CAMOSUN COLLEGE	***School of Arts & Science*** ***MATHEMATICS DEPARTMENT*** **MATH 250A** **Intermediate Calculus 1** **2009Q2**

COURSE OUTLINE

1. Instructor Information

(a)	Instructor:	Gilles Cazelais		
(b)	Office Hours:	http://pacificcoast.net/~cazelais/schedule.html		
(c)	Location:	CBA 158		
(d)	Phone:	370 - 4495	Alternative Phone:	
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2. Intended Learning Outcomes

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

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

Calculus (8th Edition) by Larson, Hostetler, Edwards.

4. Course Content and Schedule

5. Basis of Student Assessment (Weighting)

· Four term tests: 50%
· Comprehensive final exam: 50%

6. Grading System

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

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 on the College web site in the Policy Section.

Course Outline

1. Review
· Limits and Continuity (1.2 - 1.5)
· Differentiation Rules (2.2 - 2.5)
· Integration (4.4, 4.5)
· Logarithmic, Exponential, and Other Transcendental Functions (5.1 - 5.8)

2. Integration Techniques, L'Hopital's Rule, and Improper Integrals
· Basic Integration Rules (8.1)
· Integration by Parts (8.2)
· Trigonometric Integrals (8.3)
· Trigonometric Substitution (8.4)
· Partial Fractions (8.5)
· Indeterminate Forms and L'Hopital's Rule (8.7)
· Improper Integrals (8.8)

3. Infinite Series
· Sequences (9.1)
· Series and Convergence (9.2)
· The Integral Test and p-Series (9.3)
· Comparisons of Series (9.4)
· Alternating Series (9.5)
· The Ratio and Root Tests (9.6)
· Taylor Polynomials and Approximations (9.7)
· Power Series (9.8)
· Representation of Functions by Power Series (9.9)
· Taylor and Maclaurin Series (9.10)

4. Conics, Parametric Equations, and Polar Coordinates
· Conics and Calculus (10.1)
· Plane Curve and Parametric Equations (10.2)
· Parametric Equations and Calculus (10.3)
· Polar Coordinates and Polar Graphs (10.4)
· Area and Arc Length in Polar Coordinates (10.5)

5. Vectors and Geometry of Space
· Read sections 11.1 - 11.5. This material is covered in Math 251.
· Surfaces in Space (11.6)
· Cylindrical and Spherical Coordinates (11.7)

6. Vector-Valued Functions
· Vector-Valued Functions (12.1)
· Differentiation and Integration of Vector-Valued Functions (12.2)
· Velocity and Acceleration (12.3)
· Tangent and Normal Vectors (12.4)
· Arc-length and Curvature (12.5)