# 4/8/2021

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 27 April 2021

Term and Year of Implementation: Fall 2021

**Course Title:** Calculus I

**BRCC Course Rubric:** MATH 2115

**Previous Course Rubric**: MATH 210

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 5-0-5

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 75-0-75

**Louisiana Common Course Number:** CMAT 2115

**CIP Code:** 27.0101

**Course Description:** Covers limits, continuity, derivatives, applications of the derivative, integrals, Fundamental Theorem of Calculus, and applications of the integral. This is the first calculus course of a three-course sequence.

**Prerequisites:** Appropriate placement test score or MATH 1223 (or MATH 111) or MATH 1235 (or MATH 120) with a grade of C or better

**Co-requisites:** None

**Suggested Enrollment Cap:** 40

**Learning Outcomes.** *Upon successful completion of this course, the students will be able to:*

1. Find limits of a variety of algebraic and transcendental functions numerically, graphically, and analytically.

2. Find the derivative of a variety of algebraic and transcendental functions using the formal definition of the derivative and other differentiation rules.

3. Apply the derivative in a variety of application problems including tangent lines, related rates, optimization, and curve sketching.

4. Find the indefinite and definite integral of a variety of algebraic and transcendental functions.

5. Apply the techniques of integration to solve application problems including area, volume, and arc length.

**General Education Learning Outcome(s):** This course supports the development of competency in the following area(s). Students will:

Use processes and models to solve quantitative problems. (General Education Competency: Quantitative and Symbolic Reasoning)

**Assessment Measures.** Assessment of all learning outcomes will be measured using the following methods:

1. Instructor created exams, quizzes, and/or homework

2. Comprehensive final exam

**Information to be included on the Instructor’s Course Syllabi:**

* ***Disability Statement*:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.
* ***Grading:*** The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor’s and/or the department’s policy for make-up work. For example in a speech course, “Speeches not given on due date will receive no grade higher than a sixty” or “Make-up work will not be accepted after the last day of class”.
* ***Attendance Policy*:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.
* ***General Policies*:** Instructors’ policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.
* ***Cheating and Plagiarism*:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.
* ***Safety Concerns:*** In some courses, this may be a major issue. For example, “No student will be allowed in the lab without safety glasses”. General statements such as, “Items that may be harmful to one’s self or others should not be brought to class”.
* ***Library/ Learning Resources:*** Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

**Expanded Course Outline:**

I. Limits and Their Properties

A. A Preview of Calculus

B. Finding Limits Graphically and Numerically

C. Continuity and One-Sided Limits

D. Infinite Limits

II. Differentiation

A. The Derivative and the Tangent Line Problem

B. Basic Differentiation Rules and Rates of Change

C. The Product and Quotient Rules and Higher-Order Derivatives

D. The Chain Rule

E. Implicit Differentiation

F. Derivatives of Inverse Functions

G. Related Rates

H. Newton’s Method

III. Applications of Differentiation

A. Extrema on an Interval

B. Rolle’s Theorem and the Mean Value Theorem

C. Increasing and Decreasing Functions and the First Derivative Test

D. Concavity and the Second Derivative Test

E. Limits at Infinity

F. A Summary of Curve Sketching

H. Optimization Problems

I. Indeterminate Forms and l’Hopital’s Rule

IV. Integration

A. Antiderivatives and Indefinite Integration

B. Area

C. Reimann Sums and Definite Integrals

D. The Fundamental Theorem of Calculus

E. Integration by Substitution

F. Numerical Integration

G. The Natural Logarithmic Function: Integration

H. Inverse Trigonometric Functions: Integration

I. Hyperbolic Functions

V. Applications of the Definite Integral

A. Area of a Region Between Two Curves

B. Volume: The Disk Method

C. Volume: The Shell Method

D. Arc Length and Surfaces of Revolution