CAMOSUN COLLEGE	***School of Arts & Science*** ***MATHEMATICS DEPARTMENT*** **MATH 250A-Sections X01 and X02** **Intermediate Calculus 1** **2011Q4**

COURSE OUTLINE

1. Instructor Information

Instructor:	Raymond Lai (sections X01 and X02)
Office Hours:	Monday to Thursday: 11:30-1:20 Friday: 11:30 – 12:20 By Appointment
Office	CBA 152
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Website:	http://faculty.camosun.ca/raymondlai/home-2/courses/

2. Course Description

This course is a component of the Engineering Bridge Program. Topics discussed include techniques of integration, indeterminate forms, infinite series, polar coordinates, and vector functions.

Offered: Quarter 2 and quarter 4
Credit: 3
In-Class Workload and Format: 5 hours of lecture/week for 11 weeks
Out-of-Class Workload: 5-10 hours/week
Prerequisites: Restricted to students enrolled in the Engineering Bridge Program
Co-requisites: Math 251

3. 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.

4. Required Materials

Edwards and Penney, *Calculus Early Transcendentals*, Seventh Edition, Pearson Prentice Hall, 2008.
Non-graphing non-programmable scientific calculator (such as Sharp EL531W) – See Course Policy (7) below.

5. Course Content and Tentative Schedule

7 hours	Review	Sections 2.2 – 2.4, 3.3, 3.9, 4.2, 5.7, 5.8, 6.4, 6.6
2 hours	Sections 4.8 – 4.9	Indeterminate Forms and L'Hôpital's Rule
10 hours	Sections 7.2 – 7.8	Techniques of Integration
8 hours	Sections 9.1 – 9.6	Polar Coordinates and Parametric Curves
10 hours	Sections 10.2 – 10.9	Infinite Series
6 hours	Sections 11.1 – 11.6	Vectors and Curves

Note: Materials in sections 11.3 – 11.4 are to be covered in Math 251.

Lecture	43 hours
Tests	3 hours
Leeway (including Holiday and Test Review)	9 hours
Total	55 hours

6. Basis of Student Assessment (Weighting)

To get a C or higher in the course, you must pass the final exam (50% or higher) *and* have an overall average of 60% or higher, computed from:

- 5 Assignments (2%×5 = 10%): due on 4 July, 15 July, 5 August, 29 August, 8 September
- 3 Tests $(13.3\% \times 3 = 40\%)$: on 20 July, 10 August, 31 August
  - Test 1 covers sections on assignment 1, etc.
  - 2 chances to write each test (no other makeup is available) – details explained in the first class
  - Thorough understanding of the examples discussed in class and the homework exercises will be essential for success on the term tests.
- Comprehensive Final Exam (50%): during the week of 12 Sept – 16 Sept.
  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 (8) below).

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There is one exception: 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%.

7. Course Policy

- Students are responsible for announcements made in class (check with your fellow students if you have to miss a class).
- Students are required to set their mobile phones on vibrate while attending class and writing term tests and final examination.
- No access to washroom facilities is allowed during the 60-minute term tests.
  During the 3-hour multi-section final examination, access to washroom facilities is allowed only between sections.
- The mathematics department has a calculator policy on writing tests and exams of math courses in the Engineering Bridge programs:
  - Students can only use a scientific (non-graphing, non-programmable) calculator
  - The mathematics department recommends the Sharp EL-531W
  - Students who want to use a scientific calculator other than the Sharp EL-531W need to obtain approval from their mathematics instructors

8. 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		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 at **camosun.ca** or information on conversion to final grades, and for additional information on student record and transcript notations.

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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.

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.

Note: A course with a "D" or "F" grade cannot be used as a prerequisite.

9. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

Extra help available from assistant at the Math Lab: TEC142.

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.

Tentative Schedule (R for Review)

Week (Dates)	Monday (1 hr)	Tuesday (1 hr)	Wednesday (1 hr)	Thursday (1 hr)	Friday (2 hrs)
1 (6/27/11-7/1/11)	**27-Jun** **No Class** (Orientation)	**28** 2.2 (R), 2.3 (R), 2.4 (R)	**29** 3.3 (R)	**30** 3.9 (R)	**1-Jul** **No Class** (Canada Day)
2 (7/4/11-7/8/11)	**4** 4.2 (R) **Hw R due**	**5** 4.8	**6** 4.9	**7** 5.7 (R) & 5.8 (R)	**8** 6.4 (R)
3 (7/11/11-7/15/11)	**11** 6.6 (R)	**12** 7.2	**13** 7.2	**14** 7.3	**15** 7.3 **Hw 1 due**
4 (7/18/11-7/22/11)	**18** 7.4	**19** Test Review	**20** **Test 1**	**21** 7.4	**22** 7.5
5 (7/25/11-7/29/11)	**25** 7.6	**26** 7.7	**27** 7.8	**28** 9.1	**29** 9.2
6 (8/1/11-8/5/11)	**1-Aug** **No Class** (BC Day)	**2** 9.2	**3** 9.3	**4** 9.4	**5** 9.4 **Hw 2 due**
7 (8/8/11-8/12/11)	**8** 9.5	**9** Test Review	**10** **Test 2**	**11** 9.6	**12** 10.2
8 (8/15/11-8/19/11)	**15** 10.3	**16** 10.4	**17** 10.4	**18** 10.5	**19** 10.6
9 (8/22/11-8/26/11)	**22** 10.7	**23** 10.7	**24** 10.8	**25** 10.9	**26** 11.1 & 11.2
10 (8/29/11-9/2/11)	**29** 11.5 **Hw 3 due**	**30** Test Review	**31** **Test 3**	**1-Sep** 11.5	**2** 11.5
11 (9/5/11-9/9/11)	**5** **No Class** (Labour Day)	**6** 11.6	**7** 11.6	**8** Review **Hw 4 due**	**9** Review