

Berkeley City College **Spring 2019**
Mathematics 3E **Linear Algebra** **Code: 20266, 3 units**
Syllabus (v.1-15)

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

Office Hours: MTWTh 5:45-6:30, TTh 2:45-3:15 (plus 1 hr by appointment)

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

Class Meeting Times: TTh 11-12:15 **Location:** Room 051

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. 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.

Daily Preps

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 or two 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. Occasionally during the semester there will be an extra credit pop quiz, called Daily Prep. It will be open notes, and based on the indicated video/text for the day as indicated in the Daily Preps document. Each Daily Prep is worth 2 points.

Self-intros

Every day for the first few weeks of the course, 3-4 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. Tell us a bit about yourself, and answer *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 % | notes |
|-----------------|-------------|--------------|---------|-----------------------------|
| Check-ins (15) | 4 | 60 | 15% | |
| Connections (3) | ~7 | 20 | 5% | worth 6, 7, 7 points, resp. |
| Quizzes (10) | 20 | 200 | 50% | out of ~14 keep best 10 |
| Solution Share | 20 | 20 | 5% | |
| Final Exam | 100 | 100 | 25% | |

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

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* ('SS') is worth 20 points (i.e. 5% of the course total). The problems that count for SS credit are indicated in the Suggested HW list. You are encouraged to let me know in advance which problem you will do. The presentation of an SS from a given section must be within 1 or 2 class meetings after we have completed that section in class. Grading will be based on clarity, correctness, and timing. (A rubric will be provided.)

Homework

For each section I provide a list of suggested homework (HW) problems to guide your study, but I will not collect or grade the HW. If you master the problems you will learn a lot and be well-prepared for the quizzes and final.

Quizzes

There will be a short quiz almost every week, starting in Week 2. Usually Tuesdays unless otherwise announced. Each quiz will cover all of the material since the last quiz. (Usually 2 days worth of material.) There will be ~14 quizzes altogether. Each quiz is worth 20 points (i.e. 5%). They will be almost completely based on the HW problems. I will drop your lowest few quiz scores, so only your best 10 will count. *There are no make-ups.* (This is why I drop the lowest scores.)

Final Exam

The Final Exam is scheduled for Tuesday of Finals Week, in class. It will cover all of the material of the course. Almost all of the problems will be taken from the quizzes. It's worth 100 points (i.e. 25%).

Application Groups (Extra Credit)

Once during the semester, students can do a team presentation on an application topic chosen in advance. The list of possible *Application Group* topics, including the required number of team members, and the chapter each topic appears in, is posted on Canvas. Any presentation should be done before we have finished the following chapter. (So a topic from Chapter 2 should be presented before we have finished Chapter 3.) The presentation will be worth 10 points and will be graded based on both individual and team criteria. (A rubric will be provided.)

Canvas Check-ins

Fifteen times during the semester—during 15 different weeks—you are expected to write a Canvas *Check-in*. 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 1) posted before the start of the next week--by Monday 11:59pm--in the appropriate weekly forum, 2) be about the math discussed in class or the book that week, and 3) be a *useful* question, comment, or response to someone else's question. Some clarifying examples:

- *useful question*: "On problem X I tried to do Y but got the wrong answer. What am I missing?"
- *not-so-useful questions*: "I don't get problem X." or "Please do problem X for me."
- *useful comment*: "I like method X because it's easier to remember than method Y."
- *not-so-useful comment*: "I like method X."
- *useful response*: "I agree. Also, Method Y uses Theorem W, which I don't really get."
- *not-so-useful response*: "I agree."

As you can see, a useful post will likely involve you sharing your own thought process.

Here are examples of the kinds of posts that *won't* get credit (even though they may be ok to do):

- merely restating what someone else has said
- posting a solution or resource that no one has asked about, without mentioning why you find it interesting or valuable
- asking what you missed or what will be on the quiz (though I may give credit to people who answer)
- posting a file that people have to open separately in order to read your question or comment

You are encouraged to participate frequently in the Canvas discussions, though you can get credit for at most one *Check-in* per week. Each *Check-in* is worth 4 points (i.e. 1%). Also, to encourage people not to wait until the last minute to start discussion threads, if yours is one of the first 2 new topics posted in a given week, you will get extra credit. (1 point each time, up to 4 points total for the semester)

Extra Credit

Beyond what's already been covered, there are several ways to get extra credit points in this class. (Unless otherwise noted, you can do each thing once.)

1. If Shawn makes a math mistake at the board and doesn't catch it within 1 minute, whoever first points it out will get 1 point. (You can do so up to 4 times during the semester.)
2. If you come up with a better solution to a problem than the solution(s) presented by Shawn, you will get 2 extra credit points. (You can do so twice during the semester.)
3. If you participate in a study group (by the end of Week 8). Take a picture of your study group meeting (up to 6 people). Everyone present gets 1 point.
4. Go to the LRC (by the end of Week 4). Take a picture of yourself there, together with one of the tutors or staff. Be sure to get their name. You will get 1 point.

Weekly Schedule (tentative)

| Week of... | Sections | Week of... | Sections |
|-------------------------------------|----------|------------|-----------------------------------|
| 1/22 | 1.1-1.3 | 3/19 | 4.3-5.1 |
| 1/29 | 2.1-2.2 | 3/26 | 5.2-5.4 |
| 2/5 | 2.3-3.1 | 4/9 | 6.1-6.2 |
| 2/12 | 3.1-3.2 | 4/16 | 6.3 |
| 2/19 | 3.2-3.3 | 4/23 | 6.4-6.5 |
| 2/26 | 3.5-3.6 | 4/30 | 6.5-7.1 |
| 3/5 | 3.6-4.1 | 5/7 | 7.1-7.2(norms) |
| 3/12 | 4.2-4.3 | 5/14 | 4.6 (e ^{matrix})+review |
| Final Exam: Tuesday 5/21 (in class) | | | |

Important Dates (cf. BCC Spring 2019 Academic Calendar)

Jan. 26– Last day to add without permission number or add card.

Feb. 3 – Last day to add (w/ permission # or card). Last day to drop (w/o a "W") and get a refund.

Feb. 8 – Last day to file for P/NP grading option for regular session classes.

Feb. 18 – Holiday (college closed)

Mar. 15 – Last Day to File Petitions for AA or AS Degree/Certificate

Mar. 21 – No classes or office hours. Professional Day (staff meetings).

Apr. 1-7 – Holiday/Spring Break

Apr. 26 – Last day to drop with "W". Attendance Verification Day.

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

- For personal questions (e.g. about your grade), email me or drop by office hours.
- For general questions about the course—e.g. if you missed a class or want to know what will be on the quiz—do NOT email me. I almost never answer questions about the course over email. (One: I don't want to be swamped with emails. Two: I prefer to answer a question once rather than multiple times.) To get your questions answered by me and/or your peers, and to help students share ideas and build community with each other, you should post your general questions in the *forums* on Canvas.
- 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.

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.

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.

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 5 pm Friday 8/31 (during Week 2, aka "W2"). The others are due on successive Fridays. Each assignment is worth 5 points.

- Each week (from W2 to W5) you will form teams of 2-3 people and have a brief conversation.
- The conversation topic must be chosen from the menu of options below.
- The conversations can be face to face, via phone, text, email, chat, or whatever.
- Each team will submit a roughly 2-3 paragraph transcript of the conversation. Each team will submit a roughly 2-3 paragraph transcript of the conversation. The document should include the info in the Connections Form below. (Though the layout can be different.)
- Each team submits one copy via the appropriate Canvas dropbox. Formats allowed: pdf, rtf, word, open office, or plain text. (See *Connections Form* template below for the required info.)
- 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 two Responders) responds to or follows up on the comment.
- In order to get credit for N assignments, you must team up with at least N different people over the course of the 4 weeks. (So I suggest you vary who you team up every week.)
- There are examples on Canvas to give you an idea of how the write up should look.

Menu of options

1. a recent experience that has really impacted you
2. something you're confused, curious, or excited about in class
3. a news story with an interesting, confusing, or problematic use of math (you must explain why)
4. an example of how (lack of) math knowledge is used to trick people
5. an issue in the school, community, or world that really bothers you and/or an idea for improving things in the school, the community, or the world
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:...