CALC14998

Applied Calculus

Section I: Administrative Information

Program(s): Architectural Technician, Architectural Technology
Program Coordinator(s): Christopher Ferguson
Course Leader or Contact: Wendi Morrison
Version: 16.0
Status: Approved (APPR)

Credit Value: 3.0
Credit Value Notes: N/A
Effective: Winter 2016
Prerequisites: (MATH15910)
Corequisites: N/A
Equivalents: N/A
Pre/Co/Equiv Notes: N/A

Typical Instructional Format

Lecture	42.0
Total hours:	**42.0**

Courses may be offered in other formats.

Section I Notes: The course runs in a mobile computing format.

Section II: Course Details

Detailed Description

This introductory calculus course relates directly to the requirements for the architectural designation. Beginning with a review of functions, the student will study differential and integral calculus. Tangents, limits, and rules of differentiation for polynomial and trigonometric equations will be studied. The rules of antiderivatives will be studied. Emphasis will be placed on the application of derivatives to problems such as related rates, optimization, understanding curves and marginal costs. Applications of integration will include the area under a curve such as a shear stress diagram.

Program Context

Architectural Technician **Program Coordinator:** Christopher Ferguson
See Architectural Technology

Architectural Technology **Program Coordinator:** Christopher Ferguson
Applied Calculus is taken in the second term of the Architectural Technology program and follows pre- calculus taken in the first term of the Architectural courses.

Course Critical Performance and Learning Outcomes

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 Critical Performance:

By the end of this course, students will have demonstrated the
ability to use the rules of differentiation and integration and apply
these skills in the application of technical problems.

Learning Outcomes:

To achieve the critical performance, students will have demonstrated
the ability to:

1.  Analyze mathematical models for non-linear data using technology.
2.  Evaluate limits of polynomial and rational functions numerically,
    algebraically, and graphically.
3.  Define the concept of a derivative of polynomial functions
    using first principles.
4.  Calculate the derivative of polynomial functions using first
    principles.
5.  Apply rules to differentiate quotients, products, trigonometric,
    logarithmic, exponential, and composite functions.
6.  Solve applied differentiation problems involving optimization,
    tangent lines, and related rates.
7.  Accurately sketch a curve showing asymptotes, local and global
    extrema, intervals of increase and decrease, and proper
    concavity.
8.  Explore the concept of a definite integral as the limit of
    rectangluar areas.
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9. Distinguish between definite and indefinite integrals.
10. Apply the Fundamental Theorem of Calculus to calculate definite integrals.
11. Solve applied integration problems involving areas between curves, volumes of revolution, or centroids.

Evaluation Plan

Students demonstrate their learning in the following ways:

On-line Class Prep (best 10 @ 0.25%)	2.5%
On-line Homework (best 10 @ 0.5%)	5.0%
In-Class Assignments (best 9 @ 2.5%)	22.5%
On-line Quizzes (5 @ 2%)	10.0%
Tests (3 @ 12%)	36.0%
Exam	24.0%

ASSIGNMENTS
While working together is encouraged, assignments should demonstrate the individual's understanding and knowledge of the material. Submitted work MUST be the original work of the student. Any breach of this will result in a grade of zero (0) in the assignment. Refer also to the IMPORTANT NOTE below.

AIDS
Calculators are the only aids allowed during the tests and exams.

EXAM
The exam is a cumulative, summative assessment of the student's understanding of the learning outcomes for the course.

Regardless of the final total mark, students must achieve at least 50% average on the exam/quiz/test components and 50% average on the assignment/exercise/project components in order to receive a passing grade in this course.

E-portfolio

As part of the contemplative nature of scholastics study, it is expected that students will reflect in their e-Portfolio ways that the course "Critical Performance Statement" is personally achieved in this course.

Provincial Context

The course meets the following Ministry of Training, Colleges and Universities requirements:

Essential Employability Skills

Essential Employability Skills emphasized in the course:

	Communication	X	Critical Thinking & Problem Solving		Interpersonal
X	Numeracy		Information Management		Personal

Notes: N/A

Prior Learning Assessment and Recognition

PLAR Contact: Registrar's Office

Students may apply to receive credit by demonstrating achievement of the course learning outcomes through previous life and work experiences. This course is eligible for challenge through the following method(s):

Challenge Exam	Portfolio	Interview	Other	Not Eligible for PLAR
X		X		

Notes: Both methods must be successfully completed to obtain credit.

Section III: Topical Outline

Some details of this outline may change as a result of circumstances such as weather cancellations, College and student activities, and class timetabling.

Effective term: Winter 2016

Professor: Tba

Textbook(s):

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Required Text:

Technical Mathematics with Calculus, Second Canadian Edition; Calter
& Calter; Wiley

Wileyplus
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Applicable student group(s): Architectural Technology/Technician students

Course Details:

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Module 1

Introduction; identifying linear, quadratic, polynomial,
trigonometric, and other functions; modelling with excel.

Module 2

Tangent lines:  calculating the slope, limit notation, graphing
program examples; application:  instantaneous rate of change.

Module 3

Derivative definition, notation; rules:  sum, constant multiple,
power; applications:  instantaneous rate of change, tangent and
sight lines.

Module 4

Product and quotient rules; chain rule (function to a power).

Module 5
Trig rules:  explore sine and cosine; verify with graphing program;
tangent function via quotient rule.
Log and Exp rules:  explore with technology.

Module 6

Higher-order derivatives, curve sketching, applied optimization.

Module 7

Antiderivatives and indefinite integrals.

Module 8

Define integrals as area under the curve; The Fundamental Theorem of
Calculus.

Module 9

Applications of integration:  area, volume, centroids.
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Academic Honesty

The principle of academic honesty requires that all work submitted for evaluation and course credit be the original, unassisted work of the student. Cheating or plagiarism including borrowing, copying, purchasing or collaborating on work, except for group projects arranged and approved by the faculty member, or otherwise submitting work that is not the student's own violates this principle and will not be tolerated. Instances of academic dishonesty, including assisting another student to cheat, will be penalized as detailed in the Student Handbook.

Students who have any questions regarding whether or not specific circumstances involve a breach of academic honesty are advised to discuss them with the faculty member prior to submitting the assignment in question.

Discrimination and Harassment

Sheridan is committed to provide a learning environment that respects the dignity, self esteem and fair treatment of every person engaged in the learning process. Behaviour which is inconsistent with this principle will not be tolerated. Details of Sheridan's policy on Harassment and Discrimination are available in the Student Handbook.

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