Course Name: Calculus 1

Department Head/Coordinator: Costa Karavas
Effective Date: Sept 2015

School of Arts and Science

Department: University Transfer- Math

Course History:
Revised Course
Name of Replacing Course
(if applicable):
1st Year Post-secondary

Course Number:
MATH 1100

Number of Credits:
3.0

Course Pre-requisites (if applicable):
Pre-calculus Mathematics12 with a B; or MATH 1020 with a C; or Math 0983 and Math 0993 both with a B; or VCC Math Pre-calculus Assessment Test (MPT) with 72%.

Course Co-requisites (if applicable):

PLAR (Prior Learning Assessment & Recognition)

No ☐ Yes (details below):

Math 1100 Challenge Exam with a C.

Course Description:
This course focuses on the fundamental concepts of differential calculus. Topics include the concepts of limit and continuity; rates of change; basic differentiation rules; derivatives of algebraic and transcendental functions; applied optimization problems; implicit differentiation and related rates; the Mean Value Theorem; linear approximations; curve sketching; simple differential equations and models; antiderivatives; simple parametric equations and polar coordinates.
Instructional Strategies:
Lectures coupled with computer lab exercises

Course Learning Outcomes:
Upon successful completion, students will be able to:
- Evaluate limits of functions analytically, graphically and numerically.
- Determine continuity of polynomial and transcendental functions.
- Apply the Intermediate Value Theorem in solving applied problems.
- Compute derivatives and antiderivatives of functions.
- Solve applied optimization (max/min) problems.
- Apply L'Hopital's Rule to study the behaviour of functions.
- Estimate function values utilizing linear approximations.
- Solve initial value problems.
- Derive general solutions of simple differential equations and find particular solutions satisfying initial conditions.
- Derive differential equations which explain mathematical models in the applied sciences.

Program Learning Outcomes:
If this course is taken as a requirement or an elective in the following first year, University Transfer Certificate programs, the learning outcomes are found in the relevant Program Content Guides available at the Counselling and Advising Service areas.

University Transfer Arts Certificate
University Transfer Pathway to Health Sciences Certificate
University Transfer Science Certificate
University Transfer Engineering Certificate
University Transfer Computing Science and Software Systems Certificate
### Evaluation/Grading System

(Click on drop down box arrows to see list of options)

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<thead>
<tr>
<th>Grading System</th>
<th>Specify if 'Other':</th>
<th>Specify Passing Grade:</th>
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### Components and Weighting of the Assessment/Evaluation Plan

(Click on drop down box arrows to see list of options)

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<tr>
<th>Type</th>
<th>Percentage</th>
<th>Evaluation Plan</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>30</td>
<td>written, MC, SA, problems</td>
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<tr>
<td>Midterm Exam</td>
<td>35</td>
<td>written, MC, SA, problems</td>
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<tr>
<td>Final Exam</td>
<td>35</td>
<td>written, MC, SA, problems</td>
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Total 100

### Learning Environment/Type

(Select all that are used within the course)

<table>
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<tr>
<th>Instruction Type</th>
<th>Hours Per Instruction Type</th>
<th>Comments</th>
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<tr>
<td>L - Classroom</td>
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Enter Total Hours 60

### Resource Material(s):  

Resources are items in addition to tuition that the student is responsible for purchasing. Course resource information will be supplied by the department/instructor.
Course Topics and Sequence Covered:

- Prelude to Calculus: tangent lines and slope predictors; limit concept; more limits; concept of continuity
- The Derivative: the derivative and rates of change; basic differentiation rules; chain rule; derivatives of algebraic functions; maxima and minima of functions; applied optimization problems; derivatives of trigonometric functions and their inverses; exponential and logarithmic functions; implicit differentiation and related rates; successive approximations and Newton’s method.
- Applications of the Derivative: differentials and linear approximations; increasing and decreasing functions; mean value theorem; first derivative test and applications; curve sketching; higher derivatives and concavity; simple curve sketching and asymptotes; indeterminate forms and L’Hopital’s rule; more indeterminate forms.
- Antiderivatives: antiderivatives and initial value problems.
- Differential Equations: simple equations and models.

VCC Education and Education Support Policies

There are a number of Education and Education Support policies that govern your educational experience at VCC, please familiarize yourself with them.

The policies are located on the VCC web site at:  
http://www.vcc.ca/about/governance--policies/policies/

To find out how this course transfers, visit the BC Transfer Guide at www.bctransferguide.ca.