CAMOSUN COLLEGE	**School of Arts & Science** **MATHEMATICS & STATISTICS DEPARTMENT** **MATH 250A – Sections X01 and X02** **Intermediate Calculus 1** **Quarter 4, 2015**	

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, Wednesday to Friday: 11:30 am – 12:20 pm
(c)	Location:	CBA 152
(d)	Phone:	250-370-4491
(e)	Email:	lai@camosun.bc.ca
(f)	Website:	http://faculty.camosun.ca/raymondlai/home-2/courses/

2. Intended Learning Outcomes

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

1. Explain what calculus is and how it compares to pre-calculus. Describe the tangent line problem in differential calculus and that the area problem in integral calculus.
2. Use numerical methods, algebraic methods, the squeeze theorem, and the formal limit definition to evaluate limits.
3. Determine continuity at a point and continuity on open or closed intervals. Evaluate one-sided limits. Use the properties of limits to evaluate limits. Apply the Intermediate Value Theorem to locate zeros of a polynomial.
4. Use the chain rule and the power rule to find derivatives of composite and trigonometric functions.
5. Use implicit differentiation to find the derivative of a function.
6. Use pattern recognition, change of variables, and the General Power Rule to evaluate definite and indefinite integral.
7. Evaluate definite and indefinite integrals by fitting an integrand to one of the basis integration rules, the tabular method of integration by parts, trigonometric substitution, partial fractions, and integral tables. Evaluate definite and indefinite integrals of products of trigonometric functions.
8. Use L'Hôpital's rule to evaluate limits involving indeterminate forms.
9. Evaluate improper integrals with infinite limits and with infinite discontinuities.
10. Use infinite geometric series, the nth-Term Divergence test, the Integral Test, p-series, the Direct Comparison Test, the Limit Comparison Test, the Alternating Series Test, the Ratio Test, and the Root Test to determine whether a series converges or diverges.
11. Find Taylor or Maclaurin polynomial approximation of elementary functions. Use Taylor's Remainder Theorem to estimate the error in using a Taylor Polynomial approximation. Find a Taylor or Maclaurin series for a given function. Use the binomial series and other known series to determine Taylor series for other functions.
12. Find a set of parametric equations to represent a given curve. Find the slope of a tangent line to a curve given in parametric form. Find the arc length of a curve given in parametric form. Find the area of a surface of revolution using parametric form.
13. Convert equations in rectangular form to polar form and equations in polar form to rectangular form. Find the slope of a tangent line to a polar graph. Identify the graphs of standard polar equations.
14. Find the area of a region bounded by a polar graph or graphs. Find the arc length of a polar graph. Find the area of a surface of revolution given in polar form.

15. Express equations of conics in polar form. Use polar form to solve problems involving Kepler's Laws.
16. Express vectors in component form and as a linear combination of standard unit vectors. Add and subtract vectors geometrically and use vectors to solve problems involving force and velocity.
17. Understand the three-dimensional coordinate system and use three-dimensional vectors to solve real-life problems.
18. Use the dot product of vectors and the properties of the dot product to find the angle between to vectors, the projection of a vector onto another vector, and to find the work done by a constant force. Find the cross product of two vectors and the triple scalar product of three vectors in space.
19. Express the equation of a line in space in parametric, vector, and standard forms. Express the equation of a plane in space in point-normal, vector and standard forms. Find the distance between points, planes, and lines in space.
20. Recognize and write equations for cylindrical surfaces, quadratic surfaces, and surfaces of revolution. Use cylindrical and spherical coordinates to represent surfaces in space.
21. Extend the concepts of limits and continuity to vector-valued functions. Differentiate and integrate vector-valued functions. Find the velocity and acceleration associated with a vector-valued function. Use vector-valued functions to solve projectile problems. Find a unit tangent vector at a point on a space curve and find the tangential and normal components of acceleration. Find the arc length of a space curve.

3. Required Materials

(a) Texts: Optional Reference: Edwards and Penney, *Calculus Early Transcendentals,* Seventh Edition, Pearson Prentice Hall, 2008.
(b) Other: Non-graphing non-programmable scientific calculator.

4. Course Content and Schedule

Chapter 1: Derivative (Review)

Section 1.1   (Reference: section 3.2)   Basic Differentiation Rules
Section 1.2   (Reference: section 3.3)   The Chain Rule
Section 1.3   (Reference: section 3.7)   Derivatives of Trigonometric Functions
Section 1.4   (Reference: section 3.8)   Exponential and Logarithmic Functions
Section 1.5   (Reference: section 3.9)   Implicit Differentiation
Section 1.6   (Reference: section 6.8)   Inverse Trigonometric Functions

Chapter 2: Techniques of Integration and Applications of Integral   ·

Section 2.1   (Reference: sections 5.7 and 7.2)   Integration by Substitution
Section 2.2   (Reference: section 5.8)   Areas of Plane Regions
Section 2.3   (Reference: section 7.3)   Integration by Parts
Section 2.4   (Reference: section 7.4)   Trigonometric Integrals
Section 2.5   (Reference: section 6.8)   Inverse Trigonometric Functions
Section 2.6   (Reference: section 7.5)   Integration of Rational Functions by using Partial Fractions
Section 2.7   (Reference: section 7.6)   Trigonometric Substitutions

Chapter 3: Limits, Indeterminate Forms, and Improper Integrals

Section 3.1   (Reference: sections 2.2 and 2.3)   Review of Limits
Section 3.2   (Reference: section 2.4)   The Concept of Continuity
Section 3.3   (Reference: section 4.8)   Basic Indeterminate Forms and L'Hôpital's Rule
Section 3.4   (Reference: section 4.9)   More Indeterminate Forms
Section 3.5   (Reference: section 7.8)   Improper Integrals

Chapter 4: Parametric Curves and Polar Coordinates

Section 4.1   (Reference: section 9.4)   Parametric Curves
Section 4.2   (Reference: section 9.5)   Integral Computations with Parametric Curves
Section 4.3   (Reference: section 9.2, 9.4)   Polar Coordinates
Section 4.4   (Reference: section 9.3, 9.5)   Integral Computations in Polar Coordinates
Section 4.5   (Reference: section 9.6)   Conic Sections

Chapter 5: Infinite Series

Section 5.1   (Reference: section 10.2)   Infinite Sequences
Section 5.2   (Reference: section 10.3)   Infinite Series and Convergence
Section 5.3   (Reference: section 10.4)   Taylor Series and Taylor Polynomials
Section 5.4   (Reference: section 10.5)   The Integral Test
Section 5.5   (Reference: section 10.6)   Comparison Tests (for Positive Term Series)
Section 5.6   (Reference: section 10.7)   Alternating Series and Absolute Convergence
Section 5.7   (Reference: section 10.7)   The Ratio Test and the Root Test
Section 5.8   (Reference: sections 10.8 and 10.9)   Power Series and their Computations

Chapter 6: Vectors and Curves

Section 6.1   (Reference: section 11.1)   Vectors in the Plane
Section 6.2   (Reference: sections 11.2 and 11.3)   Three-Dimensional Vectors
Section 6.3   (Reference: section 11.4)   Lines and Planes in Space
Section 6.4   (Reference: section 11.5)   Curves and Motion in Space
Section 6.5   (Reference: section 11.6)   Curvature and Acceleration

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Tentative Assessment Schedule:
Quizzes: Friday July 24 (20%), Friday August 21 (20%), Friday September 4 (10%)
Final Exam: During the week of September 14 – September 19 (50%)

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5.   Basis of Student Assessment (Weighting)

3 Quizzes for a total of 50%
Final Exam for 50%

If your term work is at least 50% *and* you received 60% or higher in the final exam, then you will receive a C in the course *even if* your overall average is under 60%.

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.