Meeting Times/Place: MWF 11:00-11:50 in VSC Room 201

Course Description/Content:
• Vector spaces, linear transformations, matrices, and determinants with applications.
• This course often requires explanations or even proofs and is very VERBALLY oriented.

Prerequisites/Follow-Ups:
• Math 230 - Calculus II
• Pre/Co-requisite: Math 231 - Calculus III
• Math 240 - “Lin and Diff” is NO LONGER a prerequisite.

Text: Linear Algebra with Applications by Leon (8th ed., blue cover)

Classroom environment:
• Do not use your cell phone or other technology during class.
• I CANNOT PERMIT FOOD OR DRINKS in the room due to a documented health condition.
• Plain, unflavored water will be permitted, but no other beverages. (See above.)
• Please see me immediately if these accommodations conflict with your own documented needs.

Office Hours and Contact:
• My email address is lyn.miller@sru.edu; my office phone number is 724-738-2878.
• I’ll typically reply to email or voicemail within 24 hours during the week.
• Drop-in office hours are M-F 2:00-3:00; I’m also available by appointment, as well as by “capture” for math major courses: You are welcome to ask any time you see me whether I am free to help, but realize that I may sometimes have to say “no.”
• My office is 200-B VSC inside the Mathematics Department offices.
• Please do not bring food or beverages into my office. You may leave them in the kitchenette.
• My web page is granite.sru.edu/~lmiller. (No “www.” and no D2L except for exam grades)
• Assignments, other information will be posted regularly on my web page, NOT on D2L.

Technology:
• We’ll learn the basics of MATLAB and other software to help make computations easier.
• Software use will be incorporated into existing HW, not given as separate projects.
• On exam days, we’ll move into a computer lab so you have access to MATLAB/row-reducers.

Final Exam:
• The Final is Friday, May 8, 10:30-12:30.
• You MUST take the Final at the scheduled time. Do NOT plan travel that conflicts with it.
• The Final Exam is cumulative; it MAY have a take-home portion due at the scheduled time also.
Grading:

- **100 points** - Homework Score - computed as a percentage of assignments (see below)
- **300 points** - Exams #1, #2, and #3 - three in-class exams at 100 points each (see below)
- **150 points** - Cumulative Final Exam (see below)

The point total for the entire course is **550 points**.

\[ A = 90 - 100\%; B = 80 - 89\%; C = 70 - 79\%; D = 60 - 69\%; F = 0 - 59\%. \]

Homework Policy:

- Homework will be collected roughly once a week, probably on Fridays.
- Point values for different assignments may vary, depending on their length.
- Email, phone, or see me about difficulties in advance so that you are ready to turn in your HW.
- Homework is due on my desk at the START of each class; otherwise, it’s late.
- This course is VERY verbal, so write legibly and leave plenty of room for me to comment.
- I won’t accept make-up/late HW, but will drop your worst 10-15% of assignments.
- Typically, this means I drop 1 or 2 assignments; exact number determined at semester’s end.
- Solutions must **show your own work**, not just be copied from the text, web, study partners, etc.
- Lack of sufficient original work counts as a zero, including for all study partners involved.
- Solutions (sometimes partial) to original problems will typically be posted on my web site.
- Solutions to textbook problems will NOT be posted to honor copyright, intellectual property laws.

Exams:

- You’ll get a Topics List listing the concepts on each exam one week prior to its date.
- There are also old exams on my web page, but they are NOT representative of our content.
- Students say the best way to study is to use the Topics List to make your own study guide.
- For each item listed, review notes, reading, and HW to see what we have said/done about it.
- Copy down precise statements and examples, as well as cautions, on your study guide.
- Begin to prepare as soon as the Topics List comes out; don’t cram at the last minute.
- Exams MAY have take-home components as well, depending on necessary length.
- **TENTATIVE dates:** Exam #1: around 2/18 Exam #2: around 3/30; Exam #3: around 4/26.

Attendance and Make-Up Policy:

- Regular and prompt attendance is expected but does NOT count toward your grade.
- An attendance sheet will circulate daily for SRU record-keeping.
- Late and make-up HW: NONE! Remember, I drop 1-2 assignments at the end of the semester.
- Make-up Exams:
  1. These do require a **documented** reason and **meaningful** efforts to contact me in advance.
  2. Separate make-up exams typically are not given; rather, make-up exam scores are determined by using your percentage score on the Final Exam score at the end of the semester to replace the missed score.
- If you are absent, get the notes from a **classmate**. This is YOUR responsibility.
- When you return from an absence, be prepared to hand in any HW that is due on that day.
- **SEEK HELP EARLY AND OFTEN!**
1. **Students will demonstrate an understanding of, ability to work with and a facility in proving theorems about vector spaces over arbitrary fields. This includes the following topics:**

   (a) Definitions and examples
   (b) Subspaces
   (c) Linear independence
   (d) Basis and dimensions
   (e) The row space and the column space of a matrix

2. **Students will demonstrate an understanding of and ability to work with linear transformations. This includes the following topics:**

   (a) Definition and examples
   (b) Matrix representation of linear transformations

3. **Students will demonstrate an understanding of and ability to work with orthogonality. This includes the following topics:**

   (a) The scalar product in $\mathbb{R}^n$
   (b) Inner product spaces (definition and examples)
   (c) Orthonormal sets
   (d) The Gram – Schmidt Orthogonalization Process

4. **Students will demonstrate an understanding of and ability to work with eigenvalues and eigenvectors. This includes the following topics:**

   (a) Eigenvalues and eigenvectors
   (b) Diagonalization
   (c) Hermitian matrices
   (d) Schur’s lemma
   (e) Quadratic forms