Elements of Linear Algebra
MATH 346, Section T, Spring 2018
T, Th 6:30pm – 7:45pm, NAC 4/113

Instructor: Jhevon Smith. ("Jhevon" is fine.)
Email: JhevonTeaches@gmail.com
Office Hours: By appointment only.
Website: http://math.sci.ccny.cuny.edu/people?name=Jhevon_Smith
Text: Anton, Howard; *Elementary Linear Algebra, 11th Edition.*
Math Dept.: NAC 8/133   **Math Dept. website:** http://math.sci.ccny.cuny.edu
Math 346 website: http://math.sci.ccny.cuny.edu/courses?name=Math_34600

Websites: I gave you my website since I will be posting documents and instructions for the class there, such as: review topics, announcements, solutions to tests and quizzes, etc. I gave you the math 346 website so you can access resources like past finals. I gave you the math. dept. website because, well, you should have it.

Supplements:
(1) A self-guided aid to learning proofs for Anton:
   http://higheredbcs.wiley.com/legacy/college/anton/1118473507/pvg/solow_proofs.html
(2) Larson, Ron; *Elementary Linear Algebra, 6th edition or higher.*
(3) Coursera's Linear Algebra course; *Coding the Matrix: Linear Algebra through Computer Science Applications.* https://www.coursera.org/course/matrix
(4) Axler, Sheldon; *Linear Algebra Done Right, 2nd Edition.* (This is an advanced text)
(5) Treil, Sergei; *Linear Algebra Done Wrong.*
   http://www.math.brown.edu/~treil/papers/LADW/LADW.html
(6) Interesting article: http://www.ams.org/samplings/feature-column/fcarc-pagerank

Calculators/Technology: While you may use these to do your homework or explore some topic in depth, you will not be allowed to use them on any quiz or exam.

Grading: Grades will be assigned according to the following chart.

Letter Grade	G.P.A.	Grade	Letter Grade	G.P.A.	Grade	Letter Grade	G.P.A.	Grade
A+	4.00	96-100	B+	3.33	77-79	C+	2.33	67 - 69
A	4.00	91-95	B	3.00	74-76	C	2.00	60-66
A-	3.66	80-90	B-	2.66	70-73	**D**	**1.00**	**50-59**
			F	**0**	**< 50**			

As department policy demands, the final exam is worth 40% of your grade in this course. The remaining 60% will come from your in-class grade as follows:

Quizzes: 15% (Expect *at least* one quiz per week. I will drop the worst two).
Online HW: 10% (I will drop the worse two)
Participation: 5% (Based mostly on attendance).
In-class tests: 30% (I will give four exams, one will be dropped).
Final Exam: 40% (This will be a cumulative exam given at the end of the course).

Extra Credit: I could easily be convinced to offer generous extra credit for completing, with full participation, the Coursera course listed in the supplements (if it's still offered). Other than that, nope! You may have noticed that there is already a curve built into the grading chart. No more free lunches.

Make-up Exams/Quizzes: None will be given. I will drop some quizzes and a test.

Attendance: Attendance will be taken at the beginning of class. You are *late* if you arrive after your name is called. You will be assigned a WU (failing) grade if you accumulate 5 unexcused absences.

To be excused for an absence (or lateness) you must email me no later than one day after that particular absence (or lateness) with the reason. Of course, proof is required where applicable. For example, if your absence or lateness was due to a medical emergency, I expect to see a doctor's note. If you miss a class, it is your responsibility to catch up. You can see me during my office hour to discuss what was done in class, or catch up on your own. It's up to you.

My Expectations:

Work ethic: You are not to slack off! You are to read ahead! Very Important! Read each section before coming to class. It's better if you have your mind working on the concepts before coming to class—it will be easier for you to keep up and ask intelligent questions. Make note of definitions and notation especially. You will find that knowing the definitions and knowing how to write something down clearly and with the right notation is half the battle. Read (intelligently) and do the homework. It is highly unlikely that you will do well by just coming to class, even if you pay attention. Hopefully by now you've realized, watching someone do math on the board is different from doing it yourself.

Responsibility: This is a non-trivial math class, and as such, I do expect a certain level of responsibility, maturity, and integrity from you. You've made it this far, which means you know what it takes to get through a college math class. This class may be a little different for you if you've never seen proofs before, but I expect you to apply diligence to bridge the gap of your comfort zone. We all have to do this at some point. No excuses, and no begging for grades at the end of the semester. And no sob stories. Understand, that while I want to see every one do well and have no ill will towards anyone, it is *not* my responsibility to keep your GPA up, or to help you keep that scholarship, or whatever reason it is important that you do well here. These are your responsibilities. My responsibility is to facilitate you learning linear algebra. I shall keep that responsibility. Please keep yours.

Homework: Online homework will be assigned through the WebWork system. Due dates for online homeworks will be listed in the online system. Online, the dates are dynamic, so as the course goes on, I may extend or shorten due dates depending on how slowly we're moving through a topic. So pay attention and set up email alerts to make sure you don't miss anything. **Late homework will NOT be accepted.** The excuse does not matter.

The topics that are to be covered in class are listed on the second to last page of this document, along with some suggested problems from the textbook. These are for you own study, you do not need to hand in any written homework.

The instructions to access the online HW can be found on the next page.

To access the online homework system:
1. Go to https://webwork.ccny.cuny.edu/webwork2
2. Click on **18Sp346T** from the Courses list.
3. The username is your CCNY email address username, one word all uppercase.[1]
   For example, my CCNY email address is jsmith@ccny.cuny.edu[2], my username would be JSMITH
4. The password is the same password you would use to access your CCNY email.[3]
5. You will be logged in to the page that has the list of assignments that are currently active.

More expectations: I also expect you to remember all the math that you have done before this course. We usually won't specifically use things that you've done, in say, calculus, but I expect a level of mathematical maturity befitting those who are experts at the lower level math courses. I'd like the freedom to use examples from anywhere, including calculus without losing the class. I think highly of you and will treat you accordingly. I will heavily punish any elementary/fundamental mathematical mistakes. Such things are now beneath you.

Contact:
I will be emailing important information from time to time; including progress reports, announcements and advice as needed (to the email address listed for you on BlackBoard. If this is not a good email address, notify me). Please read the emails. If I email you, it means it is important.

Feedback: I encourage you to give me feedback about my teaching or the class, whether positive or negative (just make it constructive please). You can email me or talk to me, or if you don't want to reveal your identity, there is an anonymous feedback page on my website.

Help: FREE tutoring is available in the Marshak Building, room 403. The hours for this semester are: Mondays through Thursdays 12pm – 5pm, and Fridays 12pm – 4pm. Tutoring begins February 5th this semester. There are also online resources available. A great place to get math help, even at odd hours, is www.mathhelpforum.com. Mathhelpboards.com is also nice, as is Math.stackexchange.com. There are a significant number of brilliant people from varying time zones who decide to spend their free time helping others with math at sites like those. Take advantage of these great services. Of course, there are other online contenders like various YouTubers, Khan Academy, etc. Check them out. And don't forget your classmates. You should get the contact information of at least one person that you can study with or get missed notes from if you are absent, etc. You're all in this together, help each other out. And, of course, there is always me! Don't be afraid to come to me if you have questions or concerns. You can contact me via email or see me after class or during my office hour.

Some class rules: Please silence your cell phones and don't use them when in class. Eating in class is NOT allowed. Drinking is permitted, as long as you remove your garbage afterwards.

Academic Integrity: Any act of academic dishonesty will be dealt with by applying the most stringent penalties permitted. Cheating includes, but is not limited to, receiving help during exams and submitting homework without properly acknowledging persons who assisted you. Please read carefully the Policy on Academic Integrity posted on the CUNY website with URL http://www1.cuny.edu/portal_ur/content/2004/policies/image/policy.pdf

---

[1] See: https://www.youtube.com/watch?v=bLE7zsJk4AI
[2] Follow instructions and do NOT email me at my CCNY email address, but rather the Gmail address on the first page. I like to keep my student's emails separate.
[3] The password will remain precisely the same. If you change your CCNY email password, the WebWork password will automatically change to your new email password as well. The accounts are linked.

Selected Dates from the Spring 2018 Academic Calendar

Jan 27 – Feb 2	Change of program period; late fees apply
Jan 30	Last day to submit a request for Independent Study
Feb 2	Financial Aid Certification Enrollment Status Date; Last day to add a course to an existing enrollment; Last day to apply for Audit Options; Last day for 75% tuition refund; Last day to drop without the grade of WD; Last day to submit a Registration Appeal;
Feb 3	Course Withdrawal drop period begins (A grade of "WD" is assigned to students who officially drop a course);
Feb 9	Last day for 50% tuition refund;
Feb 12	**Lincoln's Birthday – College is closed**
Feb 16	**Last day for 25% tuition refund; Last day to drop without the grade of "W"; Course withdrawal drop period ends (Last day for "WD" grades); Census date – Form-A cutoff; Last day to change or declare a major to be effective in Spring 2018;**
Feb 17	**Course withdrawal period begins (A grade of "W" is assigned to students who officially drop a class) – No Refund; Verification of Enrollment (COA) rosters available to faculty;**
Feb 19	**Presidents' Day – College is closed**
Feb 20	**Classes to follow a Monday schedule**
Feb 24	Verification of Enrollment (COA) rosters due
Feb 28	Deadline for filling application for Degree for June 2018 Graduation
Mar 30 – Apr 08	Spring Recess
Apr 10	Registration appointments for Summer 2018 and Fall 2018 begin for continuing students. Check your CUNYFirst account for your appointment date and time.
Apr 11	**Classes to follow a Friday schedule; 60% date for the term;**
Apr 13	INC grades for Fall 2017 for Undergraduate students convert to FIN; INC grades for Winter 2017 and Spring 2017 for Graduate students convert to FIN;
Apr 16	**Course withdrawal period ends. Last day to withdraw from a class with the grade of "W";** Last day to file for Pass/NC option;
May 16	**Last day of classes**
May 17	Reading Day
May 18 – 24	Final Exams
May 30	Last day for grade submissions for Spring 2018

Course description: Vector spaces, basis and dimension, matrices, linear transformations, determinants, solution of systems of linear equations, eigenvalues, and eigenvectors.

Topics	Section - Topic	Problems
	Systems of linear equations, Matrices and Determinants	
0	Into to Linear Algebra	N/A
00	A discussion of proofs	N/A
1	1.3 - Matrices and Matrix Operations	1 - 35 odd
2	1.1 - Intro to systems of linear equations	1 - 27 odd
3	1.2 - Gaussian Elimination a.k.a Gauss-Jordan Elimination	1 - 17 odd, 23 - 31 odd, 35, 37, 39, 43
4	1.4 - Inverses and algebraic properties of matrices	1 - 11 odd, 21, 35, 37, 39, 43, 45(a), 51 - 57 odd
5	1.5 - Elementary matrices and a method of finding A^{-1}	1, 3, 5(a), 9 - 15 odd, 19(a), 21, 33
6	1.6 - More on linear systems and solving invertible matrices	1, 3, 9, 13, 15, 19, 21, 23
7	1.7 - Diagonal, Triangular, Symmetric Matrices	7, 13, 14, 15(a), 17 - 29 odd, 45 (see defn above 41), 47
8	2.1 - The determinant; cofactor expansion a.k.a. Laplacian expansion	1, 3(d), 9, 13, 15, 21, 23, 27, 29, 31
9	2.2 - Determinants by row reduction: triangular matrices and pivotal condensation	1, 5, 9, 31
10	2.3 - Properties of determinants and Cramer's rule	1, 7, 9, 15, 21, 25, 29, 33, 39
*	**Exam 1 on topics 1 through 10**	Date TBA
	Vector Spaces	
11	4.1 - Real Vector Spaces	1 - 27 odd
12	4.2 - Subspaces	1 - 11odd, 13, 14, 17, 19, 24
13	4.3 - Linear Independence	1, 2, 4, 5, 24, 25, 26, 28, 29, 31, 32
14	4.4 - Coordinates and bases	1, 3, 7(a), 11, 17, 20, 30, 31
15	4.5 - Dimension	1, 3, 5, 7(a), 22, 23, 25
16	4.6 - Change of basis	1 (Important topic, but we'll just gloss over it.)
17	4.7 - Row space, Column space, Null space	1(a), 3 - 15 odd
18	4.8 - Rank and Nullity	1, 7, 13, 19, 29
19	4.9 - Basic Matrix Transformations in $\mathbb{R}^2$ and $\mathbb{R}^3$	1, 5, 9, 13, 23
20	4.10 - Properties of matrix transformations	7, 19, 21, 23
*	**Exam 2 on topics 11 through 20**	Date TBA
	Intro to Spectral Theory: Eigenvalues, Eigenvectors, Diagonalization	
21	5.1 - Eigenvalues and Eigenvectors	1, 5, 7, 13, 15, 25, 28,
22	5.2 - Diagonalization	1, 5, 9, 11, 15, 19, 23, 25, 27, 37
23	5.4 - Systems of linear differential equations	1
*	**Exam 3 on topics 21 through 23**	Date TBA
	Linear Transformations	
24	8.1 - General linear transformations	1, 3, 5, 7, 11, 13, 19, 21, 23, 25, 31
25	8.2 - Composition and Inverse Transformations	1 - 11 odd, 15 - 23 odd, 29 - 37 odd
26	8.3 - Isomorphisms	1, 3, 5, 11, 17, 19, 23
27	8.4 – Matrices for General Linear Transformations	1, 3, 4, 5, 6, 7, 11, 17, 19
*	**Exam 4 on topics 24 through 27**	Date TBA
	Final Exam: Tue May 22, 6pm – 8:15pm in regular classroom	

Questionnaire

What is your major? _____

Are you sure you need this class? _____ Are you sure? _____

Will you need to do more math after this? _____

What is the highest math class you've taken? _____

Have you ever taken a mathematical proofs class before? _____

Rate your interest: 5 = math is my life and I'm so excited to be here, down to 1 = I don't really like math, but I'm just here to get a minor or satisfy some requirement. _____

How good are you at Algebra? _____ Precalc? _____ Calc 1? _____ Calc 2? _____ Calc 3? _____
(Enter 5 for "I can do it in my sleep!", 4 for "I'm not the best at it, but pretty awesome.", 3 for "I'm just OK; I'm good at the basics.", 2 for "I'm not the worst, but far from the best.", 1 for "The class was a blur that got more obscure over time!")

Are there any dates during the Spring for which you will not be able to take an exam/quiz due to religious reasons? If so, please state the date(s) and "occasion(s)" below.

_____

_____

Any general feelings or concerns towards this course? (For example, are you: Scared? Excited? Curious? Indifferent? Based on your perceived ability in math, what grade are you expecting? etc)

_____

_____

_____

Are there any other relevant comments that you wish to add?

_____

_____

_____