CAMOSUN COLLEGE	**School of Arts & Science** **MATHEMATICS DEPARTMENT** **MATH 250B (X01 and X02)** **Intermediate Calculus 2** **2014 Quarter 1**

COURSE OUTLINE

The course description is online @ http://camosun.ca/learn/calendar/current/web/math.html

⌖ *Please note: the College electronically stores this outline for five (5) years only.*
*It is **strongly recommended** you keep a copy of this outline with your academic records.*
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

1. Instructor Information

Instructor:	Raymond Lai
Office Hours:	• Monday to Friday: 12:30am – 1:20pm • Drop in, and by appointment
Office Location:	CBA 152
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Website:	http://faculty.camosun.ca/raymondlai/

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: (Optional Reference) Edwards and Penney, *Calculus Early Transcendentals* with student solution manual, Seventh Edition, Pearson Prentice Hall, 2008.

(b) Other: Non-graphing non-programmable scientific calculator

4. Course Content and Schedule

Geometry of Space

Section 1.1 [~ 2 hours] (Reference: section 9.6) Conic Sections
Section 1.2 [~ 1 hour] (Reference: section 11.7) Cylinders and Quadric Surfaces

Partial Differentiation ·

Section 2.1 [~ 1 hour] (Reference: section 12.2) Introduction to Functions of Several Variables
Section 2.2 [~ 1 hour] (Reference: section 12.3) Limits and Continuity
Section 2.3 [~ 2 hours] (Reference: section 12.4) Partial Derivatives
Section 2.4 [~ 2 hours] (Reference: section 12.10) Critical Points of Functions of Two Variables
Section 2.5 [~ 2 hours] (Reference: section 12.5) Multivariable Optimization Problems
Section 2.6 [~ 1 hour] (Reference: section 12.6) Increments and Linear Approximation
Section 2.7 [~ 1 hour] (Reference: section 12.7) The Multivariable Chain Rule
Section 2.8 [~ 1 hour] (Reference: section 12.8) Directional Derivatives and Gradient Vector
Section 2.9 [~ 3 hours] (Reference: section 12.9) Lagrange Multipliers and Constrained Optimization

Multiple Integrals ·

Section 3.1 [~ 1 hour] (Reference: sections 13.1 and 13.2) Double Integrals
Section 3.2 [~ 1 hour] (Reference: section 13.3) Area and Volume by Double Integration
Section 3.3 [~ 2 hours] (Reference: section 13.9) Change of Variables in Double Integrals
Section 3.4 [~ 1 hour] (Reference: section 13.4) Double Integrals in Polar Coordinates
Section 3.5 [~ 1 hour] (Reference: section 13.5) Applications of Double Integrals
Section 3.6 [~ 1 hour] (Reference: section 13.8) Surface Area
Section 3.7 [~ 2 hours] (Reference: section 13.6) Triple Integrals in Rectangular Coordinates
Section 3.8 [~ 2 hours] (Reference: section 11.8) Cylindrical and Spherical Coordinates
Section 3.9 [~ 1 hour] (Reference: section 13.9) Change of Variables in Triple Integrals
Section 3.10 [~ 1 hour] (Reference: section 13.7) Triple Integrals in Cylindrical and Spherical Coordinates

Vector Calculus ·

Section 4.1 [~ 1 hour] (Reference: section 14.1) Vector Fields
Section 4.2 [~ 1 hour] (Reference: section 14.2) Line Integrals
Section 4.3 [~ 2 hours] (Reference: section 14.3) The Fundamental Theorem and Independence of Path
Section 4.4 [~ 1 hour] (Reference: section 14.4) Green's Theorem
Section 4.5 [~ 1 hour] (Reference: section 14.5) Surface Integrals
Section 4.6 [~ 2 hours] (Reference: section 14.5) Parametric Surface
Section 4.7 [~ 1 hour] (Reference: section 14.6) The Divergence Theorem
Section 4.8 [~ 1 hour] (Reference: section 14.7) Stokes' Theorem

Lectures, Reviews, Help Sessions	Tests	Holiday	Total
50 hours	3 hours	2 hours	55 hours

5. Basis of Student Assessment (Weighting)

To get a C or better in the course, you must get 50% or higher in the final exam *and* have an overall average of 60% or higher; your numerical grade will be computed using the following two components, which is then converted to a letter grade using the standard Camosun grade scale (see Grading System (6) below).

- 3 tests (total 50%)
  - Tentatively on 10 October (18%), 7 November (23%), 21 November (9%)
  - Some tests may have a calculator free section that does not allow use of calculator
  - Thorough understanding of the examples discussed in class and the assignments/practices will be essential for success on the term tests.
  - Solutions will be emailed to you.
  - There is no makeup for missed test (except for documented medical reasons)
- Comprehensive Final Exam (50%)
  - During 7 December – 13 December
  - As stated in the college calendar, "Students are expected to write tests and final examinations at the scheduled time and place. … Exceptions, due to emergency circumstances, such as unavoidable employment commitments, health problems, or unavoidable family crisis, require approval of the appropriate instructor. Holidays or scheduled flights are not considered to be emergencies. The student may be required to provide verification of the emergency circumstances."

There is one exception: if your term work is at least 50% *and* you received 60% or higher in the final exam, then you will receive a C in the course *even if* your overall average is under 60%.

Use the table below to record your grades:

	Test 1	Test 2	Test 3	Final	Course
Grade (%)					
x Weight	x 0.18	x 0.23	x 0.09	x 0.50	
	+	+	+	=	

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	*Incomplete*: 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	*In progress*: 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 3rd course attempt or at the point of course completion.)*
CW	*Compulsory Withdrawal:* 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 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 the problems yourself.
5. Extra help available from assistant at the Math Lab located at 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 the door).