Math 251
Matrix Algebra for Engineers

Instructor: Gilles Cazelais
Office: CBA 158 (phone number: 370-4495)
Office hours: `http://pacificcoast.net/~cazelais/schedule.html`
Email address: `cazelais@camosun.bc.ca`
Course web page: `http://pacificcoast.net/~cazelais/251.html`

Textbook
Linear Algebra, A Modern Introduction (3rd Edition) by David Poole.

Calculator Policy
Only scientific calculators are allowed for the tests and final exam. Programmable or graphing calculators are not allowed.

Evaluation
· Three term tests: 50%
· Comprehensive final exam: 50%

To pass the course, a student must get at least 50% on the final exam.

If your term work is at least 50% and you get 60% or higher in the final exam, then you will receive a C in the course even if your overall average is under 60%.

Otherwise, the following percentage conversion to letter grade will be used:

Percentage:	0–49	50–59	60–64	65–69	70–72	73–76	77–79	80–84	85–89	90–100
Letter grade:	F	D	C	C+	B-	B	B+	A-	A	A+

Tentative Schedule

Test 1	October 18	**Test 2**	November 8	**Test 3**	November 29

Final exams are held from December 12 - 20. You must be available at the scheduled time.

Course Outline

1. Vectors
   · The Geometry and Algebra of Vectors (1.1)
   · Length and Angle: The Dot Product (1.2)
   · Lines and Planes (1.3)
   · Exploration: The Cross Product

2. Systems of Linear Equations
   · Introduction to Systems of Linear Equations (2.1)
   · Direct Methods for Solving Linear Systems (2.2)
   · Spanning Sets and Linear Independence (2.3)
   · Applications (2.4)

3. Matrices
   · Matrix Operations (3.1)
   · Matrix Algebra (3.2)
   · The Inverse of a Matrix (3.3)
   · The LU Factorization (3.4)
   · Subspaces, Basis, Dimensions, and Rank (3.5)
   · Introductions to Linear Transformations (3.6)

4. Complex Numbers (Appendix C)

5. Eigenvalues and Eigenvectors
   · Introduction to Eigenvalues and Eigenvectors (4.1)
   · Determinants (4.2)
   · Exploration: Geometric Applications of Determinants
   · Eigenvalues and Eigenvectors of $n \times n$ matrices (4.3)
   · Similarity and Diagonalization (4.4)
   · Applications (4.6)

6. Orthogonality
   · Orthogonality in $\mathbb{R}^n$ (5.1)
   · Orthogonal Complements and Orthogonal Projections (5.2)
   · The Gram-Schmidt Process and the QR Factorization (5.3)
   · Orthogonal Diagonalization of Symmetric Matrices (5.4)

7. Distance and Approximation
   · Least Squares Approximation (7.3)

⋆ ⋆ ⋆