MATH 310: Linear Algebra (3 credits)
Fall 2013, MWF 8-8:50am, Dennis 305

Instructor: Anand L. Pardhanani
Dennis 206
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Phone: 765-983-1683

Office hours: The following hours are tentative - I'll finalize office hours after the 1st week
M & W: 2:30-3:30pm. T & F: 1-3pm. Th: TBA.

Open door policy: I view my posted office hours as a formality, just to give you some minimum options! Students may find in more effective to just drop by whenever needed. Anytime my office door is open you're welcome to stop by and check whether I am available. Also, please do not hesitate to make an appointment if my posted office hours don't work for you.

Class website: http://www.earlham.edu/~pardhan/courses/linear/
The website is a central component of this class, and you are responsible for regularly checking it for announcements, homework assignments and various supplementary handouts. I prepare for class with the assumption that students have reviewed the website and followed through on posted instructions.

Textbook:
(ISBN: 0321385179)

Description & objectives
Linear Algebra is an area of mathematics that deals with the properties and applications of vectors, matrices, and other related mathematical structures. Interestingly, these topics readily lend themselves to a very rigorous study of the underlying mathematical theory, as well as to a broadly applications-oriented study of concepts, methods and algorithms. This course will place roughly equal emphasis on theory and applications.

Main topics we will cover include: linear systems and their solutions; linear transformations; matrix and vector algebra; vector spaces; determinants; eigenvalues and eigenvectors; and orthogonality. We will study a variety of interdisciplinary applications and related strategies throughout the course.

This class fulfills the Analytical Reasoning component of Earlham's General Education requirements.

Student learning outcomes: Upon successful completion of this course, students will be able to

1. Solve systems of linear equations.
2. Use matrix and vector algebra, and relate matrices to linear transformations.
3. Understand and apply fundamental concepts of vector spaces such as span, linear independence, basis, and dimension.
4. Apply basic strategies of mathematical proof.
5. Recognize and work with some historical and modern applications of linear algebra.
6. Strengthen mathematical reasoning, problem solving, algebraic, and quantitative skills.

Prerequisites: Calculus A and Calculus B (MATH 180 and 280).

Assessment & grading policy
In my approach to grading, correct process and method receive far more credit than correct answers. I always ask you to show all your work, and I grade all of your work!
Your final grade will be based on combined performance on: (1) homework problem sets, (2) quizzes, (3) two exams during the semester, and (4) a comprehensive final exam. Each will contribute the following proportions:

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<tr>
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<th>Proportion</th>
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<tr>
<td>Homework problem sets</td>
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<tr>
<td>Quizzes</td>
<td>20%</td>
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<tr>
<td>Two exams</td>
<td>20% + 20% = 40%</td>
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<tr>
<td>Final exam</td>
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Letter grades will be assigned according to the following scale (%):
A+: 97.0-100;   A: 93.0-96.9;   A-: 90.0-92.9;
B+: 87.0-89.9;   B: 83.0-86.9;   B-: 80.0-82.9;
C+: 77.0-79.9;   C: 73.0-76.9;   C-: 70.0-72.9;
D+: 67.0-69.9;   D: 63.0-66.9;   D-: 60.0-62.9;   F: below 60.

NOTE that all students must also satisfy the following minimum requirements to receive a grade of C- or better:
* Take all the exams (2 during the semester, plus the final).
* Turn in at least 75% of the Problem sets.
* Take at least 75% of the quizzes.

Quizzes & exams
**Quizzes:** There will be periodic short quizzes based on readings, homework, classwork and/or other assigned tasks. The quizzes will collectively account for 20% of your total grade.

**Exams:** There will be two exams during the semester, plus a final exam at the end of the semester. Each exam will be worth 20% of the total grade, including the final. The tentative dates of the in-semester exams are:

**Final exam:** The final exam date and time is set by the registrar's office. According to their calendar, the final exam will be held Wednesday, December 11, in Dennis 305 at 4:30 pm.

Other assignments
**Note:** All assignments will be posted on the class website - they will not be handed out in class.

**Reading:** These will be assigned for each day of class, to be completed before class on that day.
Reading ahead is a critical element for learning the material in this course. The time you invest reading for each class pays off in two different ways. One, your performance improves because you understand the material better, you ask questions, and attain a higher comprehension level. Two, you understand the material faster, so you spend *less time* later reviewing elementary ideas and introductory material when preparing for quizzes and exams.

**Homework problem sets:** Exercises will be assigned for each topic that we cover, and must be turned in at the beginning of class on the indicated due dates. Problem sets will collectively account for 20% of your total grade. I will drop your lowest grade when computing your average.

**Important dates**
* Last day to add this course: August 27.
* Last day to drop: November 1.
* Date of final exam: December 11.

**NOTE:** Last drop date applies to Earlham students only. Students registered through IU-East or other institutions must follow the dates and rules of their own institution.

**Academic integrity**
Respect and care for students and for one another is a cherished tradition throughout the Earlham community. In such an environment of mutual support and trust, each of us develops the best of our own unique potential and thrives in our career. We are each responsible for helping preserve this environment by acting with integrity and honesty in all of our dealings with one another. In this spirit, students are reminded of the following from the Earlham Academic Integrity Policy:

"The College trusts students who enroll at Earlham to be honest seekers of truth and knowledge. This trust is extended to all students by other students and by teachers ... Giving or receiving aid inappropriately on assignments and tests, or plagiarizing by using another person's words or ideas without credit, constitutes a serious breach of our trust in one another and in the integrity of the search for truth. Those who believe they have witnessed violations of academic integrity should feel the obligation to speak about this to the suspected offender. The witness also should feel obligated to report the suspected offender to the instructor if the person fails to offer a satisfactory explanation and refuses to report him or herself. ... Violations of academic integrity, because they undermine our trust in one another and in the credibility of the academic enterprise, are taken very seriously. Penalties for violations range from failing assignments or tests to suspension or expulsion from the College."

**Makeups**
* **Quizzes:** There will be no makeup for missed quizzes, regardless of reason.
* **Homework:** Past-due assignments will not be accepted except in rare circumstances, provided the student receives prior consent from the instructor.
* **Exams:** Make-up exams will not be given except in the case of a documented emergency.

**Academic accommodations**
Students with a documented disability (e.g., physical, learning, psychiatric, visual, hearing, etc.) who need to arrange reasonable classroom accommodations must request accommodation memos from the Academic Enrichment Center (Lilly Library, lower level, phone 765-983-1341) and contact their instructors each semester. For greater success, students are strongly encouraged to
visit the Academic Enrichment Center within the first two weeks of each semester to begin the process.

**Other sources of help**

1. **The Academic Enrichment Center:** Working on study habits and skills (personal organization, time management, understanding instructions, listening, taking notes, etc.) may be necessary to keep up with this course. The Academic Enrichment Center, located in the basement of Lilly Library, provides free tutoring services. If you sense that a tutor would be helpful, visit them and fill out a form.

2. **The Math and Science Center:** This center, located in the Wildman Science Library, is staffed by trained peer tutors who have demonstrated a mastery in the subject they tutor. Tutors are available for many math and science courses and for courses that require quantitative skills. You can schedule a tutoring appointment in advance or simply drop by during their operating hours, which are typically weekday evenings 6-9 pm. Specific hours, subject, and tutor availability will be posted in the Science Library.

3. **The Earlham Writing Center:** The Writing Center is dedicated to providing students with advice and resources about writing. Students can meet one-on-one with trained consultants who will contribute feedback to writers at any stage of the writing process: brainstorming, drafting, researching, revising, and polishing. This is a free, walk-in service in the basement of Lilly Library (The Sandbox) from 8-11 pm Sunday through Thursday with additional hours on Sunday, 2-5 pm. You may also schedule an appointment 25 to 50 minutes in length up to 10 days in advance using the online scheduler: [http://www.earlham.edu/writing-center/](http://www.earlham.edu/writing-center/). If you have questions, please contact Becky Burke, The Writing Center Director at burkebe@earlham.edu.