



## COURSE OUTLINE

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

Ω 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

(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 the student will be able to:

1. Evaluate limits of functions. Using the limit definition, find derivatives of simple algebraic functions. Use derivatives to determine the slope of the tangent line to a curve, velocity, acceleration, and rates of change.
2. Use the power, product, quotient and chain rules to differentiate algebraic, trigonometric, logarithmic and exponential functions. Use implicit differentiation.
3. Find tangents and normals to given functions. Use Newton's Method to find an approximate solution to an equation. Solve problems involving related rates, curve sketching, maxima and minima, and parametrically defined curves. Find differentials, estimate errors, and linearize functions.
4. Find antiderivatives of functions and evaluate both indefinite and definite integrals. Use the trapezoidal rule and Simpson's Rule to approximate a definite integral.
5. Use integration to solve applications problems including the area between curves, volumes of solids of revolution, and centroids.
6. Calculate determinants of 2x2 and 3x3 matrices. Add, subtract and multiply matrices. Calculate the inverse of a matrix. Solve 2x2 and 3x3 linear systems using Gauss-Jordan elimination, augmented matrices and inverse matrices.

### 3. Required Materials

- (a) Reference: Allyn J. Washington, Basic Technical Mathematics with Calculus, SI Version, 10<sup>th</sup> Ed.
- (b) Scientific Calculator (Graphing Calculators are not permitted.)

#### 4. Course Content and Schedule

- Section 1 Limits [~ 2.5 hours] (Reference section 23.1)  
Section 2 Slope of a Tangent to a Curve [~ 1 hour] (Reference section 23.2)  
Section 3 The Derivative [~ 1 hour] (Reference section 23.3)  
Section 4 Derivatives of Polynomials [~ 1 hour] (Reference section 23.5)  
Section 5 Derivatives as an Instantaneous Rate of Change [~ 0.5 hour] (Reference section 23.4)  
Section 6 Higher Derivatives [~ 0.5 hour] (Reference section 23.9)  
Section 7 Derivatives of Products and Quotients [~ 2 hours] (Reference section 23.6)  
Section 8 Derivatives of Powers of Functions & Chain Rule [~ 1.5 hours] (Reference section 23.7)  
Section 9 Derivatives of Implicit Functions [~ 0.5 hour] (Reference section 23.8)
- Section 10 Tangents and Normals [~ 1 hour] (Reference section 24.1)  
Section 11 Newton's Method for Solving Equations [~ 1 hour] (Reference section 24.2)  
Section 12 Curvilinear Motion [~ 1 hour] (Reference section 24.3)  
Section 13 Related Rates [~ 2.5 hours] (Reference section 24.4)  
Section 14 Using Derivatives in Curve Sketching [~ 2 hours] (Reference sections 24.5)  
Section 15 Applied Max/Min Problems [~ 2 hours] (Reference section 24.7)  
Section 16 Linear Approximations [~ 1.5 hours] (Reference section 24.8)
- Section 17 Derivatives of Sine and Cosine Functions [~ 1.5 hours] (Reference section 27.1)  
Section 18 Derivatives of the Other Trigonometric Functions [~ 1 hour] (Reference section 27.2)  
Section 19 Derivatives of the Inverse Trigonometric Functions [~ 1 hour] (Reference section 27.3)  
Section 20 Derivatives of Logarithmic Functions [~ 1.5 hours] (Reference section 27.5)  
Section 21 Derivatives of Exponential Functions [~ 0.5 hour] (Reference section 27.6)  
Section 22 Applications [~ 1 hour] (Reference section 27.4 and section 27.8)
- Section 23 Antiderivatives [~ 0.5 hour] (Reference section 25.1)  
Section 24 Indefinite Integral [~ 1 hour] (Reference section 25.2)  
Section 25 Area Under a Curve [~ 0.5 hour] (Reference section 25.3)  
Section 26 Definite Integral [~ 0.75 hour] (Reference section 25.4)  
Section 27 Numerical Integration: Trapezoidal Rule [~ 0.75 hour] (Reference section 25.5)  
Section 28 Numerical Integration: Simpson's Rule [~ 0.5 hour] (Reference section 25.6)
- Section 29 Applications of the Indefinite Integral [~ 1 hour] (Reference section 26.1)  
Section 30 Areas by Integration [~ 1.5 hours] (Reference section 26.2)  
Section 31 Volumes by Integration [~ 1 hour] (Reference section 26.3)  
Section 32 Centroids (2-dimensional only) [~ 1 hour] (Reference section 26.4)  
Section 33 Other Applications [~ 1.5 hours] (Reference section 26.6)
- Section 34 Introduction to Matrices: Definitions and Basic Operations  
[~ 0.5 hour] (Reference section 16.1)  
Section 35 Matrix Multiplication [~ 1.5 hours] (Reference section 16.2)  
Section 36 Matrix Inverses [~ 1.5 hours] (Reference section 16.2 and section 16.3)  
Section 37 Matrices and Linear Equations [~ 0.5 hour] (Reference section 16.4)  
Section 38 Gaussian Elimination and Gauss Jordan Elimination [~ 1 hour] (Reference section 16.5)

## 5. Basis of Student Assessment (Weighting)

Your course grade will be determined by using the following method:

	Test 1	Test 2	Assignment
Date	<b>Feb 7 (Fri)</b>	<b>Mar 6 (Fri)</b>	<b>Due: Noon Apr 6 (Mon)</b>
Weight	40%	40%	20%

- Study the materials and examples in the packages. Do the indicated exercises in the packages; then either scan or take a photo (in high contrast and good lighting) of your handwritten solutions and submit them by email to [lai@camosun.bc.ca](mailto:lai@camosun.bc.ca) before the due time (cc yourself your email as your proof of submission on time).  
You can scan using the multipurpose copying machines on campus.
- One question from each section will be selected for grading and they count for 50% of your grade; the completion of the remaining questions counts for the remaining 50%.  
Show all details of your work for full credits.  
There is a penalty of 20% per day for late submission – for instance, as the assignment is due at noon April 6 Monday, solution submitted one day late (between 12:01pm April 6 Monday and noon April 7 Tuesday) can earn at most 16% ( $0.8 \times 20\%$ ), solution submitted two days late (between 12:01pm April 7 Tuesday and noon April 8 Wednesday) can earn at most 12% ( $0.6 \times 20\%$ ), and so on.  
Note: Different students may have different questions graded.
- Help is available via email: [lai@camosun.bc.ca](mailto:lai@camosun.bc.ca) (between 9am and 4pm on weekdays).  
Questions and answers from other students will also be posted at our course site <https://sites.camosun.ca/raymondlai/home-2/courses/math-191/>

## 6. Grading System

Standard Grading System (GPA)

Competency Based Grading System

## 7. Recommended Materials or Services 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)**

<i>Percentage</i>	<i>Grade</i>	<i>Description</i>	<i>Grade Point Equivalency</i>
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

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

### 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.

<b>Temporary Grade</b>	<b>Description</b>
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	<b>Compulsory Withdrawal:</b> <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.</i>