

Berkeley City College **Fall 2016**
Mathematics 3E **Linear Algebra** **Code: 42069/42423, 3 units**
Syllabus (draft)

Instructor: Shawn McDougal **E-mail:** smcdougal@peralta.edu

Office Hours: MW 11:15-12:15pm, TR 1:45-2:45pm (plus 1 hr by appointment)

Office Location: Room 353 **Phone:** (510) 981-5018

Class Meeting Times: MW1:30-2:45pm/TR 11-12:15pm **Location:** 2000 Center St. #1/Main #422

Prerequisites: Math 3A, or placement through assessment

Textbook: *Linear Algebra: A Modern Introduction*, by David Poole. (3rd edition, 2011)

Materials: You should obtain a scientific calculator. Access to a graphing utility for some of homework problems is encouraged but not required.

Catalog Description

Gaussian and Gauss-Jordan elimination, matrices, determinants, vectors in \mathbb{R}^2 and \mathbb{R}^3 , real and complex vector spaces, inner product spaces, linear transformations, eigenvalues, eigenvectors, and applications.

Class format

Our typical class will be a mix of lectures clarifying and expanding upon the points raised in the book and the videos, hands-on problem solving sessions, solution presentations (from students as well as me), and open discussion. About half the class will be "workshop"—you will be working on problems individually or in groups as I go around helping as needed. In addition to providing feedback and guidance, I will often ask you to talk through the problems or ideas with other students. Talking through your ideas with others is a good way to 1) test and refine your ideas, 2) learn multiple ways of thinking about a concept or solving a problem, and 3) practice putting the ideas in your own words.

Every day your main homework is to *prepare for class*: you should come to class having already read the section(s) to be covered in class that day, as well as having watched any designated videos. (There will be usually be one to three short—5 to 10 min.—videos for you to watch.) You should take notes on the examples you see in the videos, get a basic idea of the key concepts and theorems in the book, and know where to find things. You are *not* expected to understand everything you read or see the very first time—that is the point of coming to class and doing the follow-up exercises!—but you will be get the most out of class—and you will not be lost—if you come prepared. For each class I will give a list "suggested homework" problems to guide your study, but I will not collect or grade them.

Self-intros

Every day for the first few weeks of the course, 2-3 students will get a chance to briefly introduce themselves to the class. "Briefly" meaning 30 sec. to 1 min. This will allow all of us to get to know a bit about each other. Include an answer to one of the following "questions":

- One experience you had after age 13 that really shaped who you are or how you think.
- If you could, what is one thing you would change about society?

Grading Allotment (400 points = 100% for course)

	points each	total points	total percent	notes
Quizzes (4)	40	160	40%	5 (drop lowest 1)
Final Exam	100	100	25%	
Solution Share	20	20	5%	
Daily Preps (20)	4	80	20%	~28 (keep best 20)
Moodle Check-ins (10)	2	20	5%	
Connections (4)	5	20	5%	

Grading Scale A: 90–100 %, B: 75–89%, C: 65–74%, D: 55–64%. F: Below 55%

Daily Preps

Twice a week (usually) there will a *Daily Prep*—a brief (< 5 min.), open notes (and sometimes open book) "quiz". I use quotes because anyone who comes prepared to class—i.e. watches the assigned videos, does the reading, and takes notes on the key points—will easily get full credit. Each *Daily Prep* is worth 4 points (i.e. 1% of the grade). There are no make-ups. To account for the fact that life happens and sometimes folk can't come to class prepared, there are many free passes: out of almost 30 *Daily Preps* I will count only your best 20.

Solution Share

I encourage students to learn from each other, take time to really think through challenging problems, and improve their presentation skills. Once during the term, you will present your solution to a problem selected from the Suggested HW list. The *Solution Share* is worth 20 points (i.e. 5% of the course total). The problems that count for *Solution Share* credit are indicated in the Suggested HW list. Grading will be based on clarity, correctness, and timing. (A rubric will be provided.)

Quizzes

There will be a quiz every three weeks, starting in Week 3. There will be 5 quizzes altogether. Each quiz is worth 40 points (i.e. 10%). I will drop your lowest quiz score, so only your best 4 quiz scores will count. The quizzes will be mostly based on the suggested HW problems. There are no make-ups.

Applications Group (Extra Credit)

Once during the semester, students can do a team presentation on an application topic chosen in advance. The *Applications Groups* will take place during the weeks indicated, and the topics will be chosen from the sections indicated. The presentation will be worth 10 points and will be graded based on both individual and team criteria. (A rubric will be provided.)

Final Exam

The Final Exam is scheduled for Monday 12/12 (or Tuesday 12/13) in class. It will cover all of the material of the course. Many (even most) of the problems will be taken from the quizzes. It's worth 100 points (i.e. 25% of the course total).

Moodle Check-ins

Up to 10 times during the semester you can get credit for writing a Moodle *Check-ins*. The purpose of the *Check-ins* is to 1) encourage folk to discuss the material outside of class, 2) let me know which concepts I most need to clarify in class, and 3) build community among students. For credit, the check-ins must be posted before the start of the next week (by Sunday night (MW) or Monday night (TR)) in the appropriate weekly forum.

In order to receive credit, a *Check-in* must be one of the following (examples are for illustration only):

- a *good question* about a problem or concept or example in the book or in a video
 - good question: "On problem X in section Y I tried to do Z but got the wrong answer. What am I missing?"
 - not-so-good questions: "I don't get problem X." or "Please do problem X for me."
- an *interesting comment* about a problem or concept or example in the book or in a video
 - interesting comment: "I like method X because of it is easier to remember than method Y."
 - not-so-interesting comment: "I like method X."
- a *substantive response* to someone else's question or comment.
 - substantive response: "I agree. Also, Method Y uses Theorem W, which I don't really get."
 - not-so-substantive response: "I agree."

You are welcome and encouraged to participate frequently in the Moodle discussions, though you can receive credit for at most one *Check-in* in a given week. Each *Check-in* is worth 2 points. Altogether the *Check-ins* are worth 20 points (i.e. 5%).

Weekly Schedule (tentative)

Week of...	Sections	Notes (all quizzes on W or R)
A22--Week 1	1.1-1.3 + cross product + code vectors	
A29	2.1-2.3	
S5	3.1	Q1; no M (holiday)
S12	3.2,3.3a	Ch2 Application Group
S19	3.3b,3.5	
S26--W6	3.6	Q2
O3	4.1,4.2 + geometric applications	Ch3 AG
O10	4.3,4.4, 4.6 (systems of diff. eqs.)	
O17	5.1,5.2	Q3; Ch4 AG
O24	5.3,5.4	
O31--W11	6.1,6.2	Ch5 AG
N7	6.3,6.4	Q4
N14	6.5,6.6	
N21	7.1 + complex matrices	Ch 6 AG; no R (holiday)
N28	7.2 (operator norms)	Q5
D5--W16	7.3 + review	
Final Exam M 12/12 or T 12/13 (in class)		

Important Dates (cf. BCC Fall 2016 Academic Calendar)

Sep. 4 – Last day to add regular session classes. Last day to drop (without a "W") and get a refund.

Sep. 9 – Last day to file for P/NP grading option for regular session classes.

Oct. 21 – Last Day to File Petitions for AA or AS Degree/Certificate

Nov. 18 – Last day to drop with "W". Attendance Verification Day.

Connections Assignments

Connections is an opportunity for students to connect with diverse colleagues outside of class while reflecting on issues relating to math, personal interest, or community interest.

There will be 4 *Connections* assignments, spaced a week apart. The first is due Friday 9/2 (during Week 2, aka "W2"). The others are due on successive Fridays. Each should take 15-30 minutes to complete.

- Each week (from W2 to W5) students will form teams of 2 or 3 people.
- Each team will submit a roughly 2-3 paragraph write-up.
- Either hardcopy (handed in during class) or electronic submission (pdf, rtf, or plaintext format) via Moodle dropbox is fine. (See *Connections Form* template below for the required info.)
- Each *Connections* assignment is worth 5 points (i.e. 1.25%).
- In order to get credit for N assignments, each student must team up with at least N different people. (So I suggest you don't team up with the same person every week ;^)
- On each team, there are 2 roles: Initiator and Responder. Students choose who plays what role.
 - The Initiator makes the initial remarks to get the conversation started. The Responder (or Responders) responds to or follows up on the comment.

Menu of options

1. a recent experience that has really impacted you
2. something you're confused, curious, or excited about in class
3. news story with (interesting, confusing, problematic) use of math
4. example of how (lack of) math knowledge is used to trick people
5. an issue in the school or community that really bothers you and/or an idea for improving things in the school or in the community
6. interview a "community expert" on how math impacts their work or the way they think ("community expert" meaning someone who works at BCC or in the local community)
7. attend and comment on a school or community event related to math, science, or social justice

Connections Form (template)

Initiator Name:

Responder Name(s):

Date:

Topic: (or name and job of person interviewed, or title of event attended)

Write up:...

Suggested Homework Problems

I will provide a list of suggested HW problems based on the material we cover. If you master the problems you will learn a lot and be well-prepared for the quizzes.

Attendance

Students who miss more than 2 consecutive classes without contacting me to explain their absences may be dropped from the course. Anyone who misses the first 2 class meetings may be dropped. Still, do not assume that I will automatically drop you if you merely stop attending class. Anyone whose name appears on the final grade roster who has not been attending class will receive an F.

Academic Honesty

Any evidence of cheating on an exam or quiz will result in a score of zero (0), and may incur further penalties. Cheating includes but is not limited to bringing notes or written or electronic materials into an exam or quiz, copying off of another person's exam or quiz, allowing someone to copy off of your exam or quiz, and having someone take an exam or quiz for you.

General Information/Expectations

- Make sure your preferred email address is listed on Passport and Moodle, as I sometimes may send out announcements. For Moodle see <http://eperalta.org/Fall2016/>
- If you have questions about the course material—e.g. because you missed a class—and cannot make it to office hours, do NOT email me. I almost never answer questions about the course material over email. (Firstly, I don't want to be swamped with emails. Secondly, I prefer to answer a question once rather than multiple times.) To help your questions get answered quickly by me and/or your peers, and to help students share ideas and build community with each other, you should post your questions in the *forums* on Moodle. (An exception to my email policy: feel free to email me if you have questions about your Solution Share.)
- Also, on Moodle you will be able to review your grades throughout the semester.
- Please turn off your cell phone ringers/alarms during class.

Justification for Course

Satisfies the General Education and Analytical Thinking requirement for Associate Degrees. Provides foundation for more advanced study in mathematics and related fields. Satisfies the Quantitative Reasoning component required for transfer to UC, CSUC, and some independent four-year institutions. Acceptable for credit: CSU, UC. AA/AS area 4b, CSU area B4, IGETC area 2A.

Student Learning Outcomes (General)

At the end of the course students will be able to:

1. represent relevant information in various mathematical or algorithmic forms.
2. calculate accurately and comprehensively.
3. interpret information presented in mathematical or algorithmic forms.
4. draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis.
5. explain quantitative evidence and analysis.

Disabilities Statement

Berkeley City College is committed to providing reasonable accommodations for all individuals with disabilities. Any student with a documented disability needing academic accommodations is requested to speak with Programs & Services for Students with Disabilities (PSSD), located in Room 261 and the instructor as early in the semester as possible. I encourage any student who suspect they may have a learning disability to contact PSSD for assistance. They can be reached by phone at (510) 981-2812 or

2813. All conversations will remain confidential. The syllabus and course material are available in alternate formats upon request.

Student Health and Wellness

Students are required to pay the Student Health fee of \$18.00 per semester for fall and spring semesters (\$15 for summer session). This fee is collected at the time of enrollment. The health fee covers low cost health, mental health and wellness services on campus at: 2000 Center St., Suite 100 from 9:30-4pm M-F.