Linear Algebra and Differential Equations

Math 550.291 (Fall 2014)

Times and Locations of Lectures and Recitations
Lecture: Monday & Wednesday 3:00 p.m. - 4:15 p.m.; Homewood Campus, Olin, Room 305.
Recitation (group 01): Tuesday 1:30 p.m. - 2:20 p.m.; Homewood Campus, Maryland, Room 202.
Recitation (group 02): Tuesday 3:00 p.m. - 3:50 p.m.; Homewood Campus, Krieger, Room 309


Perquisites: C or better in (Calculus I (AS 110.106) or Calculus I (AS 110.108) ) and (AS.110.107 Calculus II (For Biological and Social Science) or AS.110.109 Calculus II (For Physical Sciences and Engineering)).

Instructor: Dr. Wayne Hacker
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Webpage: http://dtc.pima.edu/~hacker

Office hours: Monday: 1:00 p.m. - 1:30 p.m.; 4:30 p.m. - 6:00 p.m.
Tuesdays: No pre-scheduled office hours
Wednesday: 1:00 p.m. - 1:30 p.m.; 4:30 p.m. - 6:00 p.m.
Thursday: No pre-scheduled office hours
Friday: No pre-scheduled office hours
Other times by appointment only

Note: I have an open door policy; if I’m around, just come on in.

These hours are subject to change. Changes will be announced in class.

Important dates

Holidays/Closures: Labor Day September 1 (Monday)
Fall Break October 17 (Friday)
Thanksgiving break November 24-30 (whole week off!)

Deadlines: Official withdrawal deadline November 14 (Friday)
Last day of class December 5 (Friday)
Final exam week December 13-16

Grading policy: Each exam will be scored out of 100%. At the end of the semester, the scores will be converted into grades of A, B, C, D, and F using the standard grading scale:

F < 60%  60% ≤ D < 70%  70% ≤ C < 80%  80% ≤ B < 90%  90% ≤ A

Warning: If you decide to drop the class, make sure you fill out the proper paperwork and let me know. If you do not officially withdraw, you will probably receive a failing grade for the course, which will remain on your record forever.

Course grading scheme

Homework ................................................................. 25%
Midterm Exam 1 ........................................... Friday, October 8 (3:00 p.m. - 4:15 p.m.) ...................... 25%
Midterm Exam 2 ........................................... Friday, November 19 (3:00 p.m. - 4:15 p.m.) ............... 25%
Comprehensive Final Exam ....................... Tuesday, December 16 (2 p.m. - 5 p.m.) ................. 25%

Warning: You will need to bring a student I.D. to the final exam. Except for the final exam, all exam dates are subject to change. Changes will be announced in class.

Use of electronic devices: Calculators, computers, or any other electronic devices are not allowed on the exams. No exceptions!
The rules of the game

Classroom etiquette: Disruptive behavior is defined as behavior that is disruptive to the learning process and outside normal behavior parameters. See the Student Code of Conduct for particulars; but examples of disruptive behavior are inappropriate talking (including phone calls), arriving late or leaving early, sleeping, doing other class work in class, etc. Also, any attempt at intimidating students from asking questions; for example, laughing at a question of a fellow student, will be cause for immediate ejection from class. Don’t do it! It’s rude and promotes a negative scholarly environment.

Guidelines for ethical conduct: The strength of this excellent university depends on academic and personal integrity. In this course, you must be honest and truthful.

Ethical violations include: cheating on exams, plagiarism, re-use of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.

In addition, specific ethics guidelines for this course are as follows: Students may (and should) discuss homework. However, all solutions must be written up and submitted individually. The same rules apply to computer programs. Basic ideas may be discussed but detailed codes should not be copied or shared. Finally, exams must represent the result of individual effort and communication is permitted only with the instructor and TA.

Report any violations you witness to the instructor. You may consult the associate dean of student affairs and/or the chairman of the Ethics Board beforehand. See the guide on “Academic Ethics for Undergraduates” and the Ethics Board Web site (http://ethics.jhu.edu) for more information.

Academic integrity: The Johns Hopkins University, the applied mathematics and statistics department, and your instructor consider violations of scholastic ethics serious offenses. Students may consult the Student Handbook sections on the Student Code of Conduct, on scholastic ethics and on the grade-appeal procedure.

Cheating: Students caught cheating on an exam will receive a grade of zero points for that exam. This score will be used in determining your final grade for the course. Your violation will also be reported to the proper academic authorities.

This class will abide by the Student Code of Conduct.
**General Matters**

**Attendance:** Regular attendance and work is essential in a mathematics course. Keep up. If you find yourself having trouble, seek help from the instructor and/or TA.

Class attendance is highly recommended but not required. I have found from experience that people who are frequently absent from my classes perform poorly on the exams. You are all adults who have, in some form, paid for this class. If you do not wish to come to any session, you do not have to attend. You must also decide on the amount of time that you wish to put into the class. However, it is your responsibility to make up what you have missed by not attending.

**Dropping the class:** If you decide to drop out of the class, then you must fill out the proper paper work. You should also notify me that you’re dropping the course. If you do not officially withdraw, then you will fail the course!

**Incompletes:** The grade of I is reserved for students who

(i) are passing with a C or above

(ii) cannot complete a small amount of the course for unavoidable documented reasons.

These criteria are subject to the instructor’s judgment.

**Withdrawals:** You may receive a W by officially withdrawing from the course by the drop date (see front page for date). If you just quit coming to class, the zeros you will receive on the exams and homework will most likely lower your grade to an F.

**Time outside of class:** You should be spending at least two hours per week (in addition to class time) for each one credit hour you are taking. This means that you should be putting a minimum of 8 hours per week outside of class time.

**Reading assignments:** I will regularly give reading assignments from the book. If you don’t bother to get a copy of the book, then you will be lost in lecture and will probably fail the course.

**Errors in my notes, problems, and solutions:** I try to proofread my class notes, problems, and solutions carefully before I place them on the course website. Nevertheless, typos and errors are unavoidable when writing hundreds of pages of notes, problems, and solutions under rigid time constraints. If you can’t understand how I arrived at an answer, you should ask me in class or during my office hours. There are excellent reasons for doing this—

- You might be making a mistake. If so, I can explain it to you and set you on the right track.

- If there’s a mistake in my work, I will correct it. Generations of future students will benefit from your finding the error.

- By catching one of my errors, you will prove to me that you are working hard reading my notes and checking my homework solutions. I will remember this in your favor if you end the semester near the border between two grade levels.
Exam policy

Problem types. All exams in this course may include either or both of two types of problems:
(i) multiple-choice or short-answer problems; and
(ii) partial-credit more involved problems, derivations, and/or “proofs” (i.e., “show that” problems).

No partial credit will be given for multiple-choice/short-answer problems, but I always include
one extra multiple-choice/short-answer problem that you can miss without penalty. Partial
credit may be awarded, sparingly and at the instructor’s discretion, on the partial-credit type
problems; see below for further discussion of this problem type.

Attention: I am aware that most of you are not trained in pure mathematics; so relax, there
will be no rigorous proofs! We’ll stress care, not rigor.

Multiple-choice/short-answer problems. I will not give partial credit on multiple-choice
or short-answer questions. Nevertheless, you must show your work. The purpose of this course’s
exams is to give me an accurate measurement of how well you are learning the material—not
how lucky you are at guessing answers, or how skilled you are at copying from your neighbor’s
exam. If you answer a difficult problem without doing any written work, I will assume that you
are guessing or copying.

If you have answered a difficult problem without doing any written work, or if the work that
you show doesn’t seem to lead to your answer, then I will grade the problem as wrong, even
if your answer is correct. If you feel that you have been unfairly penalized, I will give you an
oral exam during my office hours; if you can solve problems of similar difficulty without doing
any written work, I will give you credit for the exam problems. You must take this oral exam
within one week of the original exam’s being returned to you, in conformity with the regrading
policy for the course.

I always include one extra multiple-choice/short-answer question in the multiple-choice/short-
answer section of the exam. For example, if I ask 11 multiple-choice/short-answer questions,
then you may miss one without penalty. However, you cannot score above 100 % on the exam!
If you don’t like this, then just do your favorite 10.

Midterm exams: Typically midterm exams will have both a no-partial-credit multiple-choice
and/or short-answer component and a partial credit component, where partial credit is given
sparingly according to an algorithm that will be given on the exam.

The comprehensive final exam: The final exam will be comprehensive. You may find some
of the questions will be more challenging since they will incorporate multiple ideas from the
course. The final exam is designed to give a second chance to those students that did poorly
on one of the midterm exams. You may not use the final to replace a bad homework score!

Note: A make-up for the Final Exam may be available if the exam is missed due to illness or
a family emergency. Under normal circumstances a make-up exam is only available if discussed
with the instructor at least 1 day before the date of the exam. However, if it’s a true emergency
with proper documentation of the emergency, then other arrangements may be made even if
the exam date has passed.

Curving exams: Individual exam scores will not be curved. If I decide to curve, I will do so at
the end of the semester, with students’ total exam scores. In such a case, I will look for natural
breaks in the distribution—which is another reason why you shouldn’t let other students copy
your work.
Regrading exams: There is a “statute of limitations” on regrading any exam. If you believe that you should receive additional credit for an exam, you must request the additional credit no more than one week after the exam has been returned to the class. After that time, I will not award you additional points on the exam, however good your claim to them may be.

The one-week period for regrading begins when I return the exam to the whole class. If you are absent on that day and don’t get your exam until later, you will not be given additional time in which to request a higher grade.

Illegible or ambiguous answers are wrong answers. I will not award you points for a problem on which I can’t understand your answer, and I will not regrade it based on your explanation of what you were trying to say. Also, for the multiple-choice component of the exam, I will also not give you credit for a problem in which you got the right answer, but circled the wrong letter on the answer sheet.

If you ask me to regrade, I will regrade your entire exam, not just a particular part of a particular question. If I find an error that I didn’t notice the first time I graded, I will mark it as wrong. Your score after regrading may be worse than it was before.

Missed exams: Except for the final, there are no makeup exams. No exceptions!

You should not miss an exam or final exam if you can help it. However, I realize that there are times when someone misses an exam for legitimate reasons.

If you miss an exam, then I will replace your score on that exam with your score on the final. If you miss more than one, then you will receive a zero for each additional missed exam. Part of the purpose of the exams are to motivate regular attendance. Allowing you to miss lots of exams and replace them just encourages poor attendance, which then leads to poor grades.

If you must miss the final exam due to some unforeseen consequence or conflict, you need to contact me right away and supply me with proof of the conflict. In that case, we can devise an alternate final exam at another time. Be forewarned that the alternate final exam will be different, and possibly more difficult, than the final taken by the rest of the class.

Once announced, exam dates are fixed. In particular, the date of the final exam will not be changed. It is given in this syllabus and set by the university. If you will be out of town on that date, you should find a different class that better fits your schedule. In general, if you find yourself unable to make it to exams and classes, then you should drop this course and retake it when you reach a stage in your life where your schedule is less crowded.

Homework policy

You cannot learn mathematics without doing homework. Therefore you should do as many of the assigned homework problems as you can. These are not just token words about how important I believe homework is. To show my commitment to this statement I have heavily weighted the homework to send a strong message to you the student as to just how important I believe that doing your homework really is to your success in this course.

Collected homework: The collected homework assignments will be given on the board in class, and/or on the website. The collected homework should be neatly written, stapled, and the problems clearly labeled. If I can’t find a problem, or make sense of what you wrote, then I won’t grade it. Also, I will take points off for poor style (incorrect notation, incoherent writing, etc.).

For the collected homework, you may work in groups, but you must hand it in individually in your own handwriting.
At the end of the semester, depending on how the time goes, you may be given one or two homework assignments based on material that we did not have time to discuss in class. This will serve as a test on how well you can learn new material on your own. You may work in groups on these homework assignments and turn them in as a group.

Each homework set may be divided into 3 parts: easy-level questions, intermediate-level questions, and difficult-level questions. Roughly speaking,

- Easy-level questions will be straightforward. For this reason, each question will be either a short-answer or multiple-choice question. No partial credit will be given for any wrong answer! No exceptions! Students who make “trivial mistakes” on most or all of the easy-level problems that they work will suffer greatly under this grading scheme. I am giving easy-level questions to test your mastery of the very basic concepts that you should know. Students who cannot carry out basic calculations will not pass the course.

- Intermediate-level questions will require more computational skills than easy questions, but will not require what I deem to be mathematical insight in order to solve the problem.

- Difficult-level questions will require more than a superficial understanding of the material in order to solve the problem. You will rarely be given problems of this level of difficulty.
  
  **Disclaimer:** The words intermediate-level and difficult-level are relative terms! None of these problems should be difficult for an expert!

**Late Homework:** Unless discussed ahead of time with the instructor, the following rules apply to late homework:

- 75% credit if turned in after class but before 8 p.m. on Friday;
- No credit after 8 p.m. on Friday.

If homework is not turned in during class, it must be delivered to Whitehead 212B.

**Warning:** A poor homework score will not be replaced by the final exam, or any other exam for that matter! No exceptions!

**Practice Problem Sets with Solutions Portfolio**

In order to provide you with lots of example problems for the course, I have created practice problem sets consisting of hundreds of problems with solutions. If you rework these problems and keep them in a homework binder (spiral or ring binder), then I will be glad to check them during office hours for completeness. Just like the regular homework, these problems should be neatly written, clearly labeled, and well-organized. Depending on the condition of your practice-problem set portfolio, I will then give it a score of 0, 1, or 2.

These numbers \{0, 1, 2\} refer to how many free problems you will get on the final. You can think of each point as a free ticket that entitles you to choose one problem on the final (any one you want) and get full-credit for that problem! The goal of this is to entice you to work all of the extra problems.

**Warning:** You must get your practice-problem-set portfolio checked off before December 1st! I will not do it on the day of the final exam, or during reading period!

**Note:** (This section in red was added to the syllabus on September 5, 2014 after our first class meeting)
Class participation policy

I strongly encourage you to ask questions and participate in class. I reserve the right, at my
discretion, to award bonus points to students who regularly participate in classroom discussions.
If your final grade is near the border between two grade levels, your level of class participation
will be an important factor in determining your grade for the course.

Who does what

The instructor’s job:

• To give a good and clear lecture that a prepared student will understand.
• To welcome relevant questions to the topics discussed in class, but also to filter questions
  that are irrelevant to the topic(s) being covered.
• To answer student’s questions during office hours.
• To give exams that evaluate your level of understanding of the material taught in class.
• To teach you how to take a logical, rational approach to problem solving that prepares
  you for the next level in your education.

The student’s job:

• To come to class and pay attention.
• To ask questions if you don’t understand something.
• To do the reading assignments.
• To do homework.
• To show up for exams.
• To take responsibility for your education.

What is not the instructor’s job:

• To explain everything in the book so that the student doesn’t have to do any reading,
  working of problems, or learning on their own.
• To chase the student down and make sure they are coming to class and doing their
  homework.
• To be a private tutor.