

Math 251 Class Outline
CAMOSUN COLLEGE
MATHEMATICS DEPARTMENT

Calendar Description

This course is restricted to students in the Engineering Bridge (UVic) program. Topics: complex numbers, linear systems and matrices, matrix operations, determinants, vectors in 2-space and 3-space, vector spaces, linear dependence and independence, orthogonality, eigenvalues and eigenvectors and linear transformations. Engineering applications are provided throughout the course.

Course Information

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Organization

OFFERED: 4th Quarter
CREDIT: 3
IN-CLASS WORKLOAD: 6 hours lecture/week
OUT-OF-CLASS WORKLOAD: 6 hours/week

Objectives

To learn the concepts, techniques and applications associated with vectors and matrices.

Text

Howard Anton and Chris Rorres, *Elementary Linear Algebra*, Edition 9, Wiley, 2005.

Evaluation

4 term tests: 50%
Comprehensive final exam: 50%

Percentage to Letter Grade Conversion

Percentage	Letter Grade	Percentage	Letter Grade
95 to 100	A+	70 to 74	B-
90 to 94	A	65 to 69	C+
85 to 89	A-	60 to 64	C
80 to 84	B+	50 to 59	D
75 to 79	B	below 50	F

Recommended Calculator

This course contains detailed information about the use of a calculator in linear algebra. Since this material will be based on the Texas Instruments TI-89 or TI-89 Titanium, it is strongly recommended that students purchase one of these calculators.

Outline**System of Linear Equations and Matrices**

Text(Week)	Hours	Topic
1.1 (1)	read	Introduction to Systems of Linear Equations
1.2 (1)	1	Gaussian Elimination
1.3 (1)	1	Matrices and Matrix Operations
1.4 (1)	1	Inverses; Rules of Matrix Arithmetic
1 July, 2005		Canada Day
1.5 (2)	2	Elementary Matrices and a Method for Finding \mathbf{A}^{-1}
1.6 (2)	1	Further Results on Systems of Equations and Invertibility
1.7 (2)	1	Diagonal, Triangular, and Symmetric Matrices
Total hours	7	

Determinants

Text(Week)	Hours	Topic
2.1 (2)	1	Determinants by Cofactor Expansion
2.2 (2, 3)	2	Evaluating Determinants by Row Reduction
2.3 (3)	2	Properties of the Determinant Function
Total hours	5	

Vectors in 2-Space and 3-Space

Text(Week)	Hours	Topic
3.1 (3)	read	Introduction to Vectors (Geometric)
3.2 (3)	1	Norm of a Vector; Vector Arithmetic
3.3 (3, 4)	2	Dot product; Projections
15 July 2005		Test 1
3.4 (4)	2	Cross Product
3.5 (4)	2	Lines and Planes in 3-Space
Total hours	7	

Euclidean Vector Spaces

Text(Week)	Hours	Topic
4.1 (4)	1	Euclidean \mathbf{n} -Space
4.2 (5)	2	Linear Transformations from \mathbf{R}^n to \mathbf{R}^m
Total hours	3	

General Vector Spaces

Text(Week)	Hours	Topic
5.1 (5)	1	Real Vector Spaces
5.2 (5)	1	Subspaces
5.3 (5, 6)	2	Linear Independence
29 July 2005		Test 2
1 August 2005		BC Day
5.4 (6)	2	Basis and Dimension
5.5 (6)	2	Row Space, Column Space, and Nullspace
5.6 (7)	2	Rank and Nullity
Total hours	10	

Outline (Continued)**Inner Product Spaces**

Text(Week)	Hours	Topic
6.1 (7)	2	Inner Products
6.2 (7, 8)	2	Angle and Orthogonality in Inner Product Spaces
12 August 2005		Test 3
6.3 (8)	2	Orthonormal Bases; Gram-Schmidt Process
6.4 (8)	2	Best Approximation; Least Squares
6.5 (8)	1	Change of Basis
6.6 (9)	1	Orthogonal Matrices
Total hours	10	

Eigenvalues, Eigenvectors

Text(Week)	Hours	Topic
7.1 (9)	2	Eigenvalues and Eigenvectors
7.2 (9)	2	Diagonalization
26 August 2005		Test 4
Total hours	4	

Linear Transformations

Text(Week)	Hours	Topic
8.1 (10)	2	General Linear Transformations
8.2 (10)	2	Kernel and Range
8.4 (10)	2	Matrices of General Linear
Total hours	6	

Additional Topics

Text(Week)	Hours	Topic
5 September 2005		Labour Day
11.1 (11)	1	Constructing Curves and surfaces through Specified Points
9.2 (11)	1	Geometry of Linear Operators on \mathbf{R}^2
Total hours	2	

Complex Vector Spaces

Text(Week)	Hours	Topic
10.1 (1)	1	Complex Numbers
10.2 (1)	1	Division of Complex Numbers
10.3 (1)	1	Polar Form of a Complex Number
Total hours	3	

Lecture	57 hours
Tests	4 hours
Holidays	5 hours
Total	66 hours