations and homework assignments are conducted under the **honor code.** While cooperation in small groups in doing homework is permitted (and strongly encouraged), copying is not. Exams are to be done completely by
yourself with no help from others.

**Tentative Syllabus**

1. Matrices and Systems of Equations.
   - Systems of Linear Equations and Row Echelon Form
   - Matrix Arithmetic and Matrix Algebra
   - Elementary Matrices
   - Introduction of Matlab and Matlab Exercises

2. Determinants.
   - Definition
   - Properties of Determinants
   - Matlab Exercises

3. Vector Spaces
   - Definition, Subspaces, Linear Independence
   - Basis and Dimension, Change of Basis, Row Space and Column Space
   - Matlab Exercises

4. Linear Transformations
   - Definition, Matrix Representations
   - Similarity
   - Matlab Exercises

5. Orthogonality
   - Scalar Product, Orthogonal Subspaces, Least Square
   - Inner Product Spaces, Orthonormal Sets
   - Gram-Schmidt Orthogonalization Process
   - Matlab Exercises

6. Eigenvalues
   - Eigenvalues and Eigenvectors, Diagonalization
   - Singular Value Decomposition, Matlab Exercises

7. Introduction to Numerical Algorithms (if time permits)