

# ***Linear Algebra – math200***

*Fall 2015*

Welcome to Linear Algebra! This course will link some ideas from high school mathematics (solving systems of linear equations, for example) to more general algebraic concepts. Linear algebra has some interesting applications to go along with beautiful theory; you will become familiar with both this semester.

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***Office Hours*** Monday 2:00 – 4:00  
Tuesday 2:30 – 3:30  
Friday 1:30 – 2:30  
and by appointment

***Learning Objectives.*** Through this course, students should get a conceptual understanding of the algebra of vector spaces and learn some of the useful applications of those concepts. Along the way, you should gain further appreciation for the beauty and practicality of abstraction, develop your ability to write clear proofs at an appropriate level, and get practice in using constructive approaches to solving problems.

***About the textbook.*** There isn't one. Instead, there will be daily handouts available on the course website. Each will have background material followed by the next homework assignment. I do recommend that you reconcile your class notes with the first part of the handout before you start the assignment. Each assignment is meant to be a bridge from one class to the next, rather than simply review. Your handouts will have all of the definitions and theorems that you'll need.

## ***Schedule of Topics***

**September 16 – October 9:** Vector geometry, algebra; linear transformations; matrices

**October 12 – November 6:** Vector spaces, more linear transformations, determinants

**November 9 – December 11:** Orthogonality; eigenvalues and eigenvectors

## ***Important Due Dates***

You will have a homework assignment due for almost every class. Note also:

**October 14:** Take-home Exam 1 due  
**November 2:** First draft of project report due  
**November 11:** Final draft of project report due  
**November 23:** Take-home Exam 2 due  
**December 11:** Proof portfolio due  
**TBA:** Final Exam

**Course Website**      <http://sites.middlebury.edu/math200adf15/>

**Expectations.** You will each get more out of this course if you all take active responsibility for your own learning. Since homework will extend work from the previous class and anticipate the next class, I expect you to put in a strong effort on each assignment; you should plan on at least two hours (perhaps not all at once). Late homework will NOT be accepted.

Be prepared to share your work in class. The goal is substantive conversation about concepts; I'm not looking for a sequence of perfect solutions. I will ask people to show what they tried, even if they couldn't finish a problem. For the same reason, be ready to listen actively when others are speaking. Our class time is limited. Please come on time, turn off your cell phone, be ready to participate, and take your breaks after class.

Finally, expect to stretch your brain and be frustrated once in a while. The homework and the class sessions should offer some challenge – if it feels like busywork, let me know. If, on the other hand, challenge becomes discouragement, please come see me.

**Intellectual Honesty.** Every piece of work you turn in for evaluation, from the first homework until the final exam, should reflect the work of your own brain. This is not material that can be learned by rote; you will get the most out of the course by actively doing your own work. You may discuss daily homework with classmates (in fact I encourage it), but the final write-up of each problem should be your own. You may not discuss the take-home exams at all with anyone except me. The project will have collaborative and individual elements; that assignment will include specific guidelines.

**Evaluation.** I will compute your final grade roughly as follows:

Exams	20% each
Project	15%
Attendance/Participation	15%
Proof Portfolio	10%
Final Exam	20%

### ***An Operating Principle***

“Trying to come up with an answer rather than having it presented to you, or trying to solve a problem before being shown the solution, leads to better learning and longer retention of the correct answer or solution, even when your attempted response is wrong, so long as corrective feedback is provided.”

Brown, P.C., Roediger, H.L., and McDaniel, M. A. *Make It Stick: The Science of Successful Learning*. Harvard University Press, 2014; page 101.