

Math 13 – Linear Algebra
Santa Monica College – Fall 2009
MW 2:15-3:35pm (Section 2558)
Room MC 70

Instructor: Dr. Andrew Nestler

Office: MC 61

Contact: (310) 434-8515, http://homepage.smc.edu/nestler_andrew/

Class homepage: http://homepage.smc.edu/nestler_andrew/math13/math13.htm

Office hours: MW 3:45-4:45pm and T 3:30-4:30pm, and Math 7 workshop Th 3:30-4:30 in Math Lab

Course description: Topics include matrices and linear transformations, abstract vector spaces and subspaces, linear independence and bases, determinants, systems of linear equations, and eigenvalues and eigenvectors.

Text: Larson & Falvo, *Elementary Linear Algebra*, 6th ed., Houghton Mifflin, 2009

Prerequisite course: Math 8 (Calculus 2)

Prerequisite skills: Upon enrolling in Math 13 at SMC, it is your responsibility to know how to:

- Solve systems of linear equations using Gaussian elimination.
- Write the equation of a line in parametric form.
- Prove mathematical statements by methods including proof by contradiction and mathematical induction.
- Integrate and differentiate functions including functions defined by infinite series.
- Evaluate, manipulate, and interpret summation notation.
- Prove algebraically the existence of the inverse of a function by formally proving the function is one-to-one.
- Be eligible for English 1.

Exit skills / Course objectives: Upon successful completion of Math 13, you should be able to:

- Apply the concepts and theorems of linear algebra to show the consequences of a given definition.
- Perform matrix computations and apply matrix algebra.
- Express a matrix as a product of elementary matrices and an upper triangular matrix.
- Compute the inverse, if possible, of a square matrix, and express it as a product of elementary matrices.
- Solve any size system of linear equations using Gaussian elimination, and, where necessary, express solutions using parameters or as a linear combination of basis vectors.
- Apply fundamental determinant theorems.
- Prove whether or not a set and operations form a vector space (or subspace).
- Apply the concepts of linear independence and spanning to find a basis for a vector space.
- Prove whether or not a function between two vector spaces is a linear transformation or isomorphism.
- Find the matrix representation of a linear transformation with respect to two given ordered bases.
- Express the kernel and range of a linear transformation as a span of basis vectors.
- Compute the eigenvalues for a matrix, find a basis for the corresponding eigenspaces, and where possible, diagonalize the matrix.
- Use the Gram-Schmidt process to compute an orthonormal basis of a space.

Homework: Most days I will give a list of suggested homework problems. It is absolutely essential that you spend a considerable amount of time and effort to master these problems. At times I may announce that certain homework problems will be collected for careful grading. On the day it is due, homework is to be turned in at the start of class. **Late homework does not receive credit.** It is important that your work be neat and coherent, in addition to being mathematically correct. Part of your grade will be based on the completeness and legibility of your work. Your work should be very clear and precise. I suggest that you write drafts of solutions on scratch paper and then recopy your final solutions neatly. All answers must be accompanied by a clear explanation. Full credit is given for correct and complete solutions only. Please see the Homework Guidelines and Checklist page for more information.

Exams: There will be two in-class midterm exams. The approximate dates are:

Wednesday, October 7

Wednesday, November 11

The final exam will be cumulative and will be at 3:30pm on Wednesday, December 16, according to the page

http://www.smc.edu/schedules/2009/fall/guides/final_exam_schedule_093.htm

All you need to bring for exams is pens or pencils, and perhaps an eraser. You will do all of your writing on paper provided to you. Scratch paper, notes, books, calculators and electronic devices are not permitted. Ordinarily you are expected to show all relevant work for full credit, and indicate and explain your answers clearly. **Solutions presented during lectures are models for your work.** Unless you think that there is a typographical error, or you are unable to read part of the exam, you may not ask any questions during an exam. You will be told in advance which material may be covered on an exam. **Questions regarding the format or length of the exams are inappropriate and will not be answered.**

Grading: The basic grading scheme is as follows:

Homework	20%
Each midterm exam	25%
Final exam	30%

There are no make-up exams. If you do not take a midterm exam then, in a first such instance, your score for that exam will be the same as your score on the final exam. Missing additional exams results in scores of zero on those exams.

Your final course grade is based on your total T of points out of 1000 given by the formula $T = 10H + 2.5E + 3F$, where H = homework average out of 20; E = sum of 2 midterm exam scores out of 200; and F = final exam score out of 100. Some homework scores may be dropped prior to computing the homework average. No exam score is dropped. There is no extra credit. Your total score may decrease if your cell phone makes a sound in class. The following scores will guarantee you the corresponding grades:

<u>Points</u>	<u>Letter grade</u>	<u>Meaning</u>
900-1000	A	Excellent
760-899	B	Good
640-759	C	Satisfactory
500-639	D	Passing, less than satisfactory
0 – 499	F	Failing

Attendance: You are responsible for all material covered and all announcements and assignments made at each class, whether you are present or not. Therefore I recommend that you share contact information with at least one other student in this class, so that you can find out what you missed in the event of an absence. Students who do not attend each class meeting of the first week may be withdrawn. Unexcused absences may result in your being withdrawn from the course. It is your responsibility to withdraw from the course if you wish to do so.

Email: I may answer questions about the course material sent to my email address anestler@smc.edu. Here are the rules that apply when sending me email for this purpose:

- (1) To ensure that I distinguish your email from unsolicited spam, you must send the message using an SMC student email address, which you may obtain for free at the webpage <http://accounts.smc.edu/>.
- (2) You must include the course designation "Math 13" in the subject line, and your first and last name and SMC ID number in the body of the email.
- (3) You may send me an email only to ask questions about the course material.
- (4) Please do not send attachments.

Email messages that do not follow these rules may be deleted without being read and do not guarantee a response.

Classroom Conduct: When in the classroom, you are expected to give your full attention to the lectures and problem-solving periods. Food, drinks and gum are not allowed in the classroom. Please do not use or check cell phones, pagers, text messaging or recording devices, headphones or any other electronic device when class is in session. **When you come to class, please turn off such devices, put them into a bag, close the bag, and place the bag on the floor. Failure to respect this instruction may result in your removal from the classroom.**

Each student has the right to feel comfortable asking questions, making mistakes and offering good guesses and correct solutions. Students learn at different rates and prefer a variety of instruction methods. Please be courteous to and respectful of your classmates and myself.

Dr. Nestler – Math 13 - Homework Guidelines and Checklist

Your goal when answering homework problems is to explain your correct solution carefully. In general, **solutions you see during the lecture are models for your work**. In order for an assignment to be eligible for full credit, make sure it satisfies the following **checklist**.

Does your completed homework assignment:

- Clearly restate the problem to be solved?
- Define all variables and symbols that are not in the problem as stated?
- Contain justifications of each step of your arguments?
- Use correctly spelled English words, mathematical notation, punctuation and grammar?
- Solve the question that was originally asked?
- Have a metal staple if it contains more than one page?

Appearance: Rewrite or type your solutions neatly. You may find that you rewrite your solutions more than once. Use paper that has a clean edge rather than paper ripped out of a notebook, having a ragged edge. If you have crossed out writing that was not part of your final solution, you should recopy that solution neatly and turn that in instead.

True/False Questions and Answers: For true/false questions, if the statement is true, then you must find a general reason why this is so. A specific example is not sufficient, but a theorem and page number from the book, or a statement such as, “You proved it in class,” will suffice. If a statement is false, then you must find a specific example that disproves the statement; this is known as a counterexample.

Plagiarism: While I encourage you to work with others, you must write up your solutions in your own words. You must give proper reference and credit to others. Examples: “I worked with John on this”; “This example was Joan’s idea.” Submitting someone else’s work as your own is known as plagiarism and is a form of cheating that is a serious violation of the college’s Code of Academic Conduct. **It is cheating** to let someone else in the class borrow your work for the purpose of copying all or part of it. **It is cheating** to borrow someone else’s work for the purpose of copying all or part of it.

A final comment: You should take pride in your proofs and solutions. Take care to make sure they are legible, complete and correct. The reader thanks you, and you will be grateful as well when you are studying for an exam and wish to review your previous work.

Important College Policies

Withdrawal Policy: It is your responsibility to make sure that all conditions of eligibility are met. According to the schedule of classes, Monday, October 26 is the last day to withdraw from a class with a guaranteed W. From then until Monday, November 23, a student with extenuating circumstances making withdrawal **necessary** may ask the instructor to be withdrawn with a W. In my opinion, any such circumstances would make it necessary for you to drop and stay withdrawn from all classes at SMC for the remainder of the term. **It is extremely unlikely that students will be dropped from this class after October 26. You should consider October 26 the last day to withdraw from this class with a W.** Withdrawn students will not be readmitted except in case of administrative error. Auditing classes (attending while not enrolled) is not permitted.

Codes of Conduct: All SMC students are required to affirm their commitment to the College Honor Code. As testament to your commitment and readiness to join the Santa Monica College academic community, you and all students are expected to uphold the Honor Code. By enrolling in courses at SMC, you are certifying the following statement:

In the pursuit of the high ideals and rigorous standards of academic life, I commit myself to respect and uphold the Santa Monica College Honor Code, Code of Academic Conduct, and Student Conduct Code. I will conduct myself honorably as a responsible member of the SMC community in all endeavors I pursue.

I will vigorously pursue any suspected cases of plagiarism or cheating or other violations of the SMC Code of Academic Conduct, whether completed or merely attempted. An occurrence of academic dishonesty will result in an exam score of zero or even a grade of F in the course, and an Academic Dishonesty Report form will be filed with the Campus Disciplinarian. If your cell phone makes a sound in class, then you may be removed from the classroom and you may receive a disciplinary sanction for violating the SMC Student Conduct Code.

Some information for me

Please fill out this entire page and return this entire syllabus to me by Wednesday, September 9 in order to remain enrolled. You may obtain another copy of this syllabus from our class homepage.

Print your name:

SMC ID number:

Have you enrolled in this course before? If yes, when?

How did you place yourself in this course? Circle one of these four options:

- Grade of C or better in Math 8 at SMC
 - If yes, please give your grade, teacher's name and when you took it:

- Grade of C or better in a Calculus 2 course at another school
 - If yes, please give the school's name and your grade:

- SMC Math Assessment Test
 - If yes, when did you take the test?

- Counselor waiver
 - If yes, please explain why you have a waiver:

When did you last complete a math class (examples: "Spring 2009," "Three years ago"), and what was it?

How many units of college coursework are you taking this term?

If you are employed, how many hours are you working at your job each week, on average?

Are you enrolled in high school?