KEYANO COLLEGE

MATH 031A- Calculus
5 credits, 6 hours lecture

Topics covered include differential calculus of algebraic functions with applications to problems involving motion, rates of change, optimization and areas; vectors in the plane and in 3-space;matrix algebra; and solutions of systems of linear equations.

Alberta Education Course Equivalency: Mathematics 31
Prerequisite: MATH 30 -1

Instructor

Leni Cherian
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Office Hours
Monday	11:00 – 11:50 a.m.
Tuesday	1:00 – 1:50 p.m.
Wednesday	10:00 - 11:50 a.m.
Friday	10:00 - 10:50 a.m.

Hours of Instruction

Monday	2:00 –	3:50 p.m.	S207
Thursday	11.00 –	12:50 p.m.	S207
Friday	11:00 –	12: 50 p.m.	S216

Required Resources

Calculus: A first course by Stewart, Davison and Ferroni ISBN 0-07-549601-1

Course Outcomes

Upon successful completion of the course, the student shall be able to:

Limits and Rates of Change
- Explain how the idea of a limit arises when we try to find the tangent to a curve
- Explain the limits of a function and their properties and computing limits using graphical and numerical methods
- Determine the limits of polynomial, rational and power functions using limit theorems
- Extend the concept of limit to one sided limits
- Use limits to find the slope and equation of a tangent to a curve, velocities and other rates of change.

Derivatives
- Determine derivatives of functions from first principles.
- Determine the derivatives of functions using differentiation rules
- Apply power rule, sum and difference rule, product rule, quotient rule, chain rule to find the derivatives of different functions
- Determine second and higher order derivatives of functions
- Use of Implicit Differentiation to find the derivatives of certain algebraic functions

Applications of Derivatives
- Use derivatives to find velocity, acceleration and other rates of change in natural and social sciences.
- Use the rate of change of one quantity to determine the rate of change of a related quantity.

Extreme Values
- Determine the intervals on which a function is increasing or decreasing .
- Determine the absolute maximum and minimum values of functions on a closed interval.
- Use of first derivative test to determine the local maximum and minimum values
- Applications of maximum and minimum problems

Curve Sketching
- Determine the vertical and Horizontal Asymptotes of functions
- Determine where the curve is concave upward and where it is concave downward and find the points of inflection
- Use second derivative test to determine local maximum and minimum values of functions
- Use the information of domain, range, asymptotes, concavity and points of inflection, together with intervals of increase and decrease and maximum and minimum values, to develop a procedure for curve sketching

Derivatives of Trigonometric Function
- Determine the derivatives of sine and cosine functions and other trigonometric functions
- Determine Inverse trigonometric functions

Differential Equations
- Determine anti derivatives
- Solve differential equations with initial conditions

Area
- Determine the area under a curve
- Find the area between two curves in a particular interval.

Integrals
- Evaluate a definite Integral as limits of sums
- Use of fundamental theorem of calculus to determine definite integrals of functions
- Use of substitution rule to evaluate definite integrals
- Use of integration by parts to evaluate integrals

Evaluation

Unit Assignments	15%
Unit Tests	45%
Final Exam	40%
Total	100%

The minimum pre-requisite for progression is 1.7 (refer to grading system below)

Grading System

Descriptor	4.0 Scale	Percent
	4.0	96 – 100
Excellent	4.0	90 – 95
	3.7	85 – 89
	3.3	81 – 84
Good	3.0	77 – 80
	2.7	73 – 76
	2.3	69 – 72
Satisfactory	2.0	65 – 68
Minimum Prerequisite	1.7	60 – 64
Poor	1.3	55 – 59
Minimum Pass	1.0	50 – 54
Failure	0.0	0 – 49

Topic Outline

Limits and Rates of Change	Chapter 1- Sections 1.1,1.2,1.3,1.4,1.5
Derivatives	Chapter 2- Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8
Applications Of Derivatives	Chapter 3- Sections 3.1, 3.2, 3.3, 3.5
Extreme Values	Chapter 4- Sections 4.1, 4.2, 4.3, 4.4
Curve Sketching	Chapter 5- Sections 5.1, 5.2, 5.3, 5.4, 5.5
Derivatives of Trigonometric Functions	Chapter 7- Sections 7.2, 7.3, 7.5
Differential Equations	Chapter 9- Sections 9.1, 9.2
Area	Chapter 10- Sections 10.1, 10.2
Integrals	Chapter 11- Sections 11.1, 11.2, 11.3, 11.4

Performance Requirements

Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College Credit Calendar.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

Specialized Supports

Counselling and Accessibility Services

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

SKILL Centre

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.

Authorization

This course outline has been reviewed and approved by the Program Chair.

Leni Cherian, Instructor

Lisa Turner, Chair　　　　　　　　　　　　Date Authorized

Vincella Thompson, Dean　　　　　　　　　Date Authorized