

	<p><b>School of Arts &amp; Science</b>  <b>DEPARTMENT of MATHEMATICS and STATISTICS</b>  <b>MATH 250B (X01)</b>  <b>Intermediate Calculus 2</b>  <b>2017 Winter</b></p>
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## COURSE OUTLINE

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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.

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### 1. Instructor Information

Instructor:	Raymond Lai
Office Hours:	Monday and Wednesday 9:30am – 10:20am Tuesday and Friday 10:30am – 11:20am Thursday 12:30pm – 1:20pm
Office Location:	CBA 152
Phone:	250-370-4491
Email:	lai@camosun.bc.ca

### 2. Intended Learning Outcomes

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

1. Differentiate functions of many variables and use chain rules to differentiate composite functions.
2. Compute gradients and directional derivatives.
3. Solve constrained optimization problems using Lagrange multipliers.
4. Set up and evaluate multiple integrals to find areas, volumes, masses, centres of mass, and moments of inertia.
5. Change variables in multiple integrals to cylindrical, spherical, or general coordinates.
6. Compute the divergence and the curl of a vector field, and find the potential function for conservative fields.
7. Set up and evaluate line and surface integrals.
8. Use Green's theorem to evaluate line integrals.
9. Use Stokes' theorem and the divergence theorem to evaluate line and surface integrals.

### 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
48 hours	4 hours	4 hour	56 hours

## 5. Basis of Student Assessment (Weighting)

To get a C or better in the course, you must get an overall average of 60% or higher; your numerical grade will be computed using your grades of the term tests, which is then converted to a letter grade using the standard Camosun grade scale (see Grading System (6) below).

- The four term tests are tentatively scheduled to be on:  
26<sup>th</sup> January (Thursday), 23<sup>rd</sup> February (Thursday), 23<sup>rd</sup> March (Thursday), and  
12<sup>th</sup> April (Wednesday).

- Weight of Test Grades:

Weight	25%	25%	30%	15%	5%
Test Grade	1	2	3	4	Highest of 1, 2, and 3

- Thorough understanding of the examples discussed in class and the assignments/practices will be essential for success on the term tests.
- There is no makeup for missed test (except for documented medical reasons)

## 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](http://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 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).