

**Effective:** Summer 2017

## COURSE INFORMATION

**Course Title:** Integral Calculus w/Application to Commerce & Social Sciences

**Course Number:** MATH 105

**Credits:** 3

**Total Weeks:** 14 (Fall, Spring)  
12 (Summer)

**Total Hours:** 39

**Course Level:**

☒ First Year

☐ Second Year

☐ New

☐ Revised Course

☐ Replacement Course

**Department:** Mathematics

**Department Head:** G. Belchev

**Former Course Code(s) and Number(s) (if applicable):** N/A

**Pre-requisites (If there are no prerequisites, type NONE):** Math 101 or Math 111

**Co-requisite Statement (List if applicable or type NONE):** NONE

**Precluded Courses:** N/A

## COURSE DESCRIPTION

Anti-derivatives, the definite integral, techniques and applications of integration, multi-variable calculus, introduction to differential equations, probability, discrete and continuous random variables, sequence and series, Taylor polynomials/series. applications in economics, commerce, and business administration.

## LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Upon successful completion of this course, students will have a good command of the concepts of Multivariable Calculus, Integration, Differential Equations, Probability, Sequences, Series, and be able to apply this knowledge to problems in economics, commerce and business administration.

## INSTRUCTION AND GRADING

Instructional (Contact) Hours:

| Type                      | Duration |
|---------------------------|----------|
| Lecture                   | 39       |
| Seminars/Tutorials        |          |
| Laboratory                |          |
| Field Experience          |          |
| Other ( <i>specify</i> ): |          |
| Total                     | 39       |

**Grading System:** Letter Grades ☒ Percentage ☐ Pass/Fail ☐

Satisfactory/Unsatisfactory ☐

Other ☐

**Specify passing grade:** 50%

**Evaluation Activities and Weighting** (total must equal 100%)

|                  |                                                        |                  |            |
|------------------|--------------------------------------------------------|------------------|------------|
| Assignments: 25% | Lab Work: %                                            | Participation: % | Project: % |
| Quizzes/Test: %  | Midterm Exam:<br>Midterm I: 22.5%<br>Midterm II: 22.5% | Final Exam: 30%  | Other: %   |

### TEXT(S) AND RESOURCE MATERIALS

Provide a full reference for each text and/or resource material and include whether required/not required.

Calculus with Applications by Lial, Greenwell and Ritchey, Latest edition, Pearson, required  
 Calculus: Early Transcendentals by Briggs and Cochran, Latest edition, Pearson, not required

### COURSE TOPICS

List topics and sequence covered.

| Week    | Topic                                                                                                                                                                                   |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | Review of Derivatives.<br>Anti-derivatives, Indefinite Integrals, Integration by Substitution.                                                                                          |
| Week 2  | Stigma Notation, Approximating the Area under a Curve, The Definite Integral.<br>The Fundamental Theorem of Calculus.<br>Area between Curves.                                           |
| Week 3  | The Consumers' and Producers' Surplus; Continuous Money Flow.<br>Approximate Integration (Midpoint Rule, Trapezoid Rule and Simpson's Rule).                                            |
| Week 4  | Integration Methods: Partial Fractions, Integration by Parts.<br>Average of Functions, Volumes of Solids of Revolution.                                                                 |
| Week 5  | <b>Midterm 1</b><br>Improper Integrals.<br>Calculus and Probability: Discrete and Continuous Random Variables, Density Functions, Expected value, Variance, and Standard Deviation.     |
| Week 6  | Sequences and Infinite Series: Convergence & Divergence (Telescoping Series, Geometric Series), Divergence Test, Integral Test (p-series).<br>Estimate of Sums, Arithmetic with Series. |
| Week 7  | Series continued: Direct Comparison Test, Limit Comparison Test, Ratio Test.<br>Alternating Series, Absolute and Conditional Convergence.                                               |
| Week 8  | Functions of 2 Variables: Graphs, Level Curves, Partial Derivatives.<br>Relative and Absolute Extrema.                                                                                  |
| Week 9  | Lagrange Multipliers, Double Integrals.                                                                                                                                                 |
| Week 10 | <b>Midterm 2</b><br>Introduction to Differential Equations: Elementary, Separable and First Order Linear Differential Equations; Applications.                                          |

|         |                                                                                                                               |
|---------|-------------------------------------------------------------------------------------------------------------------------------|
| Week 11 | Power Series: Interval of Convergence, Taylor Series and Taylor Polynomials.<br>Error in the Taylor Polynomial Approximation. |
| Week 12 | Techniques for Finding Taylor Series and Taylor Polynomials.<br>Applications                                                  |
| Week 13 | Review                                                                                                                        |
| Week 14 | <b>FINAL EXAM</b>                                                                                                             |

**NOTES**

1. Students are required to follow all College policies. Policies are available on the website at: [Coquitlam College Policies](#)
2. To find out how this course transfers, visit the BC Transfer Guide at: [bctransferguide.ca](http://bctransferguide.ca)

**Last Revised:** March 2017

**Last Reviewed:** September 2024