About this Course

Why Study Matrix Methods/Linear Algebra?

It is hard to overstate the importance of linear algebra (i.e., matrix methods) for mathematicians, engineers, and scientists. Historically, linear algebra was developed because of the need to solve elementary systems of linear algebraic equations (we will see plenty of applications that require solutions to such systems, but such problems can be interesting in their own right). Today, the study of linear algebra is much more general—and in some contexts, more abstract. For pure mathematicians, the theory is both intrinsically interesting, and useful as a tool in almost every other branch of pure mathematics (e.g., topology, functional analysis). For applied mathematicians, statisticians, engineers, and scientists, linear algebra is an essential tool for developing algorithms, modeling phenomena, and solving real-world problems. For these reasons, linear algebra provides an invaluable set of tools for the working professional in science and engineering.

Important!

This course has a D2L webpage. Assignments, announcements, policies, grades, and other important information will be posted on D2L!
Course Objective

The objectives of this course are: (1) to demonstrate competence in the basic concepts of linear algebra, including systems of linear equations, vector spaces, subspaces, linear transformations, the fundamental subspaces of a matrix, eigenvalues, eigenvectors, and matrix decompositions (e.g. LU, QR, SVD, etc.); and (2) to recognize the importance of computational techniques in 'real-world' science and engineering problems.

Assignments

Homework (20%)

Homework is an essential part of this course. Math is best learned through practice, and one of your best opportunities for practice is homework. Collaboration is allowed, but learning from collaboration is crucial; copying homework is considered a violation of the honesty policies (see below). Assignments will be due in class every Wednesday at the start of lecture. See the class website for the schedule. A subset (often a non-empty proper subset) of problems on each assignment will be graded. The two homework assignments given before the midterm exams will not be graded. Of the remaining assignments, the two with the lowest scores will be dropped. Late homework will be penalized and will not be accepted after the answers have been posted.

Two Midterm Exams (20% each)

There will be two midterm exams during the semester. The first exam will take place on Wednesday September 28 at 5pm, and the second exam will take place on Wednesday November 2 at 5pm (rooms TBA).

Exam dates are fixed now so plan accordingly. There will be no make-up exams or early exams. If you are sick during an exam, please bring a note from your doctor verifying your illness. The rest of your course work will then determine your course grade.

Important!
Note that you must have an exam mean of 55% or higher to pass this course.

Final Exam (25%)

There will a cumulative final exam. The final exam date and place can be found here: http://tinyurl.com/jmahkp2.

Final Project (15%)

It might not seem so, but writing is an important skill in mathematics. For this reason, there will be a written class project. For the project you will work in groups of two to three. You will choose an
application of matrix methods (of mutual interest to the group!) and prepare a paper on this application. Several choices of papers will be provided. The goals of the project are for you to:

- learn how matrix methods play a role in some topic of your interest
- use the material covered to explore current applications;
- gain experience with computational methods and programming;
- practice technical writing skills.

The detailed project requirements and a tentative list of topics can be found on the course webpage.

### Final Grade

If your exam average is less than a 55%, your final grade will be an F. Otherwise, your final grade will be determined according to the following weighting scheme:

\[ x = (\text{Homework}) \times (0.20) + (\text{Midterm Exam 1 Grade}) \times (0.20) + (\text{Midterm Exam 2 Grade}) \times (0.20) + (\text{Final Project Grade}) \times (0.15) + (\text{Final Exam Grade}) \times (0.25) \]

Your final grade will be converted to a letter grade based on a scale no less forgiving than this one:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percentage</th>
<th>Letter Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>( x \geq 92 )</td>
<td>C</td>
<td>( 72 \leq x &lt; 78 )</td>
</tr>
<tr>
<td>A-</td>
<td>( 90 \leq x &lt; 92 )</td>
<td>C-</td>
<td>( 70 \leq x &lt; 72 )</td>
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<tr>
<td>B+</td>
<td>( 88 \leq x &lt; 90 )</td>
<td>D+</td>
<td>( 68 \leq x &lt; 70 )</td>
</tr>
<tr>
<td>B</td>
<td>( 82 \leq x &lt; 88 )</td>
<td>D</td>
<td>( 62 \leq x &lt; 68 )</td>
</tr>
<tr>
<td>B-</td>
<td>( 80 \leq x &lt; 82 )</td>
<td>D-</td>
<td>( 60 \leq x &lt; 62 )</td>
</tr>
<tr>
<td>C+</td>
<td>( 78 \leq x &lt; 80 )</td>
<td>F</td>
<td>( x &lt; 60 )</td>
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### Policies

#### Dropping the Course

Dropping this course after the 3-week drop date will result in a W grade posted on the transcript, and full tuition and fees will be assessed. After the 10-week deadline, students must petition the dean in order to drop the course. See [http://tinyurl.com/q3uw6a6](http://tinyurl.com/q3uw6a6) for important dates.

#### Disability Accommodations

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with your professor.

#### Religious Observances
Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please meet with your instructor within the first two weeks of the semester if you notice that a religious obligation conflicts with a scheduled exam or assignment. See the campus policy regarding religious observances for full details.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran’s status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student’s legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at honorcode.colorado.edu.

Misconduct

The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU’s Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder’s Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the OIEC website.