MA 305 Introductory Linear Algebra and Matrices

Lecture Details
Section 002 | MTWThF 11:40am-1:10pm, SAS 1220
Instructor: Suzanne Crifo | LAU 208 | secrifo@ncsu.edu | https://secrifo.wordpress.ncsu.edu/
Office Hours: Tuesday, Wednesday, Thursday 10-11am, and by appointment
Class Website: https://moodle-courses1920.wolfware.ncsu.edu/course/view.php?id=955

Course Text and Materials

- *Linear Algebra and Its Applications* by Lay, Lay, and McDonald (5th ed., or older) $147.55 for used from the bookstore.

- We will also be using WeBWork, a free online service, for most homework assignments.

Prerequisites
MA 241, or MA 231 & MA 132

Catalog Description
3 credit hours. The course is an elementary introduction to matrix theory and linear algebra. Emphasis is given to topics that will be useful in other disciplines, including systems of equations, Euclidean vector spaces, determinants, eigenvalues and eigenvectors, linear transformations, similarity, and applications such as numerical solutions of equations and computer graphics. Compares with MA 405 Introductory Linear Algebra, more emphasis is placed on methods and calculations. Credit is not allowed for both MA 305 and MA 405.

Course Structure
This course is mainly lecture based. "Lecture" in this context includes material presented by the instructor, material presented by the students, class discussion, and both group and individual in-class practice and exploration. Your participation is a necessary component to my teaching style.

Learning Objectives
Upon completion of this course, the successful student will be able to:

1. **Use Mathematical Notation and Terminology.** The students will demonstrate mastery in using the mathematical notation and terminology of linear algebra. Students will read, interpret, and use the vocabulary, symbolism and basic definitions.

2. **Understand and Describe the Fundamental Concepts of Linear Algebra.** Students will identify and apply the theorems about abstract vector spaces and linear transformations; will gain a clear understanding of the basic concepts of linear algebra, such as matrix algebra, linear independence of vectors, certain subspaces, eigenvalues and eigenvectors, and more.

3. **Identify and Utilize Tools from Linear Algebra to Solve a Given Problem.** The students will be able to apply course material along with techniques and procedures covered in this course to solve problems. For example, students will master techniques for solving linear systems by various matrix methods, compute the determinant and the inverse of a square matrix, calculate and analyze the characteristic equation of a matrix to determine its eigenvalues and eigenvectors. Moreover, students will apply properties and theorems about vector spaces to specific mathematical structures that satisfy the vector space axioms, will analyze the differences and similarities between spanning sets, bases, and orthogonal bases and will use the knowledge gained in this course to determine appropriate methods of proof for specific problems.

Course Policies Mistakes are a necessary component of learning. I encourage you to try, make mistakes, and revise your answers. Each individual is expected to be actively engaged in classroom discussion. "Actively engaged" means sharing input with the entire class and listening when others speak.

Diversity in this classroom is a source of strength and should be respected and appreciated. We must all recognize the value that each individual brings to the class. Any speech or actions that do not serve this sense of community in our classroom will not be tolerated.
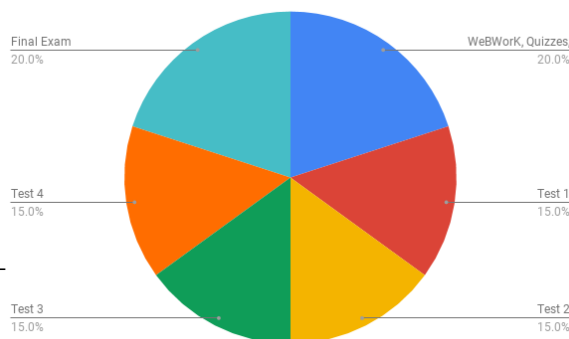
Any behavior that can be deemed distracting to others should be minimized. Please make every attempt to arrive on time for class. If you must arrive late or leave early, do so without disrupting the lesson.

Course Grade: According to NCSU policies, we will use the following grading system:

Grading Scale

97-100	A+	93-96.99	A	90-92.99	A-
87-89.99	B+	83-86.99	B	80-82.99	B-
77-79.99	C+	73-76.99	C	70-72.99	C-
67-69.99	D+	63-66.99	D	60-62.99	D-

Your final grade in this course will be determined by marks earned on the final exam, two midterm tests, online homework assignments, and potentially in class quizzes and written homework. The weighting of these components are as follows:

WeBWorK, Quizzes, and Written Homework = 20 %
Four midterm tests = 60 %
Final Exam = 20 %

WeBWorK, Quizzes, and Written Homework 20% WeBWorK is a free online service. I suggest working through each problem on WeBWorK as if it will be submitted to thoroughly understand the material; you will be required to show all work on exams, and homework is great practice. WeBWorK can be accessed through the Moodle page. I **highly** recommend you start work on homework as soon as we cover the material in class. "Pop" quizzes may occur if I find a WeBWorK problem particularly interesting. I'm very bad at keeping secrets, so you'll have a good idea if a "pop" quiz is coming in the next class period. They will not be more than five or ten minutes long. I encourage collaboration among classmates on homework as long as you maintain academic integrity as defined in the NCSU Code of Student Conduct.

Four Term Tests 60% will be closed-book, closed-notes and cell phones must be off and out of sight. I will provide you with one small card for each test (just ask if you need to rewrite yours and I'll give you another). The reference card **must be handwritten**. You may include any important examples or concepts you're not as comfortable with on this card. Keep in mind that you won't have room for everything and so you should try to internalize as much as you can. The target dates for these tests are *Thursday, May 23, Friday, May 31, Friday, June 7,* and *Friday, June 14.* Each exam will be worth 15% of your final grade. No re-tests will be given. If you miss a test because of an undocumented or unexcused absence, a zero will be entered for that test grade. Students who are unable to take the test at those times (with a documented excuse cannot, not just that you don't want to) will schedule an alternate time to take the exam.

Final Exam 20% is mandatory, cumulative and will be held in the usual classroom on Wednesday, June 19, 2019, 1:00-4:00 PM.

Corrections to Grading

If you believe an error has been made in grading on a test write a statement making your case and bring it to me. I will give partial credit where appropriate. You have *1 week after the test is returned* to request re-grading. Do not alter the original work!

Test Make-Up Policy

All *anticipated absences* must be excused in advance of the test date. These include university duties or trips (certified by an appropriate faculty or staff member), required court attendance (certified by the Clerk of Court), or religious observances (certified by the Department of Parent and Family Services 515-2441). *Emergency absences* must be reported as soon as possible once returning to class and must be appropriately documented (illness by an attending physician or family emergencies by Parent and Family Services). If you are sick on a test day and decide not to come to class, go to the health center or other medical facility. Students who miss a test and have a university-approved excuse must submit appropriate documentation.

Attendance is expected every day as it is critical for the understanding of the material and not attending class serves as its own penalty because this material takes much longer to learn independently. You are responsible for keeping up with missed work so that you do not fall behind. Attendance will be taken at all classes, but does not count towards the course grade. However, if you have **fewer** than 3 total absences (excused/unexcused) and attend all tests, the final exam score will replace your lowest midterm score (if beneficial).

Getting Help

My official office hours are designated solely for your class. Please come in or contact me with any questions as they arise. It is better to come each day for even five minutes with any new questions than only the day before the test with confusion about an entire unit. If you find that my office hours are inconvenient or impossible with your schedule, contact me to set up an appointment.

Use your classmates! If you need clarification on a topic, a different explanation from a peer is often helpful. If you feel you understand a topic really well and someone asks you for help, try explaining it. The process of organizing your thoughts to explain to someone else will not only help you learn to communicate mathematically, but also solidify the concept or expose any holes in your understanding. I will set up a Q&A forum on Moodle to facilitate this cooperation. The following statement is included since Moodle is a component of our course:

> "Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course."

The Math Multimedia Center is a tutorial center for undergraduate students that need help in their mathematics courses (100- through 300-level), and is staffed by math graduate students familiar with the material taught in these courses.

> Location: SAS Hall 2103/2105
> Hours: Monday - Friday 8:00 am - 5:00 pm

You can also get help with your courses (not only math) at the NCSU Undergraduate Tutorial Center.

Add/Drop Regulation

Undergraduate students are expected to complete all courses for which they are enrolled as of census date (the official enrollment date defined as the 10th day of fall and spring terms and the 3rd day of summer terms). Undergraduate course drops after census date will now be considered to be course withdrawals and will result in W grades on the transcript. Undergraduates will be limited to a maximum of 16 hours of course withdrawals after census date and before the drop date June 3, 2019 for their entire undergraduate career at NC State. These course withdrawals will count as attempted hours for course repeat, financial aid satisfactory academic progress, and tuition surcharge calculations.

Students with Disabilities

"Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.1)"

Student Evaluations

Online class evaluations will be available for students to complete during the last three weeks of classes. You will receive an email message directing you to a website where you can login using your Unity ID and complete the evaluation. All evaluations are confidential; instructors will not know how any one student responded to any question, and students will not know the ratings for any instructors. We may also have mid-semester evaluations to determine if instruction should change in any way to meet students' needs.

Academic Integrity Statement and Academic Dishonesty
Both faculty and students at North Carolina State University have a responsibility to maintain academic integrity. An informational brochure about academic integrity is available from the university and students are encouraged to obtain a copy. Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

> "Academic dishonesty is the giving, taking, or presenting of information or material by a student that unethically or fraudulently aids oneself or another on any work which is to be considered in the determination of a grade or the completion of academic requirements or the enhancement of that student's record or academic career." (NCSU Code of Student Conduct)

Scholarly activity is marked by honesty, fairness and rigor. A scholar does not take credit for the work of others, does not take unfair advantage of others, and does not perform acts that frustrate the scholarly efforts of others. The violation of any of these principles is academic dishonesty. Penalties for a violation: For the first violation, you will receive a zero for your work and be put on academic integrity probation for the remainder of your stay at NCSU. The second violation may result in your suspension from NCSU. Both situations will involve the Office of Student Conduct.

Non-Discrimination Policy
NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at http://policies.ncsu.edu/policy/pol-04-25-05 or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

MA 305 Tentative Schedule

Week	Topics	Special Notes	WeBWorK
5/15 - 5/17	Introduction & Chapter 1		Orientation due 5/16, HW1 due 5/17
5/20 - 5/24	Chapters 2 & 3	Test 1 on 5/23	HW 2 due 5/22, HW3 due 5/24
5/27 - 5/31	Chapter 4	No Class 5/27, Test 2 on 5/31	HW4 due 5/31
6/3 - 6/7	Chapters 4 & 5	Test 3 on 6/7	HW5 due 6/4, HW6 due 6/7
6/10 - 6/14	Chapters 6 & 7	Test 4 on 6/14	HW7 due 6/14
6/17 - 6/19	Chapter 7	Final Exam on 6/19, 1-4pm	HW8 due 6/19