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

MATH-250A-DX01
Intermediate Calculus 1
2020 Fall

COURSE OUTLINE

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

Ω *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.*

1. Instructor Information

(a)	Instructor:	Raymond Lai			
(b)	Virtual Office Hours (using Blackboard Collaborate Ultra in D2L):	Monday	Tuesday	Wednesday	Thursday
		9:30am – 10:20am	10:30am – 11:20am,	1:30 pm – 2:20pm	noon – 12:50pm
		Also by email appointment (preferably 24 hours in advance and first come first booked) – check the module "Email Appointment Confirmation" in the D2L Content Page for time available			
(c)	Office Location:	Blackboard Collaborate Ultra in D2L			
(d)	Office Phone:	250-370-4491			
(e)	Email:	lai@camosun.bc.ca			
(f)	Website:	https://sites.camosun.ca/raymondlai/			

2. Intended Learning Outcomes

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

1. Differentiate inverse trig functions.
2. Integrate polynomials, trigonometric and inverse trigonometric functions, and exponential and logarithmic functions.
3. Evaluate limits of indeterminate forms, and calculate improper integrals.
4. Use integration to find area, volume, arc length, surface area of revolution, work, moments and centroids.
5. Integrate using substitution, parts, trigonometric integrals, trigonometric substitution, and partial fractions.
6. Test a sequence for convergence and explain the difference between convergence of a sequence and convergence of a series.
7. Test series for convergence using the integral test, p-test, comparison tests, alternating series test and ratio test and explain the difference between convergence and absolute convergence.

8. Estimate the error in approximating a series using improper integrals and the alternating series remainder.
9. Calculate Taylor polynomials, power series, Taylor series, and MacLaurin series and estimate the error in an approximation using Taylor's Theorem.
10. Determine the interval of convergence of a power series.
11. Graph and analyze parametric and polar curves and find their first and second derivatives.
12. Perform integration computations with parametric and polar curves to compute area, arc-length, volume and surface area.
13. Sketch, differentiate, and integrate vector-valued functions to find velocities, accelerations, tangents, and normals.

3. Required Materials

(a) Course notes (accessible from the course D2L site)
(b) Texts: (Optional Reference) Gilbert Strang, Edwin "Jed" Herman, *Calculus: Volume 1, 2, and 3*, OpenStax, 2016 [all available for free at BCCampus Open Education https://open.bccampus.ca/]
(c) Other: Non-graphing non-programmable scientific calculator.

4. Course Content and Schedule

Chapter 1: Derivative

Section 1.1 [~2 hours]   Basic Differentiation Rules; Tangent Line and Normal Line
                           (Reference: Volume 1 sections 3.3, 3.5, 3.6, 3.7, 3.9; Volume 2 section 2.7)
Section 1.2 [~1 hour]   Derivatives of Inverse Trigonometric Functions (Reference: Volume 1 section 3.7)

Chapter 2: Techniques of Integration and Applications of Integrals

Section 2.1 [~1 hour]   Integration Rules and General Power Rule
                           (Reference: Volume 1 section 4.10; Volume 2 sections 1.3, 1.4)
Section 2.2 [~1 hour]   Integration by Substitution (Reference: Volume 2 sections 1.5, 1.6, 2.7)
Section 2.3 [~4 hours]   Applications of Integrals
                           (Reference: Volume 2 sections 2.1 to 2.6; Volume 3 section 2.3)
Section 2.4 [~1 hour]   Integration of Exponential Functions (Reference: Volume 2 section 2.7)
Section 2.5 [~2 hours]   Inverse Trigonometric Functions (Reference: Volume 2 section 1.7)
Section 2.6 [~2 hours]   Integration by Parts (Tabular Method) (Reference: Volume 2 section 3.1)
Section 2.7 [~3 hours]   Trigonometric Integrals
                           (Reference: Volume 1 section 4.10; Volume 2 sections 1.5, 2.1, 3.2)
Section 2.8 [~2 hours]   Integration of Rational Functions by using Partial Fractions
                           (Reference: Volume 2 section 3.4)
Section 2.9 [~2 hours]   Trigonometric Substitutions
                           (Reference: Volume 1 section 4.10; Volume 2 section 3.3)

Chapter 3: Indeterminate Forms and Improper Integrals

Section 3.1 [~1 hour]   Basic Indeterminate Forms ($0/0$ and ∞/∞) and L'Hôpital's Rule
                           (Reference: Volume 1 section 4.8)
Section 3.2 [~2 hours]   Other Indeterminate Forms ($0 \cdot \infty$, $\infty - \infty$, 1^{∞}, ∞^{0}, and 0^{0})
                           (Reference: Volume 1 section 4.8)
Section 3.3 [~2 hours]   Improper Integrals: Infinite Limits and Infinite Discontinuities
                           (Reference: Volume 2 section 3.7)

Chapter 4: Parametric Curves

Section 4.1 [~1 hour]   Parametric Curves, First and Second Derivatives
                           (Reference: Volume 3 sections 1.1, 1.2)
Section 4.2 [~2 hours]   Applications of Parametric Curves (Reference: Volume 3 section 1.2)

Chapter 5: Polar Coordinates

Section 5.1 [~2 hours]   Polar Coordinates, Polar Graphs, First Derivative
                           (Reference: Volume 3 sections 1.3 and 5.3)
Section 5.2 [~3 hours]   Applications of Polar Curves (Reference: Volume 3 section 1.4)

Chapter 6: Infinite Sequence and Infinite Series

Section 6.1 [~1 hour]   Sequence Convergence (Reference: Volume 2 section 5.1)
Section 6.2 [~1 hour]   Series Convergence: Geometric Series and nth Term Divergence Test
                           (Reference: Volume 2 sections 5.2, 5.3)
Section 6.3 [~2 hours]   The Integral Test (Reference: Volume 2 section 5.3)
Section 6.4 [~1 hour]   The p-series Test (Reference: Volume 2 section 5.3)
Section 6.5 [~2 hours]   Direct Comparison Test and Limit Comparison Test
                           (Reference: Volume 2 section 5.4)
Section 6.6 [~1 hour]   The Alternating Series Test and Absolute Convergence
                           (Reference: Volume 2 section 5.5)
Section 6.7 [~1 hour]   The Ratio Test (Reference: Volume 2 section 5.6)
Section 6.8 [~2 hours]   Taylor Polynomials and Taylor's Remainder Theorem
                           (Reference: Volume 2 sections 6.3, 6.4)
Section 6.9 [~1 hour]   Maclaurin Series and Taylor Series (Reference: Volume 2 sections 6.3, 6.4)
Section 6.10 [~2 hours]   Power Series: Interval of Convergence and their Operations
                           (Reference: Volume 2 sections 6.1, 6.2, 6.4)

Chapter 7: Curves and Motion in Space with Vector-Valued Functions

Section 7.1 [~2 hours]   Vector-Valued Functions for Velocity and Acceleration
                           (Reference: Volume 3 sections 2.5, 3.1, 3.2, 3.3, 3.4)
Section 7.2 [~1 hour]   Tangential and Normal Components of Acceleration
                           (Reference: Volume 3 sections 3.2, 3.3, 3.4)

Lectures, Reviews, Help Sessions	Tests (see 5 below)	Holiday	Total
63 hours	4 hours	3 hours	70 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):

	Test 1	Test 2	Test 3	Test 4
Tentative Date (Victoria local time)	Oct 5th (Mon)	Oct 30th (Fri)	Nov 27th (Fri)	Dec 9th (Wed)
Sections Covered	1.1 to 2.6	2.7 to 4.2	5.1 to 6.7	6.8 to 7.2
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. The final examination will take place during the period of Dec14th to Dec 22nd.
Your course grade will then be determined using the following weighting – Table 2:

	Test 1	Test 2	Test 3	Test 4	Final Exam.
Weight	13.5%	13.5%	13.5%	9.5%	50%
	(Term tests together count for 50%)				

Notes:

- Thorough understanding of the examples discussed in class and in the notes and completion of the practice exercises in the notes will be essential for success on the term tests.
- There is no makeup for missed test.
- 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 between Dec 7th and Dec 11th).
- 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:

	Term Test Minimum	Weighted Term Tests	Final Exam	Course
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%

Instructions on writing Online Tests/Exam:

- 1. Download and print out the test from the course D2L site.
  2. Complete the test in ink (or using pencil), please make sure it is dark enough for scan to be legible).
  3. Scan the finished test and save it as one single pdf file.
  4. Submit your pdf file before the deadline.
- You earn credits by using **only** the method(s) used in the examples in class and/or in the notes. Other methods of solutions are not accepted.
- For full credits of you solutions, show details comparable to the examples discussed in class and/or shown in the course notes.
- The only materials you can use are the course formula sheet (bring you own copy – not provided with the test) and non-graphing non-programmable scientific calculators.
- Taking into consideration of the work before and after writing the test, the start time of the 50-minute test is 15 minutes before the class start time and the end time (also the due time of submission) of the test is 15 minutes after the class end time.

6. Grading System

| X | Standard Grading System (GPA)

| | Competency Based Grading System

7. Recommended Materials 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.

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. Study efficiently:

   - Working with each other is a smart way to learn mathematics; however, make sure you can solve problems yourself.
   - It is important **not** to spend too much time on a single exercise – as a general rule of thumb, if you spend 15 minutes either staring at a problem not knowing what to do or having trouble finding arithmetic mistakes you might have made, move on to the next exercise (email me your work and we can go over it together – there may be typo in the answer provided, check typo corrections posted on the D2L course site).
   - In addition to getting help from your instructor, you can also do so by visiting the math help center at http://camosun.ca/learn/subjects/mathematics/help-with-math.html

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	*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 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	*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.