UNIVERSITY OF CALGARY

FACULTY OF SCIENCE
Department of Mathematics and Statistics

Mathematics 211 Linear Methods I

(see Course Descriptions for the applicable academic year: http://www.ucalgary.ca/pubs/calendar/)

Syllabus

Topics	**Number of hours**
Systems of linear equations, Gauss-Jordan elimination, homogeneous systems, rank	3
Vectors in R^2 and R^3 , dot and cross products, projections, lines, planes, area, volumes	9
Matrix transformations in R^2, linear transformations	4
Matrix algebra, transpose, inverses, applications to systems of equations	6
Determinants by row reduction and their properties, application to inversion, area	4
Eigenvalues, eigenvectors, diagonalization	4
Polar coordinates, Complex numbers	4
Selected applications (Markov Chains, economic models, least squares approximation, linear programming)	2
TOTAL HOURS	**36**

Course Outcomes

By the end of this course, students will be fluent in some central techniques of elementary linear algebra, and be exposed to how they apply to problems from various areas of Business, Engineering, Science, and others.

Specifically, by the end of this course, students will be able to:

1. Recognize which techniques of linear algebra that can be useful in solving or provide information to some problems from various areas.
2. Construct a plan on how to approach these problems using the techniques of linear algebra.
3. Execute the proposed plan correctly from the viewpoint of computation and mathematics.
4. Interpret the resulting information in the context of the problem at hand.

Subject specific knowledge

By the end of this course, students will be fluent in the basic techniques of linear algebra and their application.

Specifically, by the end of this course, students will be able to:

5. Generate the general solution of systems of linear equations using the Gaussian algorithm, solve application problems involving systems of linear equations, and show elementary statements concerning the theory of systems of linear equations
6. Perform all the basic algebraic operations on matrices, calculate determinants and show elementary statements concerning the theory of matrices and determinants.
7. Perform all the basic operations on vectors, both algebraically and geometrically, and express relationships among the above concepts.
8. Perform all the basic operations on complex numbers, both algebraically and geometrically.
9. Calculate eigenvalues, eigenvectors and basic eigenvectors, and use these to determine if a matrix is diagonalizable, and if it is, diagonalize it.
10. Solve application problems involving Markov chains and dynamical systems.
11.

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2016:08:10
Calendar Antirequisite note revised 2009:07:01
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