MATH 330: Linear Algebra I

Course Syllabus · Spring 2023

Course Description	Introduction to linear algebra, including matrices and linear transformations, eigenvalues and eigenvectors.
Course Format	MoWe 2:00–3:20pm, Jan 17, 2023–May 6, 2023 In-Person, KAB 131
Instructor Information	Sungju Moon **Primary Contact:** Use the conversations tool within Canvas **Office Location:** DAW 223 **Phone:** (702) 992-2725 **Email:** Instructors use the Canvas Inbox and announcements to communicate about course-specific topics. All other official College communication is conducted using Nevada State College-issued e-mail addresses (e.g., @students.nsc.edu) in order to comply with the Family Educational Rights and Privacy Act (FERPA). If you need assistance accessing your NSC e-mail account, contact the NSC Support Center at (702) 992-2400, menu option 3, or online at NSC Support Center Links to an external site. For more about this, see the Student Responsibilities page.
Office Hours	Tuesdays 2:30PM–3:30PM, Wednesdays 4:00PM–5:00PM or by appointment *Office hours may be adjusted early into the semester to better accommodate student needs.*
E-mail Response Time	You can generally expect a response to emails within 24-48 hours (or slightly longer over weekends or holidays). Feedback for completed discussions, quizzes, and assignments depends on the length and complexity of the activity and could take up to 10 days. For questions on the status of a completed assignment, discussion, or test please contact me.
Required Text(s)	**Title:** *A First Course in Linear Algebra* **Author:** K. Kuttler **Edition:** Lyryx 2021-A or later **URL:** https://lyryx.com/first-course-linear-algebra/ This is an open textbook, freely available through the above URL:
Required Supplementary Material	Certain assignments (e.g., projects) will require having access to a scientific computing software tool such as Octave or MATLAB. Octave is a free and redistributable alternative to MATLAB. The following options are available: • You can download GNU Octave available at https://octave.org/. • Octave Online can be accessed through your web browser: https://octave-online.net/

- Alternatively, if you already have access to MATLAB, you may also use MATLAB to complete your project assignments.
- If you are familiar with some other scientific computing software tools such as Python, Fortran, etc, you may also complete your project assignments using those upon consulting with the instructor.

Learning Outcomes

This is the first course on linear algebra. By the end of this course, students should be able to:

- do computations involving matrices including Gauss–Jordan elimination, matrix multiplication, computation of determinants, finding eigenvalues and eigenvectors of a matrix.
- explain some theoretical underpinnings of linear algebra that make possible the computations using the language of vector spaces.
- recognize real-life situations where the knowledge of linear algebra is applicable and be able to sketch out/implement simple applications.

Assignment Description & Due Dates

- **Problem Sets (30%):** Problem sets will be assigned on a weekly basis. Your solutions must include every step to get to your final answers and must read as if you are explaining it to a friend. Due dates will typically be within 1 week of the dates assigned. If your assignment is submitted on or before the due date and your initial mark is over 50%, you are allowed to resubmit your work for unlimited number of times until the next exam date. You may work together with other students taking this course, but each student must submit their own work. You may turn in your completed work electronically (typed or scanned) or as a physical copy in person.
- **Quizzes (15%):** There will be 5-minute weekly quizzes at the start of class (mostly on Mondays). A quiz will typically consist of 2 questions. The first question will ask for a definition or the statement of a theorem. In the second question, you will be asked to either come up with an example or provide further explanation pertaining to the above definition or theorem. The first quiz (Quiz 0) is a practice run and therefore will not be counted, and your lowest quiz grade going forward will be dropped from your overall grade.
- **Projects (15%; 5% each):** There will be three project assignments. The tentative due dates are **Wed, Feb 22 (Project 1), Mon, Mar 20 (Project 2), and Mon, Apr 17 (Project 3).** You will be asked to make use of a scientific computing software such as Octave to complete these assignments. Instructions for how to use Octave (or equivalently, MATLAB) will be given in class. Your final submission must consist of a brief report and accompanying source code. You are encouraged to work in a group of 2-3 members, and only one report is required per group. Your submission must also include a short statement disclosing each member's role and contribution.

Exam Description & Due Dates

- **Midterm and Final Exams (20% each):** The exams will take place in person during class time. The tentative dates for the exams are **Mon, Mar 6 (Midterm) and Wed, May 3 (Final).**

Late Policy

When students miss work for medical and/or personal reasons, they should access the Student Absence Notification System.

Problem Sets may be turned in repeatedly for up to full credit until the next exam date if the following condition are met:

1. The assignment was turned in on or before the initial due date, and
2. The initial mark on the assignment is over 50%.

The following assignments may be turned in late for reduced credit until the next exam date:

- Projects

The following assignments may *not* be turned in late without explicit permission from the instructor:

- Quizzes
- Exams

Grading Criteria

Your grade will be determined by the following rubric:
(Course Point Totals)—100%

- Problem Sets (30%)
- Quizzes (15%)
- Projects (15%; 5% each)
- Midterm and Final Exams (20% each)

Notetaker's Advantage: in addition, you may earn up to 1% extra credit for sharing your review notes before each exam. This must be submitted at least 1 week prior to the exam and will be shared anonymously on the course webpage.

Grading Scale (Letter Grade and Point Range):

A	93% or higher	C	73%–76.99%
A-	90%–92.99%	C-	70%–72.99%
B+	87%–89.99%	D+	67%–69.99%
B	83%–86.99%	D	63%–66.99%
B-	80%–82.99%	D-	60%–62.99%
C+	77%–79.99%	F	less than 60%

Accessing Grades and instructor feedback

To access your grades and find all of the instructor's feedback, click on Grades in the course navigation menu on Canvas. Scroll through the list until you find the new graded assignment (indicated by the blue dot to the left of the assignment name). Then click on the assignment name. You will see your grade. Below it you can click on Show Rubric to see the marked up rubric. Click on the paper title if you want to download the original document. (The instructor's marks or comments will not appear on the downloaded document.) Click on the box to the right of the paper title to see the Turnitin report. Click on View Feedback to see the paper marked up with the instructor's comments/corrections in DocViewer. The instructor's feedback is on the right. Accessing Grades will take you step-by-step through how to find all instructor feedback and see the marked-up paper and rubric.

Student Responsibilities

Students are responsible for reading, understanding, and abiding by the policies listed on the Student Responsibilities page and LAS-specific policies, including, but not limited to:

- Americans with Disabilities Act (ADA) Accommodations
- Student Email Policy
- Diversity and Inclusion Statement
- Appropriate Online and Video-Conferencing Behavior
- Video- or Audio-Recording Lectures
- Withdrawing from a Course
- Technical Support and Requirements
- LAS Academic Conduct Policy

Plagiarism, cheating, and copyright infringement

Plagiarism can involve directly quoting, summarizing, or paraphrasing the work of others without specifically citing sources, or handing in work that is not your own. For more on this see the Copyright, Plagiarism, and Citing Sources page.

Cheating can involve deception about your own work or about the work of someone else, and can include unauthorized giving or receiving of information in exams or other exercises or assessments. The use of books, notes, mobile devices, or other reference materials and/or collaboration with other students is strictly prohibited on all quizzes and exams unless specific permissions have been given by the professor. Violating this rule is considered cheating. All assignments, quizzes, and exams, for both in-person and online classes, are to be completed by each student individually, unless otherwise documented by the instructor.

Copyright infringement includes sharing or posting course materials on external websites or other locations; NSC instructors' course materials are their intellectual property and are protected under copyright.

Detailed explanations and examples of plagiarism and cheating can be found in the Academic Standards section of the Student Code of Conduct and Policies. *You are responsible for reading, understanding, and abiding by the Academic Standards.*

The grade of 0 or F may be assigned for any assignment, quiz, or exam in which plagiarism or cheating is discovered; depending on the severity of the incident (including whether the student has previous incidents), a grade of F may be assigned in the course and a Student Conduct charge may be filed. Evidence of such dishonesty will be kept on file, and will not be returned to the student. Instructors have the responsibility to report such incidents to the dean. Serious penalties may be imposed, depending on the nature of the incident.

Turnitin

By taking this course, you agree that all required assignments may be submitted to Turnitin for detecting plagiarism. All submitted papers will be included as source documents in the Turnitin reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin service is subject to the Turnitin End-User License Agreement posted on the Turnitin site. If you do not agree, contact your instructor immediately.

Non-Attendance Enrollment Cancellation

Faculty must report whether students begin attending and participating in the academic content of all courses, including online courses. The Registrar's Office will administratively drop students reported by faculty as not participating by the end of the second week of fall and spring terms (shortened deadlines apply to accelerated terms).

Administratively dropped students will be removed from the course and the course will not appear on their transcripts. The Cashier's Office will reverse all charges related to the course and the Office of Financial Aid will make any necessary adjustments to dropped students' award packages.

For more information, refer to the enrollment cancellation policy.

Students who wish to drop or withdraw from a course remain responsible for doing so through their myNSC student account.

Student Success Resources

At some point in the semester, you may require assistance for a variety of issues. Here is a brief list of helpful resources:

- Academic Advising Center
- Academic Success Center
- Writing Center
- Student CARE Team
- Financial Aid Office
- Mental Health Counseling

The Academic Resources page has various academic resources including the academic calendar; disability accommodations; library guides; plagiarism, copyright, and citation information; and veteran concerns.

If life circumstances are making it difficult for you to succeed, please reach out to me and let me know. I am willing to work with you to devise a plan for success or make recommendations for other support services on campus. For example, I may connect you with an Academic Advisor who can develop a personalized success strategy that will keep you on track to graduate and discuss any impacts to your financial aid. You can also contact Academic Advising directly at (702) 992-2160 or at studentsuccess@nsc.edu.

Emergency CARE Services

Emergency CARE Services—If you are struggling with hunger, unstable housing, safety, mental health worries or ANY other concerns, contact case manager, Laura Hinojosa. Together, we can help meet those needs. E-mail: laura.hinojosa@nsc.edu — Call (702) 992-2514 — Website: www.nsc.edu/care

Military & Veterans

Veterans and active duty military personnel with special circumstances are welcome and encouraged to communicate these, in advance if possible, to the instructor. If you are active duty, National Guard, or reserve and will be missing class due to military obligations, I encourage you to submit those absences through the Student Absence Notification Form. For more information regarding this process, please contact Academic Advising at aac@nsc.edu or call (702) 992-2160. For complete information regarding the policy, you can visit the Student Military Leave Policy.

Course Schedule

All Dates are Subject to Change

Agenda	Assignment	Date	Due Dates[†]
Introduction; System of linear equations		Wed, Jan 18	
Gaussian Elimination	Quiz 0 (uncounted)	Mon, Jan 23	
Vectors, linear combination, span		Wed, Jan 25	
Matrix equations $Ax = b$	Quiz 1	Mon, Jan 30	
Applications of linear systems	Project 1: Networks	Wed, Feb 1	
Linear independence	Quiz 2	Mon, Feb 6	
Linear transformations		Wed, Feb 8	
Matrix operations	Quiz 3	Mon, Feb 13	
Invertible matrices		Wed, Feb 15	
No class (Presidents' Day)		Mon, Feb 20	
LU decomposition		Wed, Feb 22	Project 1 due
Partitioned matrices	Quiz 4	Mon, Feb 27	
Applications to computer graphics	Project 2: Graphics	Wed, Mar 1	
Midterm Exam		Mon, Mar 6	Midterm Exam
Determinants: computation		Wed, Mar 8	
Determinants: theory	Quiz 5	Mon, Mar 13	
Cramer's rule		Wed, Mar 15	
Vector spaces	Quiz 6	Mon, Mar 20	Project 2 due
Bases and coordinate systems		Wed, Mar 22	
Inner product and orthogonality	Quiz 7	Mon, Mar 27	
Gram–Schmidt process	Project 3: Least Squares	Wed, Mar 29	
No class (Spring Break)		Mon, Apr 3	
No class (Spring Break)		Wed, Apr 5	
Eigenvalues and eigenvectors	Quiz 8	Mon, Apr 10	
Characteristic equations		Wed, Apr 12	
Diagonalization: computation	Quiz 9	Mon, Apr 17	Project 3 due
Diagonalization: theory		Wed, Apr 19	
Complex eigenstuff	Quiz 10	Mon, Apr 24	
Dynamical systems & Markov chains		Wed, Apr 26	
Review & catch up		Mon, May 1	
Final Exam		Wed, May 3	Final Exam

[†]Not including weekly problem set due dates