

Syllabus

Math 207 Section A: Matrices and Linear Algebra

Spring 2015

3 Credits

Classes: TR 8:00-9:20 in Carver 0001

Instructor: Michael Pollack

Office: Carver 456

Office Hours: MW 2:00-4:00 or by appointment

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Instructor: William DeMeo

Office: Carver 466

Office Hours: MW 12:30-2:00 or by appointment

E-mail: demeo@iastate.edu

Team Teaching: This course has two primary instructors, who design and plan the course together. This is meant to provide multiple perspectives on the course material, as well as more opportunities for contact outside of class. Both instructors have office hours and are available for email questions, regardless of which instructor provided the lecture for the material in question.

Textbook: *Elementary Linear Algebra (Custom Edition)*, by Ron Larson.

Prerequisites: 2 semesters of calculus

Website: Grades: <http://bb.its.iastate.edu>

Online Homework: www.webassign.net

Other: <https://github.com/williamdemeo>

Grade: Homework: 15%

Quizzes: 10%

Two Tests: 45%

Final Exam: 30%

Letter Grades: A: $\geq 91\%$, B: $\geq 81\%$, C: $\geq 71\%$, D: $\geq 61\%$, F: $< 61\%$,

Homework: Online homework will be completed on WebAssign. Instructions to register for WebAssign are found on the Blackboard site. The due date for online homework will be midnight on the Thursday and no late homework will be accepted. The lowest homework score will be dropped at the end of the semester.

Quizzes: There will be quizzes throughout the semester that will take place on Thursdays. No make-up quizzes will be accepted. The lowest quiz grade will be dropped at the end of the semester.

Tests: There will be two tests given. No make-up tests will be accepted. Tentative dates are

Test 1: Thursday, February 19

Test 2: Thursday, April 9

Final: There will be a cumulative final exam. Date and time TBD.

Material:

Chapter	Description
1	Systems of Linear Equations
2	Matrices
3	Determinants
4	Vector Spaces
5	Inner Product Spaces
6	Linear Transformations
7	Eigenvalues and Eigenvectors

Calculators: Calculators will not be allowed on quizzes or tests. All calculations will be doable by hand.

Dead Week: There may be a homework assignment due and a quiz during dead week. These would be announced a week or two in advance.

Disability Accommodations: Iowa State University complies with the American with Disabilities Act and Section 504 of the Rehabilitation Act. If you have a disability and require accommodations, please contact the instructor early in the semester so that your learning needs may be appropriately met. You should contact the Disability Resources office for information on appropriate policies and procedures. The Disability Resources office is located on the main floor of the Student Services Building, Room 1076; phone: 515-294-6624.

MATH 207 Learning Outcomes.

Systems of Linear Equations

- Recognize and set up a system of linear equations
- Perform row operations on a system of linear equations to obtain echelon and reduced echelon forms
- Interpret echelon forms to determine solution sets of systems of linear equations
- Apply systems of linear equations to problems in networking, balancing chemical equations, and other areas

Matrix Algebra and Determinants

- Perform matrix arithmetic operations
- Use determinants to determine if a matrix is invertible
- Use determinants to find the inverse of a matrix if it exists
- Apply augmented matrices to find the inverse of a matrix if it exists

Vector Spaces

- Identify subspaces of n dimensional real space
- Identify subspaces of abstract vector spaces
- Produce a basis for a given vector space
- Verify if a given set is linearly independent, spanning, or both
- Identify the standard subspaces $\text{Nul}A$, $\text{Col}A$, and $\text{Row}A$ for a given matrix A

Linear Transformations

- Give the standard matrix for a given linear transformation
- Interpret matrix multiplication as a composition of linear transformations

- Find change of base matrices and their relationship to a linear transformation
- Relate one to one and onto with $\text{Nul}A$ and $\text{Col}A$ and invertibility

Inner Product Spaces

- Understand orthogonality and magnitude in n dimensional space
- Utilize inner products in abstract vector spaces
- Use an inner product to induce a norm
- Utilize matrices to solve least squares problems

Eigenvalues and Eigenvectors

- Understand the definition of eigenvalues and eigenvectors
- Verify if given scalars are eigenvalues
- Verify if given vectors are eigenvectors
- Use the characteristic polynomial to find all eigenvalues and eigenvectors
- Use the number of eigenvectors to determine if a matrix is diagonalizable