



School of Arts & Science
MATHEMATICS DEPARTMENT

MATH 250B-X01 and X02
Intermediate Calculus 2
2008Q1

COURSE OUTLINE

1. Instructor Information

(a)	Instructor:	Raymond Lai		
(b)	Office Hours:	See the schedule below, or by appointment		
(c)	Location:	Centre for Business and Access (CBA) Room 152		
(d)	Phone:	370-4491	Alternative Phone:	
(e)	Email:	lai@camosun.bc.ca		
(f)	Website:	http://lai.disted.camosun.bc.ca/		

	Monday	Tuesday	Wednesday	Thursday	Friday
07:30-08:20	Office Hour	Office Hour	Office Hour	Office Hour	
08:30-09:20	Math 250B (X01) TEC 177	Math 250B (X01) TEC 177	Math 250B (X01) TEC 177	Math 250B (X01) TEC 177	
09:30-10:20	Math 250B (X02) TEC 177	Math 250B (X02) TEC 177	Math 250B (X02) TEC 177	Math 250B (X02) TEC 177	
10:30-11:20	Office Hour	Office Hour	Office Hour	Office Hour	
11:30-12:20	Office Hour	Office Hour	Office Hour	Office Hour	
12:30-1:20					
1:30-2:20					

2. Intended Learning Outcomes

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

1. Sketch the graph of a function of two variables using contours.
2. Evaluate limits and justify why a limit might not exist.
3. Use differentials to do computations in linear approximation and error analysis.
4. Calculate derivatives using the chain rule for functions of several variables.
5. Calculate partial derivatives implicitly.
6. Solve optimization problems using directional derivatives.
7. Find equations of tangent planes and normal lines to surfaces.
8. Find the relative extrema of a function of several variables.
9. Use the second partials test to determine the nature of relative extrema of a function of two variables.
10. Perform calculations involving the method of least squares.
11. Solve constrained optimization problems using the Lagrange Multiplier method.
12. Evaluate a double integral as an iterated integral.
13. Calculate the area of a plane region and the volume of a solid region using a double integral.
14. Evaluate double integrals in polar coordinates.
15. Calculate the mass, centre of mass and moments of inertia of a planar lamina using double integrals.
16. Find the area of the surface of a solid using a double integral.
17. Find the volume, mass, centre of mass and moments of inertia of a solid region using a triple integral.
18. Evaluate triple integrals in cylindrical or spherical coordinates.
19. Use a Jacobian to change variables in a double or a triple integral.
20. Calculate the curl and the divergence of a vector field.
21. Determine whether a vector field is conservative.
22. Evaluate a line integral, a line integral of a vector field and a line integral in differential form.
23. Perform calculations involving the Fundamental Theorem of line integrals, the concept of independent of path and of conservation of energy.
24. Use Green's Theorem to evaluate a line integral.
25. Represent a surface using a set of parametric equations.
26. Find a normal vector and a tangent plane to a parametric surface and calculate the area of a parametric surface.
27. Evaluate a surface integral as a double integral.
28. Evaluate a surface integral for a parametric surface.
29. Perform calculations using the Divergence Theorem and Stoke Theorem.

3. Required Materials

(a)	Texts	R.E. Larson, R.P. Hostetler and B.H. Edwards, <i>Calculus</i> , Eighth Edition, Houghton Mifflin Co., Boston, 2002.
(b)	Other	Calculator Policy Graphing calculator (such as Texas Instruments TI-89) allowed

4. Course Content and Schedule

Prerequisites MATH 250A

Organization

In-class workload: 4 hours lecture per week

Out-of-class workload: 5 hours per week (or more for students with weak background)

First day of instruction: Monday 22 September 2008

Last day to drop quarter courses (Fee Deadline): Monday 6 October 2008

Last day to withdraw without a failing grade: Monday 10 November 2008

Last day of instruction: 5 December 2008

No class on: Monday 13 October 2008 (Thanksgiving Day), and
Tuesday 11 November 2008 (Remembrance Day)

Course Content

The course will follow the textbook fairly closely, covering the following topics:

Chapter 13 – Functions of Several Variables

- 13.1 Introduction to Functions of Several Variables
- 13.2 Limits and Continuity
- 13.3 Partial Derivatives
- 3.9 Differentials for functions of single variable (review)
- 13.4 Differentials
- 2.5 Implicit Differentiation for functions of single variable (review)
- 13.5 Chain Rules for Functions of Several Variables
- 13.6 Directional Derivatives and Gradients
- 13.7 Tangent Planes and Normal Lines
- 13.8 Extrema of Functions of Two Variables
- 13.9 Applications of Extrema of Functions of Two Variables
- 13.10 Lagrange Multipliers

Chapter 14 – Multiple Integration

- 14.1 Iterated Integrals and Area in the Plane
- 14.2 Double Integrals and Volume
- 14.3 Change of Variables: Polar Coordinates
- 14.4 Center of Mass and Moments of Inertia
- 14.5 Surface Area
- 14.6 Triple Integrals and Applications
- 14.8 Change of Variables: Jacobians
- 14.7 Triple Integrals in Cylindrical and Spherical Coordinates

Chapter 15 – Vector Analysis

- 15.1 Vector Fields
- 15.2 Line Integrals
- 15.3 Conservative Vector Fields and Independence of Path
- 15.4 Green's Theorem
- 15.5 Parametric Surfaces
- 15.6 Surface Integrals
- 15.7 Divergence Theorem
- 15.8 Stoke's Theorem (if time permits)

5. Basis of Student Assessment (Weighting)

Assignment

- A list of suggested exercises from the textbook is provided at the end of this outline.
- Complete solutions will be posted online at the class's website. You can also find a copy of the solution guide on reserve in the library (it contains complete solution for both odd- and even-numbered exercises).

Term Tests

- There will be 5 sixty-minute term tests, one on each of the following weeks:

week 2	week 4	week 6	week 8	week 10
2 Oct	16 Oct	30 Oct	13 Nov	27 Nov

- Complete understanding of the examples discussed in class and the suggested exercises from the textbook will be essential for success on the term tests.
- Complete solutions will be posted online at the class's website.

Final Examination

- The final exam will cover the entire course and will be 3 hours long.
- As stated on page 34 in the current college calendar 2008 – 2009, "students are expected to write tests and final examinations at the scheduled time and place." Exceptions will only be considered due to **emergency** circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.
- Final examination period December 8 – 12, 2008 (specific date, time, and location TBA)

The final grade will be calculated according to the following breakdown:

5 Term Tests	Final Exam.
$5 \times 10\% = 50\%$	50%

Note: For grade inquiry, email your request with your Camosun student ID no.

6. Grading System

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. <i>(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)</i>
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.

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.

How to do well in the course and where to get help

1. Do not skip classes.
2. Start working on the exercises as soon as we finish a section.
3. It is important to understand the principles involved rather than to memorize a method of solution – try variations of questions.
4. Studying in groups is an efficient way to learn mathematics; however, make sure you can solve problems yourself.
5. Extra help available from assistant at the Interurban Math Room: Technologies Centre (TEC) Room 142 (phone: 370-4492). This drop-in centre is freely available for your use to work on math homework and to seek help from the tutor on staff (see hours posted on door).

Suggested examples and exercises to practice from the text

Practice as many exercises as you can (try at least one in every group in each section).

Instead of reading examples in the text, try solving them yourself and compare your answers with the ones in the text.

Chapter.Section	Try at least one in each group (Eg for example and # for exercise)			
13.1	Eg1	Eg2, #21	#(11b, 15b)	Eg(3, 4), #53
	Eg6, #71	#(89 to 92)		
13.2	Eg(1 to 3), #(43, 63, 64)		Eg4, #71	#59
	Eg(5, 6), #(17, 65, 66)			
13.3	Eg(2, 6), #(9, 47, 55, 103, 104)		Eg(4, 5), #(39, 106)	
	Eg(7, 8), #(65, 105)			
3.9	Eg3, #(31, 35, 41)		Eg(4, 5)	Eg7, #44
13.4	Eg1, #1	Eg2, #41	Eg3, #17	Eg4, #30
	Eg5, #45			
2.5	Eg(2, 7), #(11, 15, 47)		Eg(5, 8), #(26, 27, 29)	
13.5	Eg1, #(3, 5)	Eg2, #53	Eg(3 to 5), #(21, 23)	
	Eg(6, 7), #(33, 39)			
13.6	Eg(1, 2), #(5, 17)		Eg(3, 4), #(23, 27, 77 to 80)	
	Eg(5, 6), #(33, 73)		Eg7, #57	
	Eg8, #(11, 37, 81)			
13.7	Eg2, #19	Eg4, #33	Eg 5	Eg6, #49
	#43			
13.8	Eg(1, 2)	Eg(3, 4), #(7, 9, 11, 25, 26, 43, 63, 64)		
	Eg5, #(55, 57)			
13.9	#(1, 2)	Eg1, #(9 to 11)	#7	#13
	Eg2	Eg3, #(28, 29)		
13.10	Eg(1 to 3), #(23, 25)		Eg4, #13	Eg5, #(19, 28)
14.1	Eg2, #(18, 19, 25)		Eg(3, 4, 6), #(33, 35)	
	Eg5, #(41, 43, 45, 47, 61, 62, 79, 80)			
14.2	Eg1, #1	Eg2, #(15, 18, 19)		#53
	Eg(3 to 5), #(27, 28, 39, 75)		#76	
14.3	#14	Eg3, #(15, 18)	Eg2, #(25, 26)	#31
	Eg(4, 5), #(37, 41)		#(53, 54)	
14.4	Eg(1, 2),	Eg3, #(13, 21)	Eg4	Eg5, #(35, 39)
14.5	Eg(1, 2), #(8, 15)		Eg(3, 4), #(16, 18)	
14.6	Eg1, #(3, 4)	Eg2, #(17, 21)	Eg(3, 4), #(27, 28)	
	#(23, 25)	Eg5, #(33, 35, 37, 47)		Eg6, #55
14.8	Eg1, #29	Eg3, #11	Eg(2, 4), #21	#(15, 22)
14.7	#(3, 11)	Eg(1 to 3), #(10, 17, 21, 23)		
	Eg(4, 5), #(13, 14, 31, 33)			

Chapter.Section	Try at least one in each group (Eg for example and # for exercise)		
15.1	Eg(1 to 3)	Eg(4 to 6), #(37, 38, 41)	#(89, 90)
	Eg7, #(43, 69, 71, 91, 92)		Eg8, #55
	Eg9, #(61, 73, 75)		
15.2	Eg1, #(6, 83)	Eg(2 to 5), #(9, 17, 21, 81, 82)	
	Eg(6 to 9), #(37, 41, 57, 84)		
15.3	Eg(2, 3), #29	Eg(1, 4), #(35, 36, 37, 39)	
	Eg5, #(13, 15, 20, 21, 23)		#(47 to 50)
15.4	Eg(1 to 4, 6), #(7, 15, 19, 20, 23, 24)		
	Eg5, #(25, 27, 31, 32, 35, 37)		
15.5	Eg(1, 2), #(6, 7)	Eg(3, 4), #(19, 25, 29)	Eg5, #(32, 33)
	Eg(6, 7), #(36, 39)		
15.6	Eg(1,2), #(4, 5, 7)		Eg3, #11
	Eg4, #(12, 15, 19)		Eg(5, 6), #(27, 29, 30)
15.7	Eg(1 to 4), (#3, 5, 7, 9, 10, 11, 13, 15, 16)		#(17, 18)
15.8	Eg2, #(7, 9)	Eg(1), #(11, 13, 15, 19, 20)	Eg3, #(21, 22)