



## MAT 253 – Linear Algebra

### COURSE OUTLINE

**Class Section(s) Time & Location: MWF 9:00am – 9:50 ZOOM**

<https://ccac.zoom.us/j/94004722275?pwd=UEQ1Zy9BRGxibTJrZ29vUi9TbmRkZz09>

Password: 808571

Instructor:	Kathleen Kane	Semester:	Fall 2020
Office Hours:	MWF 11:30am -12:30 pm TR 8:00am – 9:00 am	Office Location:	Zoom – Link posted on Blackboard
Instructor Contact Methods:	Email: <a href="mailto:kkane@ccac.edu">kkane@ccac.edu</a> - Preferred Phone: (412) 237-4511 – Messages are forwarded via email.		

Books & Materials	Elementary Linear Algebra: Applications Version by Howard Anton and Chris Rorres, 11 <sup>th</sup> edition 9781118434413
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Course Credits:	3 credits
Prerequisites/ Co-requisites:	Prerequisite: MAT 202 or equivalent Co-requisites: None
Course Description:	This introductory course focuses on the theory and techniques of linear algebra. Topics include vectors in $n$ – dimensional space, matrix theory, systems of linear equations, vector space theory, linear transformations, eigenvalues, eigenvectors, and inner product spaces.
Learning Outcomes:	Upon successful completion of the course, the student will: <ol style="list-style-type: none"><li>1. Perform basic operations with vectors in <math>n</math> – dimensional space.</li><li>2. Perform basic operations with matrices.</li><li>3. Solve a system of <math>m</math> linear equations in <math>n</math> unknowns.</li><li>4. Prove basic theorems in a vector space.</li><li>5. Perform basic operations with vectors in the standard matrix spaces and function spaces.</li><li>6. Find the matrix representation of a linear transformation between two vector spaces.</li><li>7. Find eigenvalues and eigenvectors for a given matrix.</li><li>8. Perform basic operations in an inner product space.</li><li>9. Prove basic theorems in an inner product space.</li></ol>

General Education Goal(s)	How this course meets the General Education goal(s)?
Quantitative Reasoning and Problem solving	Students will work to develop competency in the computations involved in the study of linear algebra. Additionally, they will develop logical reasoning skills by interpreting the results to show conceptual understanding of the theorems presented.
Critical Thinking and Problem Solving	Students will work to develop competency in the computations involved in the study of linear algebra. Additionally, they will develop logical reasoning skills by interpreting the results to show conceptual understanding of presented.

### Course Policies & Procedures

Evaluation Plan:	<p>The grade will be determined based on the following:</p> <ol style="list-style-type: none"> <li>1. Assignments (10%)</li> <li>2. Tests (70%)</li> <li>3. Comprehensive Final Exam (20%)</li> </ol> $\text{Grade} = 0.10(\text{Assignment Average}) + 0.70(\text{Test Average}) + 0.20(\text{Final Exam Average})$ <p>The grade will be assigned according to the following scale: 90 - 100 A, 80 – 89 B, 70 – 79 C, 60 – 69 D, 0 - 59 F</p> <p><b>THERE IS NO EXTRA CREDIT!</b> <b>THE GRADES WILL NOT BE CURVED!</b> <b>YOU GET WHAT YOU EARN!</b></p> <p>At any point, students can view their current grade on the Blackboard Website under the “My Grades” tab. Please alert the instructor if anything is recorded incorrectly.</p>
Attendance:	<p>Students are expected to attend ALL scheduled classes. Attending class means the following: Joining the Zoom meeting a few minutes before the start of class, so that you can be admitted on time and staying logged in for the entire meeting. You should treat a Zoom class the same as an in person class. Pay attention, take notes, and ask questions. If a student misses a scheduled class, it is their responsibility to learn what was covered in class. Please be advised that the material in the textbook may not completely cover the lecture material. Additional topics, explanations and solution techniques may be covered in class.</p>

<p>Test and/or Quiz Makeup:</p>	<p>There will be tests given throughout the semester and a comprehensive final given during the final exam period. The date of each test and the material it covers will be announced in class at least one week ahead of time. The final exam time will be determined by the college schedule and will be announced as soon as it becomes available.</p> <p><b>Tests will be given via Zoom. It will be your responsibility to set up your testing area with proper testing conditions. You should be alone in the room and have a solid writing surface such as a table or a desk. Your workspace should be well lit and should contain only items to be used for the test: blank paper, acceptable calculator, and pencil/pen. To the extent possible, control the distractions in your testing area – have your pet in another room, ask family members/roommates to turn off or lower the volume on the TV/Radio/Stereo, etc. Your head, hands, and workspace must be visible on camera at all times. If you wear a hat during the test, please wear it backward, so that the bill of the hat is not shielding your face. Failure to comply with the testing regulations will result in a grade of zero for the test.</b></p> <p><b>You will be provided the test questions by one of the following two options:</b></p> <ul style="list-style-type: none"> <li>• <b><u>Option 1:</u></b> If you have a printer and wish to have a paper copy of the test, email me on the morning of the test before 9:50 am. At 9:50 am on the morning of the test, I will start replying to the emails and sending the test. You will have 10 minutes to print out the test and join the Zoom meeting with the test in view. Failure to join the Zoom meeting by 10:00 am will be considered cheating and you will receive a grade of 0 on the test.</li> <li>• <b><u>Option 2:</u></b> If you do not have a printer or if you prefer, the test questions will be displayed on the screen via the shared screen feature on Zoom.</li> </ul> <p><b>I will post an announcement on Blackboard before each test reminding you to indicate your choice in a timely manner. If you fail to indicate a choice by the deadline, Option 2, above, will be your choice.</b></p> <p><b>You will write the answers and all supporting work on blank paper that is NOT part of any kind of notebook. You will be asked to show your paper to the screen before the start of the test to verify that it is blank.</b></p>
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	<p><b>At the conclusion of the test, you will be required to scan your work into a SINGLE PDF and submit it via Blackboard. Details on this process can be found on Blackboard and practiced as a homework assignment during the first week. After you complete the test, you will have 10 minutes to complete this process and must stay on Zoom until it is confirmed that your test is submitted.</b></p> <p><b>You will be given fifty minutes each test and 10 minutes to submit the test.</b></p> <p>Cheating of any type will not be tolerated. Anyone caught cheating will be subject to punishments described in the student handbook.</p> <p><b>Make up tests will not be given for any reason, including being on vacation. If you miss a test, regardless of the reason, your final exam grade will be used in place of the missing test score. This will be done one time only during the semester. Any subsequent missed tests will receive an automatic zero. There are no exceptions.</b></p> <p><b>There is no make up for the final exam and failure to take the exam will result in an automatic F. There are no exceptions.</b></p>
Technology Use:	<p>You must have reliable internet access and technology that supports Zoom. You will not be required to have your camera on during class, but you will be required to have the camera on during testing. Lectures will be recorded and posted on Blackboard. Office hours will also be conducted via Zoom. Office hour sessions will not be recorded. If you wish to discuss issues regarding your grade or performance in the course, please wait until you are alone in the Zoom. Additionally, it will be your responsibility to secure privacy at your location – that is, make sure that your parent, roommate, spouse, etc are not able to over hear conversations regarding the class that you wish to keep private.</p> <p>Students are prohibited from separately recording classroom lectures or activities conducted on Zoom. Students are further prohibited from sharing, distributing or disclosing recordings made available to any third part not enrolled in the course.</p> <p>You will be required to sign in using your full name as it appears on the class roster. Use of a nickname or a pseudonym is prohibited. Students who choose to use a preferred name that might not be reflected in the official class roster should review and follow the “Chosen First Name Procedure” set forth in the CCAC Student Handbook.</p>
Academic Honesty:	<p>Cheating of any type will not be tolerated. Anyone caught cheating will be subject to the policies and procedures described in the student handbook.</p> <p>Academic dishonesty (cheating) includes, but is not limited to:</p>

	<ul style="list-style-type: none"> <li>• Having unauthorized material in your testing area. The only items in front of you should be a calculator that does not symbolically do calculations such as derivatives and integrals, blank sheets of scratch paper, and a writing utensil.</li> <li>• Not showing the front and back of your scratch paper to the webcam. Scratch paper consists of single sheets of paper and may not be in a notebook.</li> <li>• Not performing an adequate environmental scan. Your scan should show your entire surroundings, including your workspace and the area around it.</li> <li>• Tampering with video or sound recording during your exam.</li> <li>• Having someone else present in the room used while testing.</li> <li>• Leaving your seat during the test.</li> <li>• Collaborating with anyone regarding the exam.</li> <li>• Anything considered cheating in an in-person test.</li> <li>• Altering your scratch paper after the exam ends. The only changes you are allowed to make is putting your name on the scratch and numbering the problems in the appropriate areas.</li> </ul> <p>By the taking the exam, you agree to these guidelines. Failure to abide by them will result in a grade of zero.</p>
Other Policies and Procedures:	<p>Zoom classes are meant to mimic live in person classes to the extent possible. As such, behavior befitting a college classroom is expected at all times. If you have your camera on during a class session or testing session, please make sure that you dress appropriately.</p> <p>Homework will be assigned via WebAssign. The due dates will be indicated on each assignment.</p>
Resources:	<ul style="list-style-type: none"> <li>• Instructor office hours via Zoom</li> <li>• Math Café available via Zoom</li> <li>• EBook</li> <li>• Help offered in WebAssign</li> </ul>
	<p>All students are expected to read and comply with the policies and regulations set forth in the CCAC Student Handbook, including without limitation the College's policies regarding academic and behavioral conduct, the procedures for requesting an accommodation based upon a disability, pregnancy or pregnancy related condition, or a religious observance, and for reporting unlawful discrimination and harassment.</p> <p>The Student Handbook is available to view and download from the College's website at the following</p>

	<p>URL: <a href="https://www.ccac.edu/policies">https://www.ccac.edu/policies</a>.</p> <p>The full text of the College's <i>Policy Manual</i>, <i>Administrative Regulations Manual</i>, and the Civil Rights Complaint Procedure can also be viewed and downloaded at: <a href="https://www.ccac.edu/policies">https://www.ccac.edu/policies</a>. Information concerning the process and documentation required to request a disability-related accommodation can be obtained by contacting the campus' Office of Supportive Services for Students with Disabilities (OSSSD) or by visiting the OSSSD information page at <a href="https://www.ccac.edu/policies">https://www.ccac.edu/policies</a>.</p> <p>Students are reminded that they can access their course information and CCAC email account, the CCAC Academic Calendar (including add/drop/withdrawal deadlines), the Student Handbook, the College's Incident Report form, and many other College services through the MyCCAC portal at: <a href="https://my.ccac.edu">https://my.ccac.edu</a>.</p>
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Course Plan:

Class Week/Date	Topics / Learning Activities	Assignments / Homework	Tests, Quizzes, Evaluations
Week 1 8/17 – 8/23	Introduction Section 1.1 Section 1.2	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 2 8/24 – 8/30	Section 1.3 Section 1.4 Section 1.5	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 3 8/31 – 9/6	Section 1.6 Section 1.7	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 4 9/7 – 9/13	9/7 Labor Day Section 1.8 Test 9/11	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 5 9/14 – 9/20	Section 2.1 Section 2.2 Section 2.3	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 6 9/21 – 9/27	9/23 Test Section 3.1 Section 3.2 Section 3.3 Section 3.4	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 7 9/28 – 10/4	Section 3.5 Test 10/2	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 8 10/5 – 10/11	Section 4.1 Section 4.2	Attend Zoom Classes and do homework	See Announcements in Blackboard.

Week 9 10/12 – 10/18	Section 4.4 Section 4.5	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 10 10/19 – 10/25	Section 4.6 Section 4.7 Section 4.8	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 11 10/26 – 11/1	Section 4.9 Section 4.10	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 12 11/2 – 11/8	Test 11/2 Section 5.1 Section 5.2	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 13 11/9 – 11/15	Section 6.1 Section 6.2	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 14 11/16 – 11/22	Section 6.3 11/20 Test	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Week 15 11/23 – 11/29	<b>Thanksgiving Break</b>	Review and start to study for final	
Week 16 11/30 – 12/6	Section 8.1 Section 8.2 Section 8.3	Attend Zoom Classes and do homework	See Announcements in Blackboard.
Last Class and Final Exams 12/7 – 12/13	Section 8.4 Comprehensive Final Exam according to college schedule	Attend last Class Study for final	Study for final Take final Enjoy your break!

#### Course Outline Corrections:

During the semester/session, reasonable changes to the course outline may be academically appropriate. Students will be notified of these adjustments by the instructor in a timely manner.