What is this course about? Linear algebra is a beautiful subject, used in numerous fields: Economics, Finance, Computer Science, Physics, Chemistry, among others. The methods we learn in this course will enable us to solve linear systems arising in dynamics, manipulate matrices coming from Astronomy, make predictions about the long term effects of economic policies, or migration rates in and out of countries. These topics will be picked up again in Math 16b.

Learning Goals for Math 15a. Students in Math 15a will:

- Gain foundational knowledge for a broad variety of math and science courses, which they will draw on for their entire college career, and beyond.
- Think critically and logically about problems they encounter, both in this and other courses.
- Apply familiar techniques in unfamiliar settings, by relying on experience, intuition, and understanding.

Linear is a challenging course. It’s worth saying up front that for many students Linear Algebra is a challenging course. It is the first exposure to abstract mathematics and reasoning, and switches away from the traditionally computation-heavy classes like Calculus. We will basically only learn two computational techniques in this course, one of them in the first week, but the point of the course is to keep rephrasing new questions we’re interested in ways which can be answered by these techniques. Don’t be discouraged if it doesn’t make sense right away, it is only in struggling that we really learn.

“Learning results from what the student does and thinks and only from what the student does and thinks. The teacher can advance learning only by influencing what the student does to learn.”
– Herbert Simon, Nobel Laureate in Economics

Office Hours. Many students don’t understand what office hours are for. Office hours are not just for struggling with the course, but for learning more about the material and getting to know your professor. This applies for all your courses! Perhaps the biggest mistake strong students make is never utilizing office hours, which means that years later when asking for a recommendation letter, all your professor can say is that you “did well in class.” These letters do very little (if anything) for your application.

The book can be purchased from the University Bookstore, or bought online, but you are responsible for making sure you purchase the correct book. If you buy an older edition, it is your responsibility to make sure you’re reading the correct sections and doing the correct homework problems. I strongly recommend you try for a new or used version of this edition.
**Prerequisites.** MATH 5a and permission of the instructor, placement by examination, or any mathematics course numbered 10 or above. Students may take MATH 15a or 22a for credit, but not both. If you HAVE NOT taken Math 10a and 10b, please come meet with me at the beginning of the semester.

Solving linear systems is a basic component of the mathematical tools used by many sciences, e.g. computer science, physics, biology, chemistry, economics, etc. In this course, students will learn the language and techniques needed to solve such systems, and extend the theory to more sophisticated settings. For example, in Calculus we can understand a lot about a function by studying its tangent line at a point. For multivariable functions, e.g. a function $F : \mathbb{R}^2 \to \mathbb{R}^3$, we instead have a $3 \times 2$ matrix of partial derivatives, which can be viewed as a linear map that approximates the original function at a point.

**Exams.** There will be two midterm exams and a final exam.

- Exam 1: Thursday, 10/3 in class (this is a Brandeis Monday schedule, so we will have class).
- Exam 2: Monday, 11/4 in class.
- Final Exam: Determined by registrar block schedule.

**Grades.** Your grade in the course will be based on the following:

1. **Class participation (5% of your grade)**
   - You should plan to attend every lecture. Because the nature of mathematics is that it is cumulative, the lectures build on each other, and it is very difficult to understand the lectures following a missed one. Lecture is not mandatory, but if you are going to miss one, please let me know.
   - We will use *Echo 360 platform* supported by Latte this semester to respond to group work prompts, gauge understanding, and reflect on the material and our own learning.

2. **Homework (10% of your grade)**
   - Homework assignments will be collected once a week.
   - **No late homework will be accepted**, but your three lowest homework grades will be dropped.
   - I encourage you to discuss homework problems with your classmates, but you must write up your own solutions.

3. **Quizzes (10% of your grade)**
   - Short quizzes will be given regularly.
   - **No make-up quizzes will be given.** Missed quizzes count as zeroes. However, the lowest 25% of your quiz grades will be dropped.

4. **Two midterm exams (each 25% of your grade)**
5. **Final exam (25% of your grade)**

**Calculators.** You should have access to a scientific calculator (an online one is OK). Calculators are **not allowed** during exams or quizzes. You do not need a graphing calculator.

**LATTE.** All course materials for Math 15a will be available online on LATTE. Log in at [http://latte.brandeis.edu](http://latte.brandeis.edu) using your Unet username and password.

**Office hours.** You are encouraged to use my office hours and/or the course assistants’ office hours whenever you have questions about the course material. If you can’t attend my office hours, don’t hesitate to ask for an appointment at another time.
Four-Credit Course (with three hours of class time each week). Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for exams, etc).

Students with disabilities. Brandeis seeks to welcome and include all students. If you are a student who needs accommodations as outlined in an accommodations letter, please talk with me and present your letter of accommodation as soon as you can. In order to provide test accommodations, I need the letter more than 48 hours in advance. I am happy to arrange for your accommodations, but cannot do so retroactively. If you have questions about documenting a disability or requesting accommodations, please contact Student Accessibility Support (SAS) at 781.736.3470 or access@brandeis.edu.

Academic Integrity. You are expected to be honest in all of your academic work. Please consult Brandeis University Rights and Responsibilities for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be found at LTS - Library guides.

Privacy. This class may require the use of tools that may disclose your coursework and identity to parties outside the class. To protect your privacy you may choose to use a pseudonym/alias rather than your name in submitting such work. You must share the pseudonym/alias with me and any teaching assistants as needed. Alternatively, with prior consultation, you may submit such work directly to me.