ACMS 20620, Applied Linear Algebra, Spring 2019
Course Information and Syllabus


Class time and place:

- Section 1: MWF 10:30am - 11:20am, DBRT 217 (Lecture).
  Instructor: Yongtao Zhang (yzhang10@nd.edu)
  Office location: Hurley Hall 176
  Office phone: (574) 631-6079
  Office hours: Fridays, 2:00pm - 3:00pm, or by appointment.

- Section 2: MWF 11:30am - 12:20pm, DBRT 217 (Lecture).
  Instructor: Margaret Regan (mregan9@nd.edu)
  Office location: Crowley Hall 208
  Office phone: (574) 634-1639
  Office hours: Tuesdays, 2:00pm – 3:00pm, or by appointment.

Teaching Assistants (TAs): Diana Morales (dmorale3@nd.edu), Alfredo Effendy (aefendy@nd.edu).

Help session office hours hold by the TAs: Besides office hours hold by the course instructors, teaching assistants are holding additional help session office hours every week to help you in this course. You are also encouraged to visit TAs’ office hours if you need helps in your study of this course. Diana Morales holds help session office hours from 2:00 pm to 4:00 pm on Mondays, and from 9:00 am to 12:00 pm on Fridays. Alfredo Effendy holds help session office hours from 3:30 pm - 5:30 pm on Tuesdays. All help session office hours are held in room 202 Crowley Hall.

Class website: http://www.nd.edu/~yzhang10/acms20620/index.html

Please download MATLAB to your computer from ND OIT website: https://oit.nd.edu/services/software/software-downloads/, for helps on downloading MATLAB, contact oit: oithelp@nd.edu, or (574) 631-8111.

Homework Assignments: Homework problems will be assigned in every class and are in general due every Wednesday 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, March 1**, and on **Wednesday, April 17**. The final exam will be on **Wednesday, May 8, 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 your course instructor ASAP 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:
  \[ \begin{align*}
  A & \geq 93, \\
  A- & \geq 90, \\
  B+ & \geq 87, \\
  B & \geq 83, \\
  B- & \geq 80, \\
  C+ & \geq 77, \\
  C & \geq 73, \\
  C- & \geq 70, \\
  D & \geq 60.
  \end{align*} \]

- **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.

**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
   - Matlab Exercises