



**CAMOSUN COLLEGE**  
**School of Arts & Science**  
**Department of Mathematics & Statistics**

**MATH-250B-X01, X02**  
**Intermediate Calculus 2**  
**Winter 2020**

## COURSE OUTLINE

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

$\Omega$  Please note: This outline will *not* be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

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### 1. Instructor Information

(a)	Instructor:	Raymond Lai				
(b)	Office Hours: (also by appointment)	Monday	Tuesday	Wednesday	Thursday	Friday
		Appt.	11:30 – 1:20	12:30 – 1:20	11:30 – 12:20	Appt.
(c)	Location:	CBA 152				
(d)	Phone:	250-370-4491				
(e)	Email:	<a href="mailto:lai@camosun.bc.ca">lai@camosun.bc.ca</a>				
(f)	Website:	<a href="https://sites.camosun.ca/raymondlai/">https://sites.camosun.ca/raymondlai/</a>				

### 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: None
- (b) Other: Non-graphing non-programmable scientific calculator

### 4. Course Content and Schedule

#### Chapter 1: Partial Differentiation

- Section 1.1 [~ 10 hours] Partial Derivatives of Functions of Several Variables and Critical Points of Functions of Two Variables
- Section 1.2 [~ 1 hour] The Multivariable Chain Rule
- Section 1.3 [~ 1 hour] Gradient Vector and Directional Derivatives
- Section 1.4 [~ 3 hours] Lagrange Multipliers and Constrained Optimization

#### Chapter 2: Multiple Integrals

- Section 2.1 [~ 2 hours] Area and Volume by Double Integration
- Section 2.2 [~ 1 hour] Mass, Centre of Mass, and Moment of Inertia by Double Integration
- Section 2.3 [~ 3 hours] Change of Variables in Double Integrals
- Section 2.4 [~ 2 hours] Triple Integrals in Rectangular Coordinates
- Section 2.5 [~ 1 hour] Change of Variables in Triple Integrals
- Section 2.6 [~ 3 hours] Triple Integrals in Cylindrical and Spherical Coordinates

#### Chapter 3: Vector Calculus

- Section 3.1 [~ 1 hour] Line Integrals
- Section 3.2 [~ 2 hours] Potential Function for Conservative Fields and The Fundamental Theorem of Line Integrals
- Section 3.3 [~ 3 hours] Surface Integrals
- Section 3.4 [~ 1 hour] Green's Theorem
- Section 3.5 [~ 1 hour] Divergence Theorem
- Section 3.6 [~ 1 hour] Stokes' Theorem

Lectures, Reviews, Help Sessions	Tests	Holidays and Reading Break	Total
47 hours	4 hours	5 hour	56 hours

## 5. Basis of Student Assessment (Weighting)

Your course grade will be determined by using one of the following two methods:

- (a) If your performance on each of the four term tests is at least 30%, your course grade can be determined 100% by your performances on the term tests using the following weighting – Table 1 (you do not need to write the comprehensive final exam but you can opt in if you want to – see Table 2 below):

<b>Table 1</b>	Test 1	Test 2	Test 3	Test 4
Tentative Date	Jan 31 (Fri)	Feb 28 (Fri)	Mar 27 (Fri)	Civil: Apr 6 (Mon) Mech: Apr 7 (Tue)
Weight	27%	27%	27%	19%

- (b) If you fall short of getting at least 30% in any of the term tests, you will need to write the comprehensive final exam. and your course grade will then be determined using the following weighting – Table 2:

<b>Table 2</b>	Test 1	Test 2	Test 3	Test 4	Comprehensive Final Exam.
Weight	13.5%	13.5%	13.5%	9.5%	50%
	(Term tests together count for 50%)				

The final examination will take place during the period of Apr 14<sup>th</sup> to Apr 22<sup>nd</sup>.

Note:

- 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). Requests for makeup tests due to illness must be supported by your physician's note.
- Regardless of what your term mark is, you can opt in to write the comprehensive final examination (by notifying the instructor with email during the last week of classes and receiving confirmation from the instructor).
- Once you opt in writing the final examination, you cannot go back to use 100% term work for your course grade.
- You can get a better grade or a worse course grade depending on whether your performance in the final examination is better or worse than that in the term, for instance,

	<b>Term Test Minimum</b>	<b>Weighted Term Tests</b>	<b>Final Exam</b>	<b>Course</b>
Student 1	40%	80%	Do not write	80%
Student 2	40%	80%	(Opt in to write) 90%	85%
Student 3	40%	80%	(Opt in to write) 60%	70%
Student 4	40%	55%	(Opt in to write) 75%	65%
Student 5	40%	55%	(Opt in to write) 45%	50%
Student 6	20%	80%	(Need to write) 90%	85%
Student 7	20%	80%	(Need to write) 60%	70%
Student 8	20%	55%	(Need to write) 75%	65%
Student 9	20%	55%	(Need to write) 45%	50%

## 6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

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

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).

## 8. College Supports, Services and Policies



### Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ <http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

### College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

### College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. 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		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. 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 at <http://camosun.ca/about/policies/index.html> 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 are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
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.