![Camosun College logo]	**School of Arts & Science** **DEPARTMENT OF MATHEMATICS AND STATISTICS** **MATH 191 (X01 and X02)** **Applied Math for Civil/Mech 1** **Fall 2016**

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

(a)	Instructor:	Raymond Lai
(b)	Office Hours:	Monday to Thursday 11:30am – 12:20pm Friday 12:30pm – 1:20pm
(c)	Location:	CBA152
(d)	Phone:	250-370-4491
(e)	Email:	lai@camosun.bc.ca
(f)	Website:	http://faculty.camosun.ca/raymondlai/

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 Text: Allyn J. Washington, Basic Technical Mathematics with Calculus, SI Version, 10th Ed.
(b) Non-programmable Scientific Calculator (Graphing Calculators are not allowed)

4. Course Content and Schedule

The Derivative (Ref: Chapter 23)

    Section 1   Limits (Ref: Section 23.1)
    Section 2   The Slope of a Tangent to a Curve (Ref: Section 23.2)
    Section 3   The Derivative (Ref: Section 23.3)
    Section 4   Derivatives of Polynomials (Ref: Section 23.5)
    Section 5   The Derivative as an Instantaneous Rate of Change (Ref: Section 23.4)
    Section 6   Higher Derivatives (Ref: Section 23.9)
    Section 7   Derivatives of Products and Quotients of Functions (Ref: Section 23.6)
    Section 8   The Derivative of a Power of a Function (Ref: Section 23.7)
    Section 9   Differentiation of Implicit Functions (Ref: Section 23.8)

Applications of the Derivative (Ref: Chapter 24)

    Section 10   Tangents and Normals (Ref: Section 24.1)
    Section 11   Newton Method for Solving Equations (Ref: Section 24.2)
    Section 12   Curvilinear Motion (Ref: Section 24.3)
    Section 13   Related Rates (Ref: Section 24.4)
    Section 14   Using Derivatives in Curve Sketching (Ref: Section 24.5)
    Section 15   Applied Maximum and Minimum Problems (Ref: Section 24.7)
    Section 16   Differentials and Linear Approximations (Ref: Section 24.8)

Differentiation of Transcendental Functions (Ref: Chapter 27)

    Section 17   Derivatives of the Sine and Cosine Functions (Ref: Section 27.1)
    Section 18   Derivatives of the Other Trigonometric Functions (Ref: Section 27.2)
    Section 19   Derivatives of the Other Inverse Functions (Ref: Section 27.3)
    Section 20   Derivative of the Logarithmic Function (Ref: Section 27.5)
    Section 21   Derivative of the Exponential Function (Ref: Section 27.6)
    Section 22   Applications (Ref: Sections 27.4 and 27.8)

Integration (Ref: Chapter 25)

    Section 23   Antiderivatives (Ref: Section 25.1)
    Section 24   The Indefinite Integral (Ref: Section 25.2)
    Section 25   The Area Under a Curve (Ref: Section 25.3)
    Section 26   The Definite Integral (Ref: Section 25.4)
    Section 27   Numerical Integration: The Trapezoidal Rule (Ref: Section 25.5)
    Section 28   Numerical Integration: Simpson's Rule (Ref: Section 25.6)

Applications of Integration (Ref: Chapter 26)

    Section 29   Applications of the Indefinite Integral (Ref: Section 26.1)
    Section 30   Areas by Integration (Ref: Section 26.2)
    Section 31   Volumes by Integration (Ref: Section 26.3)
    Section 32   Centroids (Ref: Section 26.4)
    Section 33   Other Applications (Ref: Section 26.6)

Matrices, Systems of Linear Equations (Ref: Chapter 16)

    Section 34   Matrices: Definitions and Basic Operations (Ref: Section 16.1)
    Section 35   Multiplication of Matrices (Ref: Section 16.2)
    Section 36   Finding the Inverse of a Matrix (Ref: Section 16.3)
    Section 37   Matrices and Linear Equations (Ref: Section 16.4)
    Section 38   Gaussian Elimination (Ref: Section 16.5)

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:

- 4 term tests with equal weight (for a total of 50%)
  - o Tentatively scheduled on
    Friday Sept 30th (test 1), Friday Oct 21st (Test 2), Thursday Nov 10th (Test 3), Friday Dec 2nd (Test 4)
  - o Thorough understanding of the examples discussed in class and the assignment problems is essential for success on the term tests.
  - o Requests for makeup term tests due to illness must be supported by your physician's note.
- Comprehensive Final Exam (50%)
  - o During the period Dec 12 to Dec 20 (no exam on Sunday Dec 18)
  - o 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."

which is then converted to a letter grade using the standard Camosun grade scale (see Grading System below).

There is one exception: If your final exam grade is higher than your term grade AND your term work is complete and 50% or higher, then your final exam grade will count as 100% of your overall course grade.

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.