MATH 260 Applied Multivariable Calculus

Your instructor	**Chi-Ming Leung**
Office	**CBA 147**
Tel.	**4448**
Email	**leungc@ccins.camosun.bc.ca**
Web Page	**http://www.camosun.bc.ca/~leungc/**

Course Description

This course is a component of the Civil Engineering UBC Bridging Program.

Topics: Taylor and Maclaurin series, coordinates and graphs in 3-space, vectors in 3 -space, dot and cross products, planes and lines, quadric surfaces, functions of several variables, graphs, Level curves and surfaces, limits and continuity, partial derivatives, tangent and normal lines, higher order partials, equality of mixed partials, chain rule for higher order partials, approximations, differentials, differentiability, gradients and directional derivatives, implicit functions, extreme values, critical points, classification, extreme value problems on restricted domains , equality constraints, Lagrange multipliers , Newton's method, double integrals, evaluation by inspection , iteration of double integrals , improper double integrals, iteration in polar coordinates change of variable in a double integral, triple integrals, iteration, change of variables, cylindrical coordinates, spherical coordinates, applications of multiple integrals.

Offered:	Quarter 2
Credit:	4
In-Class Workload:	8 hours
Out-of-Class Workload:	8-12 hours
Prerequisites:	Restricted to Civil Engineering Bridging Program (UBC)

Textbook

Calculus (Vol.1 & 2), R. Larson, R. Hostetler and B. Edwards, 7th Edition, Houghton Mifflin Company, 2002.

Evaluation

Assignments: 10% of Final Mark

> Assignment is given on Monday weekly. It is due on the following Monday. No late assignment is accepted. Solutions should be presented in a neat and clear fashion and the paper should be well organized and stapled at the top left corner if there is more than one page. Solutions of most questions will be posted.

Tests: 20% of Final Mark

> There will be 3 midterm tests. There is **NO** makeup (medical excuse must be accompanied by a physician's note). Solutions will be posted.

Final Examination: 70% of Final Mark

The following percentage conversion to letter grade will be used:

0-49	50-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
F	D	C	C+	B-	B	B+	A-	A	A+

Mathlab

Extra help available from assistant at the Interurban Math Lab: TB 142

Outline

Section Hour   Topic

Chapter 1   **Limits and Their Properties**

1.1	0	A Preview of Calculus
1.2	1	Finding Limits Graphically and Numerically
1.3	1	Evaluating Limits Analytically
1.4	2	Continuity and One-Sided Limits

Chapter 2   **Differentiation**

2.4	1	The Chain Rule
2.5	2	Implicit Differentiation

Chapter 4   **Integration**

4.5	2	Integration by Substitution

Chapter 7   **Integration Techniques, L'Hôpital's Rule, and Improper Integrals**

7.1	1	Basic Integration Rules
7.2	2	Integration by Parts
7.3	2	Trigonometric Integrals
7.4	2	Trigonometric Substitution
7.5	2	Partial Fractions
7.6	0	Integration by Table and Other Integration Techniques
7.7	2	Indeterminate Forms and L'Hopital's Rule
7.8	2	Improper Integrals

Chapter 8   **Infinite Series**

8.1	1	Sequences
8.2	1	Series and Convergence
8.3	1	The Integral Test and p-Series
8.4	1	Comparisons of Series
8.5	1	Alternating Series
8.6	1	The Ratio and Root Tests
8.7	1	Taylor Polynomials and Approximations
8.8	1	Power Series
8.9	2	Representation of Functions by Power Series
8.10	2	Taylor and Maclaurin Series

Chapter 9   **Conics, Parametric Equations, and Polar Coordinates**

9.1	0	Conics and Calculus
9.2	2	Plane Curves and Parametric Equations
9.3	2	Parametric Equations and Calculus
9.4	2	Polar Coordinates and Polar Graphs
9.5	2	Area and Arc Length in Polar Coordinates
9.6	1	Polar Equations of Conics and Kepler's Law

Chapter 10   Vectors and Geometry of Space

10.1	0	Vectors in the Plane
10.2	0	Space Coordinates and Vectors in Space
10.3	1	The Dot Product of Two Vectors
10.4	1	The Cross Product of Two Vectors in Space
10.5	1	Lines and Planes in Space
10.6	1	Surfaces in Space
10.7	1	Cylindrical and Spherical Coordinates

Chapter 11   Vector-Valued Functions

11.1	1	Vector-Valued Functions
11.2	2	Differentiation and Integration of Vector-Valued Functions
11.3	1	Velocity and Acceleration
11.4	1	Tangent Vectors and Normal Vectors

Chapter 12   Functions of Several Variables

12.1	0	Introduction to Functions of Several Variables
12.2	2	Limits and Continuity
12.3	1	Partial Derivatives
12.4	2	Differentials
12.5	2	Chain Rules for Functions of Several Variables
12.6	2	Directional Derivatives and Gradients
12.7	1	Tangent Planes and Normal Lines
12.8	2	Extrema of Functions of Two Variables
12.9	1	Applications of Extrema of Functions of Two Variables
12.10	2	Lagrange Multipliers

Chapter 13   Multiple Integration

13.1	1	Iterated Integrals and Area in the Plane
13.2	2	Double Integrals and Volume
13.3	2	Change of Variables: Polar Coordinates
13.4	1	Centre of Mass and Moments of Inertia
13.5	1	Surface Area
13.6	1	Triple Integrals and Applications
13.8	2	Change of Variables: Jacobians
13.7	2	Triple Integrals in Cylindrical and Spherical Coordinates

Lecture: 80 hours   Test: 4 hours   Leeway: 4 hours   Total: 88 hours

Office hours: As posted or by appointment

Jan 04, 2005 ---March 18, 2005

	Monday	Tuesday	Wednesday	Thursday	Friday
08:30-09:20	MATH 260 CC 104	MATH 260 TEC 175		MATH 260 CC 104	MATH 260 CC 104
09:30-10:20	MATH 260 CC 104	MATH 260 TEC 175		MATH 260 CC 104	MATH 260 CC 104
10:30-11:20	Office Hour	Office Hour		Office Hour	Office Hour
11:30-12:20	Office Hour			Office Hour	Office Hour
12:30-13:20	MATH 162 TEC 174			MATH 162 TEC 174	MATH 162 CBA 101
13:30-14:20		MATH 162 TEC 174			
14:30-15:20		Office Hour			
15:30-16:20					