Elements of Linear Algebra

MATH 346, Section E, Spring 2016
M, W, 2:00pm – 3:15pm, NAC 6/122

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).
Written HW: 5% (I will drop the worse two)
Online HW: 5% (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. 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: No way… Always be here. Always on time. Don't get sick. Don't have a crisis.

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. **To reiterate, there is no make-up for a missed quiz/homework/exam.**

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 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; it is not fair to toss them on me.

Homework: The problems for written homework can be found on the last page. Online homework will be assigned through the WebWork system online. Whenever we complete a section in class, written homework for that section is due the following class. 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.

I expect your written homework to follow certain guidelines (**you lose points otherwise**):
(1) Show all your work, writing down your full solutions clearly.
(2) Your homework must be stapled if it consists of more than one page.
(3) Your homework must be properly labeled: **Your name, and the HW number *and* topic.**
(4) Only ONE HW number per stapled group.
(5) Be neat! And write legibly, for Pete's sake!

To access the online homework system:

1. Go to https://webwork.ccny.cuny.edu/webwork2
2. Click on Math346E_sp16 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: You are to email me at the end of the first day of class, stating your name, your course and its section. I will deduct 5 points off your final grade if you fail to do this. I will be emailing important information from time to time; including progress reports, announcements and advice as needed. Please read the emails. If I email you, it means it is important—important enough for me to take the time to write an email so that you will have it in writing.

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 418S. I am also a tutor there. The hours for this semester are: Mondays through Thursdays 12pm – 5pm, and Fridays 12pm – 4pm. Tutoring begins February 8th 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

[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.

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

I really don't like cheating. Please don't do it. There, I asked nicely.

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Spring 2016 Academic Calendar

January	
01/15/2016	Last day to apply for an e-permit
01/28/2016	**Last day for 100% tuition refund**
01/28/2016	Last day of Registration
01/29/2016	**CLASSES BEGIN**
01/29/2016 – 01/31/2016	Change of Program
01/30/2016	**FIRST DAY OF SATURDAY CLASSES**
February	
02/01/2016 – 02/04/2016	Change of Program
02/04/2016	Last day to file for Pass/Fail and Audit Options
02/04/2016	Last day to drop classes for 75% tuition refund
02/04/2016	Last day to add a class to an Existing Program
02/04/2016	Last day to submit a request for Independent Study
02/09/2016	**Classes follow a Friday schedule**
02/09/2016	Application for Degree for June 2016 Graduation begins
02/11/2016	Last day to drop classes for 50% tuition refund
02/12/2016	**Lincoln's Birthday – COLLEGE CLOSED**
02/15/2016	**President's Day – COLLEGE CLOSED**
02/18/2016	Last Day to drop classes for 25% tuition refund
02/18/2016	Las day to drop classes without the grade of "W"
02/18/2016	Last day to change or declare a major, minor and/or concentration effective for Spring 2016; Form A census cutoff.
02/18/2016	Verification of Enrollment begins
02/19/2016	**Course withdrawal period begins (A grade of "W" is assigned to students who officially drop a class) – No Refund**
02/26/2016	Verification of Enrollment due to Registrar for assignment of WN grades
02/28/2016	Last day to submit proof of immunization for NYS residents
March	
03/14/2016	Last day to submit proof of immunization for non-NYS Residents
03/15/2016	**FAFSA priority deadline for 2016 – 2017 financial aid**
03/23/2016	**Classes follow a Friday schedule**
03/25/2016-03/27/2016	No classes scheduled

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April	
04/08/2016	INC grades for Fall 2015 for Undergraduate students convert to FIN
04/08/2016	INC grades for Winter 2015 and Spring 2015 for Graduate students convert to FIN
04/11/2016	Course withdrawal period ends. Last day to withdraw from a class with the grade of "W"
04/11/2016	Deadline for filing Application for Degree for June 2016 Graduation
04/22/2016 – 04/30/2016	Spring Recess
May	
05/18/2016	**LAST DAY OF CLASSES**
05/19/2016 – 05/20/2016	Reading Day or Final Exams
05/21/2016 – 05/27/2016	Final Exams
05/28/2016	End of Spring Term
05/30/2016	**Memorial Day - COLLEGE CLOSED**
June	
06/03/2016	**Commencement**
06/03/2016	Last day for grade submissions for Spring 2016
06/06/2016	**Summer Session Begins**

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

HW #	Section - Topic	Problems
Systems of linear equations, Matrices and Determinants		
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
*	**Exam 4 on topics 24 through 26**	**Date TBA**
Final Exam: Wed May 25, 1-3:15pm 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?

_____

_____

_____