

Fall 2022 Math 265.002: Linear Algebra 1
1:00 - 1:50 M-Th, Samuelson 113

Instructor: Dr. Jim Bisgard

Office: Samuelson 221C

Phone: 963-2823

E-mail: bisgardj@cwu.edu

Office Hours: M-Th 2:00-3:00, F 11:00 - 11:50 and by appointment, in-person or Zoom

Course Goals: Math 265 is a first course in linear algebra. We will begin by investigating situations where matrices arise, and how we can use matrices to encode information about a variety of structures, such as graphs, networks, and Markov chains. Next, we will learn about how to do algebra with matrices of various kinds (including column and row vectors), including matrix multiplication, and apply those ideas to the examples of graphs, networks, Markov chains, and data and see how questions involving them can be phrased in terms of matrices. Next, we will learn about linear systems and how many problems can be phrased in terms of linear systems. We will learn about row reduction, row echelon form, Gaussian elimination, its interpretation as a matrix factorization, and determinants. We will then discuss how can these tools can be used to find eigenvalues/eigenvectors. Finally, we will learn about vector spaces, subspaces, spans, linear independence, and dimension.

Text: Notes will be provided, under the Pages tab in Canvas. These notes form a draft of a text, and as such are copyrighted and may not be distributed without my permission.

You will do a lot of writing in this class. Unlike calculus, there will rarely be long calculations with lots of algebra. That makes it important that you describe how you know certain things. In many situations, you will “know” the “right” answer ahead of time, and so the main point is to explain why that answer is in fact correct. This rarely a matter of a simple calculation (although sometimes it is). Notice that explanation involves words, and as a result, solutions that don’t involve any words will never earn full credit!

1 Grades/Quizzes/Homework/Exams

Grades

Grades will be calculated using the following weighting system:

Homework: 45%;

Exams: 55% total, broken up as follows: 15% for each mid-term and 25% for the final.

I will use the following formula to determine your final percentage

$$.45 \left(\frac{\text{total homework points earned}}{\text{total homework points possible}} \right) + .15 (\text{Exam \#1 percentage}) \\ + .15 (\text{Exam \#2 percentage}) + .25 (\text{Final Exam percentage})$$

and then the following scale:

	87 – 89.9 : B+	77 – 79.9 : C+	67 – 69.9 : D+	below 60 : F
93 – 100 : A	83 – 86.9 : B	73 – 76.9 : C	63 – 66.9 : D	
90 – 92.9 : A–	80 – 82.9 : B–	70 – 72.9 : C–	60 – 62.9 : D–	

Homework

Homework will be assigned every week, except for those weeks when we have an exam.

Homework will be assigned on Wednesdays, and due the following Wednesday at 4 pm. I

encourage you to work with other students, but you should write up your solutions in your

own words. **DO NOT COPY!** Because life is likely to happen to all of us this quarter, your lowest homework score will be dropped. There will be a homework assignment due during the last week of class.

Submitting Work Electronically: Homework for this course will be submitted electronically through Canvas.

1. Homework may only be submitted in .pdf format, and your submission must consist of a **SINGLE PDF FILE**. That is: you may **NOT submit a separate file for each page of your work! You must combine all parts of your submission into a single pdf prior to submission!** Your submission must be less than 20 MB, and fewer than 15 pages. Submissions that do not meet these guidelines will earn zero points.
2. If you choose to hand-write your homework, you have a couple of options for submission:
 - (a) You can scan it to a PDF document using a cell phone camera. Some apps that do this (there are many others if you don't like these): Adobe (free) or CamScanner (free version) for Android phones; the Notes App (built-in) or CamScanner (free version) for iPhone.
 - (b) You can take a well-lit, in-focus photograph, insert it into a Microsoft Word or OpenOffice Writer document (making sure that the photo is oriented correctly and easy to read), and then save the document as a .pdf file for upload to Canvas.

Whichever method you choose, please double-check that your image is oriented correctly. Images not oriented correctly, images that are not well-lit, or images that are out of focus will lead to the assignment being returned without being graded.

Late Policy for Homework

Homework will be due at 4 pm on Wednesdays. Homework submitted after 4 pm on its due date will have 5 points deducted, and 5 more points will be deducted every 24 hours after. That means: if you submit a quiz at 4:30 pm on Wednesday, you can earn at most 20 out of 25 on that quiz. If you submit your homework Thursday at 4:30 pm, you can earn at most 15 out of 25, since over 24 hours will have passed. In addition, no credit can be earned for homework submitted after graded work is returned to the class. This will typically be before class on Monday.

Exams

There will be three exams: two mid-terms and a final, which will be done in person. The first mid-term will be in class Tuesday, October 18. The second mid-term will be in class Tuesday, November 8. The Final Exam is Wednesday, December 7, from noon to 2 pm. The Final Exam will be cumulative. If you are unable to take an exam in the allotted time frame, you may be eligible for a make-up. To get a make-up, you must notify me before the exam (if possible) or within 24 hours after the exam that you will not be able to take it. In addition, a make-up is only allowed if you have proof of a compelling reason for having missed the exam. Make-ups will not be given for circumstances you know about ahead of time! When a make-up exam cannot be taken before I return the corrected exam, I reserve the right to instead replace that portion of your course grade with your final exam grade. These considerations also apply to the final: **IF YOU MISS THE FINAL BECAUSE YOU OVERSLEPT OR HAVE THE WRONG DATE OR TIME, YOU DO NOT GET A MAKE-UP FINAL!**

2 Important Dates

September 27 - Last Day for Add/Drop

October 18 - first mid-term exam
November 7 - uncontested withdrawal deadline
November 8 - second mid-term exam
December 7, noon to 2 pm - final exam

3 General Class Policies

Come to class — attendance is considered necessary for success! You are responsible for all material covered in class, even from days that you are unable to attend! Do your own work. Work really hard; this class is likely to be quite difficult, but you will leave it with a useful set of skills that will be applicable in your future math and computer science courses.

Face Coverings: Please note that if you wish to come to office hours or an appointment at my office, you **MUST** wear a face-covering. If this is not an option, we can instead meet virtually using Zoom.

Class Recordings: Attendance is considered mandatory, and you should plan to attend on an ongoing basis. Because of the ongoing pandemic, class will be recorded and posted on Canvas. It will not be edited, and I may point to portions of the board that aren't in the view of the camera. (Everybody in class is able to see the entire board, unlike the restricted viewing angle of the camera.) We all benefit from the conversations in-class, and they will be richer for having you there! One of the points of attending classes is to have an expert in the content area provide you with guidance in that content area, and be able to respond to any questions you may have. In addition, we may have some period of class where you will work with your neighbor to solve problems. If you do not attend, you miss out on the substantial benefit these small group interactions provide.

Academic Honesty: The integrity of students and their written and oral work is a critical component of the academic process. Consult university policies (CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

Inclusivity Statement: As a member of a peer learning community, a high degree of professionalism is necessary. **CWU expects every member of the university community to contribute to an inclusive and respectful culture across its entire campus including within its classrooms, offices, and at all campus events.**

Classroom Conduct: Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct, obstructive conduct, or harassment (see definitions from the Washington Administrative Code: WAC 106-125-020) will be referred to the Dean of Student Success. Refusal to wear a face-covering will be considered disruptive conduct.

Disability Support Services: Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, DS@cwu.edu

Religious Obligations and Schedule Conflicts: In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their

instructor *within the first two weeks of class* listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

Switching to Online: If I need to quarantine during the quarter or if CWU decides that the safest way to conduct classes is completely online, class will be run as a synchronous online course, which will meet at its regularly scheduled day and time using Zoom. In this case, I will send all enrolled students a Zoom link and post it to Canvas.

I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.