

ARAPAHOE COMMUNITY COLLEGE SYLLABUS

Course Number: MAT 255

Title: Linear Algebra

Credits: 3

Instructor:

Phone:

E-mail:

Office Location (if applicable):

Office Hours (if applicable):

Catalogue Description:

This course includes an introduction to the theory of vector spaces, linear transformations, matrix representations, eigenvalues and eigenvectors.

Prerequisites: MAT 202 (or equivalent)

Text: *Linear Algebra and its Applications*, 3rd ed. Lay, 2008. Addison Wesley Longman

Required Course Material: Text and graphing calculator (TI-86 or TI-89 recommended)

Optional Course Material: Student Solutions manual

Grading Criteria:

Makeup Policy:

Attendance Policy:

Important Dates:

Last day to drop with refund:

Last day to withdraw without refund:

Student Success Center for all ACC students: Peer and professional tutoring in Room M2720 now includes student tutors, math support, and the Writing Center in one location to provide academic assistance for all your classes.

ACC math instructors provide help with concepts, homework, online resources and graphing calculator workshops. Students may watch course related videos and DVDs in the library. For information, contact the Student Success Center at 303-797-5669 or email

Mathhelp@arapahoe.edu

Arapahoe Community College provides accommodations to qualified students with disabilities. To request accommodation, contact Disability Services in M2710 or call (303) 797-5937 v/tty.

Academic Honesty Statement

Arapahoe Community College is committed to academic honesty and scholarly integrity. The College can best function and accomplish its mission in an atmosphere of the highest ethical standards. All members of the College community are expected and encouraged to contribute to such an environment by observing all accepted principles of academic honesty. Academic dishonesty includes but is not limited to: plagiarism, cheating, fabrication, grade tampering, misuse of computers and other electronic technology, and facilitating academic dishonesty. Those found in violation may also be subject to potential disciplinary sanctions under the Arapahoe Community College Code of Conduct.

Online Course Evaluations: As this course nears completion, you will have the opportunity to complete a confidential evaluation of the class online. Login instructions will be sent to your 'student.ccs.edu' e-mail address. Your feedback is important, and ensures that ACC continues to offer quality instruction that meets your needs. Please take time to complete the survey – I appreciate your feedback.

E-mail Communication: Effective 1/20/09 electronic correspondence from ACC employees will go to your student email account *only*. When you activate your account you can forward emails to an e-mail account that you already have. To activate your student e-mail account, go to <http://www.arapahoe.edu> and click on the “Activate Student E-mail” link. Questions? Please call 303-797-5621.

The safety and security of all our students, faculty, staff and visitors is of the utmost importance to the Campus Police Department. We rely on each of you to be an additional set of ears and eyes to help maintain campus safety. Please be diligent in your efforts to report suspicious or unusual behavior or circumstances to the Campus Police Department. Trust your instincts when something doesn't look, seem or feel right and tell someone. The Campus Police can be reached at 303-797-5800 or in M2600 on the second floor behind Information Central. Additional safety information can be found on the website at <http://www.arapahoe.edu/studentsvcs/campuspolice/index.html>

Contact Information for Learning Support Services

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|------------------------------|--------------------|
| Library | M2500 303-797-5090 |
| Technical Support | 797-5700 x3199 |
| Writing Center | M2855 303-797-5830 |
| Advising/Counseling | M2010 303-797-5651 |
| Instructional Testing Center | M2280 303-797-5993 |
| Bookstore | M1200 303-797-5676 |
| Computer Lab | M1650 303-797-5907 |
| Tutorial Services | M2710 303.797.5669 |
| Career Center | M2025 303-797-5805 |
| eLearning | 303-797-5700 x6700 |
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Course Outline:

Matrices and Vectors

Addition and multiplication, properties, identity, inverses, transpose, rank

Systems of Linear Equations

Gaussian elimination, Gauss-Jordan method, echelon form of a matrix, eigenvectors and eigenvalues

Vector Spaces

Zero vector, linear combination of vectors, linear dependence, bases, dot product, norms, angles

Transformations

General transformations, linear transformations, projections, rotations

Determinants

Properties and evaluation

Course Outline:

Ch.1 Linear Equations in Linear Algebra

1.1 Systems of Linear Equations

1.2 Row Reduction and Echelon Forms

1.3 Vector Equations

1.4 The Matrix Equation $Ax = b$

1.5 Solution Sets of Linear Systems

1.6 Applications of Linear Systems

1.7 Linear Independence

1.8 Introduction to Linear Transformation

1.9 The Matrix of a Linear Transformation

Ch. 2 Matrix Algebra

2.1 Matrix Operations

2.2 The Inverse of a Matrix

2.3 Characterizations of Invertible Matrices

2.4 Partitioned Matrices

2.5 Matrix Factorizations

2.7 Applications to Computer Graphics

2.8 Subspaces of \mathbb{R}^n

Ch. 3 Determinants

3.1 Introduction to Determinants

3.2 Properties of Determinants

3.3 Cramer's Rule, Volume, and Linear Transformations

Ch. 4 Vector Spaces

4.1 Vector Spaces and Subspaces

4.2 Null Spaces, Column Spaces, and Linear Transformations

4.3 Linearly Independent Sets; Bases

4.4 Coordinate Systems

4.5 The Dimension of a Vector Space

4.6 Rank

4.7 Change of Basis

4.9 Application to Markov Chains

Ch. 5 Eigenvalues and Eigenvectors

5.1 Eigenvectors and Eigenvalues

5.2 The Characteristic Equation

5.3 Diagonalization

5.4 Eigenvectors and Linear Transformations

5.5 Complex Eigenvalues

Ch. 6 Orthogonality and Least-Squares

6.1 Inner Product, Length, and Orthogonality

6.2 Orthogonal Sets

6.3 Orthogonal Projections

6.4 The Gram-Schmidt Process

6.5 Least-Squares Problems

6.7 Inner Product Spaces

Ch. 7 Symmetric Matrices and Quadratic Forms

7.1 Diagonalization of Symmetric Matrices

7.4 The Singular Value Decomposition