

**Elementary Linear Algebra I (Math 341)**  
Fall 2014

**Meeting times:** Mon., Tues., Wed., and Fri. 9–9:50pm in 105 Peterson Hall

**Instructor:** Ben Elias

**Office:** Fenton 210, x6-5629

**Office hours:** M 12-1, T 1-2, F 10-11

**E-mail:** belias@uoregon.edu

**Course website:** <http://pages.uoregon.edu/~belias/341-fall-2014/>

**Midterms:** Tuesday October 21 and Tuesday November 18, in class

**Textbook:** *Linear Algebra, 4th edition*, by David C. Lay. We will cover most of Chapters 1–4.

Topics we will cover: solving systems of linear equations, matrix algebra, determinants, and vector spaces. See below under “Course Learning Goals” for a more detailed outline.

**Calculators:** Calculators will not be allowed on any of the exams. If a calculator is needed for any part of the homework, it will only be for basic arithmetic.

**Grading and Exams:** There will be two midterms and a final exam. The dates of the two midterms are October 21 and November 18. There will also be a practice quiz (not for credit) before each midterm. The final exam is worth 40% of your grade, the midterms 35% total, and homework 25%. No calculators or other electronic devices will be permitted on any of the exams. Please bring your UO ID to all exams.

**Prerequisite:** Math 253 or the instructor’s permission.

**Homework:** There will be homework due each Wednesday by the start of class, and assigned the previous Wednesday (first homework due W 10/8). Check the course website each week. Late homework will not be accepted without *prior* permission. We will *not* be using Blackboard this term; all materials will be on the course website.

**Learning Outcomes:** The goal of this course is to gain a working knowledge of matrix algebra, to see some applications of matrix algebra, and to introduce vector spaces. Specific goals:

- (1) Find the general solution to a system of linear equations by row reduction
- (2) Understand the notions of subspace, span, basis, and dimension within the context of  $\mathbb{R}^n$ .
- (3) Be able to find a basis within a spanning set. Be able to work out if a given vector lies within the span of some other vectors.
- (4) Understand the notion of a linear transformation, and be able to visualize it in low dimensions.
- (5) Multiply matrices, and compute their inverses and determinants.

- (6) Be able to compute the coordinates of a vector, and the matrix of a linear transformation, with respect to a given basis or bases.
- (7) Compute the kernels and images of linear transformations, and understand the rank-nullity theorem.

**Learning Environment:** The University of Oregon strives for inclusive learning environments. Please notify me if the instruction or design of this course results in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall at 541-346-1155 or [uoaec@uoregon.edu](mailto:uoaec@uoregon.edu).

**Academic Conduct:** The code of student conduct and community standards is at:

<http://conduct.uoregon.edu>

It is not appropriate to help each other on exams, to look at other students exams, or to bring unauthorized material to exams.

In this course, you are encouraged to work on the homework problems with your colleagues. Math is a collaborative activity, and one which is easier to learn as a team. However, when it comes time to write up your homework answers, this should be done individually, without reference to any common solution or the work of others. By writing it up individually, you can really isolate those things you thought you understood in the group, but which did not make sense later. For example:

Ok: a study group works a problem on the blackboard, gets the answer. Erases the answer, each member tries to write up the solution individually, asks questions of the group when something goes wrong.

Not Ok: a study group works a problem on the blackboard, gets the answer. Members copy the answer from the board to their homework sheet, or write up the solution while referencing the solution on the board. This is cheating, even if credit is given to your collaborators (otherwise it is also plagiarism).

**Attendance and Participation:** If you miss a class, it is your responsibility to find out what happened in this class from your colleagues. Office hours will not be used to reteach class material, but to help with understanding it. If your grade is borderline between one grade and another, then attendance and participation will be taken into account.

Please, do not hesitate to ask questions, either in class or in office hours. Chances are that if you are confused, so are many of your colleagues, and they will thank you for speaking up. Office hours should be very helpful. I will create a google group for class announcements, which can also be used for communication between classmates. I do not plan to answer any mathematical questions by email - email will be used for administrative business. Mathematical questions are best asked at office hours; if you can't make office hours, email me to set up an appointment. Mathematical questions can also be asked of your classmates!