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

Instructors:	Drs. Peter J. Trushel and Chi-Ming Leung
e-mails:	trushel@camosun.bc.ca and leungc@camosun.bc.ca
web site:	http://www.camosun.bc.ca/~trushel/math251
web tools:	http://ccins.camosun.bc.ca/~trushel/etc/
Offices:	CBA 151 and CBA 147 Interurban Campus
Phones:	(250) 370-4490 and (250) 370-4448
Office hours:	by appointment or posted

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 8E, Wiley, 1997.

Evaluation

Assignments	10%
Two term tests:	40%
Comprehensive final exam:	50%

Percentage to Letter Grade Conversion

Letter Grade
A+
А
A-
B+
В
B-
C+
С
D
F

Outline

Complex Vector Spaces

Text(Week)	Hours Topic	
10.1 (1)	1	Complex Numbers
10.2 (1)	1	Modulus; Complex Conjugate; Division
10.3 (1)	2	Polar Form; DeMoivre's Theorem
Total hours	4	

System of Linear Equations and Matrices

Text(Week) Hours Topic

read	Introduction to Systems of Linear Equations	
2	Gaussian Elimination	
1	Matrices and Matrix Operations	
2	Inverses; Rules of Matrix Arithmetic	
2	Elementary Matrices and a Method for Finding A^{-1}	
1	Further Results on Systems of Equations and Invertibility	
1	Diagonal, Triangular, and Symmetric Matrices	
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Determinants

Text(Week)	Hou	rs Topic
2.1 (3)	1	The Determinant Function
2.2 (3)	1	Evaluating Determinants by Row Reduction
2.3 (3)	1	Properties of the Determinant Function
2.4 (4)	1	Cofactor Expansion; Cramer's Rule
Total hours	4	

Vectors in 2-Space and 3-Space

Text(Week)	Hour	s Topic
3.1 (4)	1	Introduction to Vectors (Geometric)
3.2 (4)	1	Norm of a Vector; Vector Arithmetic
3.3 (4)	2	Dot product; Projections
3.4 (4, 5)	2	Cross Product
3.5 (5)	2	Lines and Planes in 3-Space
Total hours	8	-

Euclidean Vector Spaces

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

OUTLINE (continued)

General Vector Spaces

Text(Week)	Hours	Торіс
5.1 (6)	1	Real Vector Spaces
5.2 (6)	1	Subspaces
5.3 (6)	2	Linear Independence
5.4 (6, 7)	2	Basis and Dimension
5.5 (7)	2	Row Space, Column Space, and Nullspace
5.6 (7)	2	Rank and Nullity
Total hours	10	

Inner Product Spaces

Text(Week) Hours Topic

6.1 (7, 8)	2	Inner Products
6.2 (8)	2	Angle and Orthogonality in Inner Product Spaces
6.3 (8)	2	Orthonormal Bases; Gram-Schmidt Process
6.4 (8, 9)	2	Best Approximation; Least Squares
6.5 (9)	2	Orthogonal Matrices; Change of Basis
Total hours	10	

Eigenvalues, Eigenvectors

Text(Week)	Hou	rs Topic
7.1 (9)	2	Eigenvalues and Eigenvectors
7.2 (9, 10)	2	Diagonalization
Total hours	4	

Linear Transformations

Text(Week)	Hour	s Topic
8.1 (10)	1	General Linear Transformations
8.2 (10, 11)	2	Kernel and Range
8.4 (11)	2	Matrices of General Linear Transformations
Total hours	5	

Additional Topics

Text(Week)	Hou	rs Topic
11.1 (11)	1	Constructing Curves and sufaces through Specified Points
9.2 (11)	1	Geometry of Linear Operators on \mathbf{R}^2
9.3(11)	1	Least Squares Fitting to Data
Total hours	3	1 0
Lecture		60 hours
Holidays		4 hours

Holidays	4 hours
2 nd Midterm	2 hours
Total	66 hours