



**School of Arts & Science**  
**MATHEMATICS DEPARTMENT**

**MATH 185-002**  
**Technical Mathematics 1**  
**2008Q1**

## **COURSE OUTLINE**

The Approved Course Description is available on the web @

<http://leungc.disted.camosun.bc.ca/>

Ω Please note: this outline will be electronically stored for five (5) years only.  
It is strongly recommended students keep this outline for your records.

### **1. Instructor Information**

(a)	Instructor:	Chi-Ming Leung		
(b)	Office Hours:	T W TH F 9:00-9:20, 10:30-11:00 T W 14:30-15:20		
(c)	Location:	CBA 147		
(d)	Phone:	4448	Alternative Phone:	
(e)	Email:	leungc@camosun.bc.ca		
(f)	Website:	<a href="http://leungc.disted.camosun.bc.ca/">http://leungc.disted.camosun.bc.ca/</a>		

### **2. Intended Learning Outcomes**

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

Upon completion of this course the student will be able to:

1. Determine the sum, difference, and dot product (inner product) of two vectors. Determine the opposite of a vector. Determine variable components so that two given vectors are equal. Multiply a vector by a scalar.
2. Use the inner product to determine the length of a vector. Geometrically add and subtract vectors. Interpret geometrically the length of vector, scalar multiple of a vector, and opposite of a vector. State and use the properties of inner products.
3. Use inner products to determine the angle between vectors, the projection of vector **b** upon vector **a**, and the area of the parallelogram determined by two vectors.
4. Determine the dimension of a matrix. State and use the axioms of matrices. Add, subtract, and multiply two matrices. Multiply a matrix by a scalar.
5. Determine the inverse of a matrix by the Gauss-Jordan Method and by the Adjoint Matrix method.
6. Solve linear systems using the augmented matrix method, Cramer's Rule and by using inverse matrices.
7. Graph points and vectors in three-dimensions. Apply vector operations to three-dimensional vectors. Calculate the dot and cross product of three-dimensional vectors. Use dot products to find angles between three-dimensional vectors. Use

- the cross product to find the areas of triangles, parallelograms, and the volume of a pyramid.
8. Find the equation of a plane given a point on the plane and the normal to the plane. Find the equation of a plane given three points on the plane. Find the distance from a point to a plane. Find the equation of a line in three space given a point on the line and a vector parallel to the line. Find the equation of a line given two points on the line. Find the equation of a line in vector, scalar parametric, and standard form. Find the equation of the line of intersection of two planes. Find the distance from a point to a line. Find the distance between two lines.
  9. Identify and employ the matrices for reflection, projection, counter clockwise rotation, and dilation and contraction operators in the  $R^2$  and  $R^3$ .
  10. Use linear algebra to construct equations of lines through 2 points, circles through 3 points, and a general conic through 5 points.
  11. Take limits and derivatives of functions using the limit definition. Find the slope of the tangent line to a curve. Use derivatives to determine velocity, acceleration, and rates of change of one variable with respect to another.
  12. Use the power rule, chain rule, product, quotient rule, and implicit differentiation to differentiate polynomial functions, trigonometric functions, logarithm functions and exponential functions.
  13. Find tangents and normal to given functions. Solve problems involving related rates, curve sketching, and applied maximum and minimum problems. Find velocity and acceleration for parametrically defined curves.

### 3. Required Materials

(a) Texts

Allyn J. Washington, *Basic Technical Mathematics with Calculus, SI version*, 8<sup>th</sup> edition, Pearson Education Canada, 2005.

*Matrix Algebra* course materials (available in bookstore).

### 4. Course Content and Schedule

(Can include: class hours, lab hours, out of class requirements and/or dates for quizzes, exams, lectures, labs, seminars, practicums, etc.)

#### Outline

	Section	Topic	Hours
Week 1	V.1	intro/vector concepts	1
	V.2	vector concepts	1
	V.3	dot product	1
	V.4	cross product	1
	V.5	applications - projections	1
Week 2	V.6	Applications – equation of a plane	1
	MA 7.1-7.2	Review 2x2 linear systems - substitution and addition methods	0
		Brief “how to solve systems using augmented systems and rref/Excel	1
	W 23.1	Limits	1
	W 23.2	Slope of Tangent to Curve	1
		<b>Test 1: October 3, Friday</b>	1

Week 3	W 23.3	The Derivative	2
	W 23.4	Instantaneous Rates of Change	1
	W 23.5	Derivatives of Polynomials	1
	W 23.6	Derivatives of Products and Quotients	1
Week 4		<b>Thanksgiving Day</b>	
	W 23.6	Derivatives of Products and Quotients	1
	W 23.7	Derivative of a Power of a Function and Chain Rule	2
	W 23.8	Differentiation of Implicit Functions	1
Week 5		<b>Test 2: October 20, Monday</b>	1
	W 24.1	Tangents and Normals	1
	W 24.2	Newton's Method for Solving Equations	1
	W 24.3	Curvilinear Motion	1
	W 24.4	Related Rates	1
Week 6	W 24.4	Related Rates	1
	W 24.5	Using Derivatives in Curve Sketching	1
	W 24.6	More on Curve Sketching	1
	W 24.7	Applied Max/Min Problems	2
Week 7		<b>Test 3: November 3, Monday</b>	1
	W 24.8	Differentials and Linear Approximations	2
	W 27.1	Derivatives of the Sine and Cosine Functions	1
	W 27.2	Derivatives of the Other Trig Functions	1
Week 8	W 27.3	Derivatives of the Inverse Trig Functions	1
		<b>Remembrance Day</b>	
	W 27.4	Applications	1
	W 27.5	Derivatives of the Log Function	1
	W 27.6	Derivatives of the Exponential Functions	1
Week 9	W 27.7	Applications	1
	MA 8.1	Review of Matrices	1
		<b>Test 4: November 19, Wednesday</b>	1
	MA 8.2	Operations with Matrices	2
Week 10	MA 8.3	Inverse of a Square Matrix	2
	MA 8.4	Determinant of a Square Matrix	1
	MA 8.5	Applications of Matrices and Determinants	1
		<b>Test 5: November 28, Friday</b>	
Week 11		Additional linear algebra topic	2
		Review	3

## 5. Basis of Student Assessment (Weighting)

*(Should be linked directly to learning outcomes.)*

- (a) Assignments      Weekly (with solutions posted)
- (b) Quizzes 5      50% of the Final Mark
- (c) Exams      50% of the Final Mark
- (d) Other (e.g., Attendance, Project, Group Work)

## 6. Grading System

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

### Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

### Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at **camosun.ca** for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. (For these courses a final grade will be assigned to either the 3 <sup>rd</sup> course attempt or at the point of course completion.)
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

## 7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

### LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at [camosun.ca](http://camosun.ca).

## STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED