

Linear Algebra and Vector Calculus for Engineers
MATH 392, Section F, Spring 2013
M, W 3:30pm – 4:45pm, NAC 6/114

Instructor: Jhevon Smith. (“Jhevon” is fine.)

Email: Jhevon@gmail.com

Office Hours: The hour immediately after class, both days, by appointment. Other times, by appointment.

Website: http://math.sci.ccny.cuny.edu/people?name=Jhevon_Smith

Texts: 1. Stewart’s Essential Calculus, 1st edition, published by Cengage.

2. Heuvers’ Linear Algebra for Calculus, published by Brooks/Cole.

Math Dept.: NAC 8/133 **Math Dept. website:** <http://math.sci.ccny.cuny.edu>

Calculator: Calculators are NOT permitted in exams nor quizzes in this course.

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

Letter Grade	G.P.A.	Grade	Letter grade	G.P.A.	Grade
A ⁺	4.00	97-100	C	2.00	74-76
A	4.00	95-96	C-	1.66	70-73
A ⁻	3.66	90-94	D	1.00	60-69
B ⁺	3.33	87-89	F	0	Below 60
B	3.00	84-86			
B-	2.66	80-83			

If you are taking this course, chances are you’re an engineering major. As far as the math dept. is concerned, you need a C to pass this class; as far as the college is concerned, a D will do—but the school of engineering might not be so lenient. Keep this in mind. You may be required by engineering to get a B or better in this class, or some such requirement. If you really want to know the grade you need, speak to your advisor in the school of engineering. If your goal is to get an A/A+ no matter what, then you’re good in any case—and you’re also my kind of student. (Why are the rest of you here?) For engineers, this is an important class; you should want to do well in it! (I’d say you *need* to do well in it.)

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, the breakdown of which is as follows:

Quizzes: 30% (In general, you will have one or two quizzes per week—I’ll drop the worst two).

In-class tests: 60% (I plan to give 4 exams and count the best 3, each worth 20% of your grade).

Participation: 10% (Based on attendance and homework).

Your final grade for the course, which will be converted to a letter grade as dictated in the table above, is computed as follows: $Course\ grade = 0.6*(In\text{-}class\ grade) + 0.4*(Final\ exam\ grade)$

Extra Credit: Not happening...

Make-up Exams/Quizzes: No way...

Attendance: Attendance will be taken at the beginning of class. You are *late* if you arrive after your name is called. You are considered *absent* if you arrive 15 minutes after the class begins. If you are late twice, that is considered as one absence. I will deduct 2^{n-2} points, where n is the number of times you are absent, $1 < n < 5$. 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 doctor's appointment, I expect to see a doctor's note. To reiterate, there is no make-up for a missed quiz/homework/exam. Seriously! I drop your lowest scores to make up for the fact that there are no make ups.

My Expectations: You are not to slack off (more on this in class)! 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. Homework will be collected and we will try to review each homework ASAP, usually by the next class, so try to complete your assignments promptly. I will give you a due date, you have a week after this date or before the next test (whichever comes first) to hand in the homework. Points will be deducted for late homework. If you miss a class, it is your responsibility to catch up. You can see me during my office hour, or catch up on your own. It's up to you.

I expect your hand-in homework to follow certain guidelines (you lose points otherwise):

- (1) Your homework must be stapled if it consists of several pages.
- (2) Your homework must be properly labeled: Your name, the topic number *and* section (see the syllabus for what these are).
- (3) Only ONE topic per stapled group. That is, if you are handing in the homework for several topics, do NOT staple them all together. But separate each topic and staple that group together.
- (4) Be neat! And write legibly, for Pete's sake!

I also expect you to remember the math that you have done before this course. The first half of the course, for example, relies heavily on concepts learnt in calculus 3, HEAVILY! This is not a calc 3 course, so I can't take time to go over calc 3 stuff (I will not, for example, teach the sections in topic 9). There is simply not enough time, as much as I'd love to be thorough. You just have to take it upon yourself to review calc 3 (and/or calc 1, calc 2, algebra, precalc...) when necessary. I will assume you are all experts at the lower level math courses. If this is not currently true for you, make it true, quickly; like by the end of the week.

Repeat the following to yourself 10 times a day. Five times when you wake up and five times before you go to sleep.

*I must NOT cancel across sums,
I must NOT distribute powers across sums,
I must NOT divide by zero,
All these are blasphemy!
But I will use brackets when appropriate.*

So yeah, the above may seem like a joke, and it is somewhat, but here's the part that's not funny: **do NOT commit any of the blasphemies mentioned above! Doing so will result in an instant zero (0) on any exam or quiz in which such an offense is made! Regardless of how well you did otherwise.**

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 be emailing important information from time to time; including weekly progress reports, homework, announcements and advice as needed. Please read the emails. They might seem long sometimes, but 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: Tutoring is available in the Marshak Building, room 418S. I am also a tutor there. The hours for this semester are: Mondays and Wednesdays 10am – 3pm; Tuesdays and Thursdays 12pm – 5pm, and Fridays 12pm – 4pm. There are also online resources available. A great place to get math help, even at odd hours, is www.mathhelpforum.com. There are a significant number of brilliant people from varying time zones who decide to spend their free time helping others with math. Take advantage of this great service. Another great resource on the web is wolframalpha.com. You can use that site to check your answers. Brilliant site. Of course, there are other online contenders like youtube, 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.

Another source of help (that is new this semester) is the recitation sessions. This semester the math dept has instituted “jumbo” classes (up to 100 students per class) and have also instituted recitation sessions: Q&A and problem solving sessions for the students in these large classes. However, the math dept. encourages students from regular classes to participate. The sessions will begin on Wednesday, January 30th and are 50 minutes long. Recitation sessions for math 392 will be in room SH 205 on Fridays at 11am and Mondays at noon. There is no recitation for math 203 (calculus 3).

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.

Topics and Assignments:

#	Topic	Assignment
Part 1: Vector Calculus: 24 hours. (Stewart Essential Calculus)		
1	10.7 Parametrized curves	13 – 16 all, 24, 25, 28 – 30 all, 39 – 42 all, 49, 51.
2	10.8 Arc Length; omit curvature	1 – 4 all, 10.
3	13.1 Vector Fields	1, 21 – 24 all.
4	13.2 Line Integrals	1 – 13 odd, 17, 19, 23(a), 26(a), 33, 35.
5	13.3 Fundamental theorem for line integrals	3 – 19 odd.
6	Exam #1 on topics 1 through 5	Date: TBA
7	13.4 Green's Theorem	1, 3, 7 – 19 odd.
8	13.5 Curl and Divergence	1 – 7 odd, 10, 11, 13, 15, 20.
9	12.5-12.7 Triple integrals; cylindrical and spherical coordinates (I won't teach these sections)	12.5: 3, 10, 11, 15, 16. 12.6: 17 – 27 odd, 28. 12.7: 21 – 25 all, 35, 36.
10	13.6 Parametric Surfaces and their areas	1 – 4 all, 15 – 21 odd, 29 – 43 odd.
11	13.7 Surface Integrals	5 – 27 odd.
12	Exam #2 on topics 7 through 11	Date: TBA
13	13.8 Stokes' Theorem	1 – 7 all, 11, 13.
14	13.9 Divergence Theorem	1 – 13 odd.
Part 2: Linear Algebra: 14 hours. (Heuvers' Linear Algebra for Calculus)		
15	1 Matrices and Matrix Algebra	1 – 14 all.
16	2 Linear Systems, Elementary Row Operations	1, 2, 3(c), 5 – 7 all.
17	3 Varieties of Systems of Linear Equations	1 – 4 all, 7.
18	Exam #3 on topics 13 through 17	Date: TBA
19	4 The Determinant of a Matrix	1 – 4 all, 7 – 9 all.
20	5 The Inverse of a Matrix	1 – 4 all; 6(a),(b); 7, 10, 16(a),(d).
21	6 Orthogonal Matrices and Changes of Coordinates (6.1 & 6.2 only; optional)	I don't plan on doing this. Even the math dept. says "optional".
22	7 The Eigenvalue Problem (7.1 & 7.2 only) (with applications to systems of ODE's in notes distributed by course supervisor)	4, 5, sample problems and exercises from the M392ODEProblem2009.doc file on the math dept.'s website—392 page.
23	Exam #4 on topics 19 through 22	Date: TBA
24	Final Exam	Date: TBA

Your first assignment is to email me, as in the "Contact" instructions above.

(It's not in the syllabus, but I recommend that you review, early on, section 10.6 in the text as well).

COURSE LEARNING OUTCOMES

DEPARTMENT: Mathematics

COURSE #: 39200

COURSE TITLE: Linear Algebra and Vector Analysis for Engineers

CATEGORY:

TERM OFFERED: Fall 2008

PRE-REQUISITES: Math 20300

PRE/CO-REQUISITES: Math 39100

HOURS/CREDITS: 3 hrs./ week; 3 credits.

DATE EFFECTIVE: 1/28/10

COURSE COORDINATOR: Stanley Ocken

CATALOG DESCRIPTION

Matrix theory, linear equations, Gauss elimination, determinants, eigenvalues problems and first order systems of ordinary differential equations, vector field theory, theorems of Green, Stokes, and Gauss.

Required Texts

Essential Calculus (Stewart) ISBN 0495014427

Linear Algebra for Calculus ISBN 0534252486

Both published by Thomson Brooks-Cole

COURSE LEARNING OUTCOMES

Please describe below all learning outcomes of the course, and indicate the letter(s) of the corresponding Departmental Learning Outcome(s) (see list at bottom) in the column at right.

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. solve linear systems and find matrix inverses ,determinants, eigenvalues and eigenvectors;	a, b
2. relate characteristics of solutions of a linear system to determinant and rank of its associated matrices;	a, e2
3. use eigenvector methods to solve a system of first-order ordinary differential equations	a, b, c
4. construct precise descriptions of curves, surfaces, and solids using parametrizations or equations/inequalities;	a, b
5. compute work, flux, and mass integrals on curves, surfaces, and solids, respectively;	a, b
6. find lengths, areas, and volumes of curves, surfaces, and solids, respectively;	a, b, c
7. choose co-ordinate systems (polar, spherical, cylindrical, rectangular) appropriate to a given problem;	a, b, c
8. state and apply the theorems of Green, Stokes, and Gauss;	a, b, e1, e2
9. find and use potential functions, when appropriate, to find work integrals along curves; and	a, b, c
10. solve other problems appropriate for a course in linear algebra and vector analysis;	a, b, c, e1,e2

COURSE ASSESSMENT TOOLS

Please describe below all assessment tools that are used in the course.

You may also indicate the percentage that each assessment contributes to the final grade.

1. Final exam: 40%

2. In-class exams, quizzes, homework, attendance: 60%

DEPARTMENTAL LEARNING OUTCOMES (to be filled out by departmental mentor)

The mathematics department, in its varied courses, aims to teach students to

- a. perform numeric and symbolic computations*
- b. construct and apply symbolic and graphical representations of functions*
- c. model real-life problems mathematically*
- d. use technology appropriately to analyze mathematical problems*
- e. state (e1) and apply (e2) mathematical definitions and theorems*
- f. prove fundamental theorems*
- g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.*
- al argument.*

Questionnaire

What is your major? _____

Are you sure you need this class? _____

What is the highest level of math you *have to* complete? _____

How did you get into this class? (Passed the prerequisite course, placed here upon college entry, placed by an advisor, etc)

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?
