LABETTE COMMUNITY COLLEGE BRIEF SYLLABUS

SPECIAL NOTE:
This brief syllabus is not intended to be a legal contract. A full syllabus will be distributed to students at the first class session.

TEXT AND SUPPLEMENTARY MATERIALS USED IN THE COURSE (if any):

Please check with the LCC bookstore http://www.labette.edu/bookstore for the required texts for this class.

COURSE NUMBER: MATH 130

COURSE TITLE: CALCULUS I

SEMESTER CREDIT HOUR: 5

DEPARTMENT: Mathematics

DIVISION: General Education

PREREQUISITE: MATH 125-Trigonometry or recommendation of placement test.

REVISION DATE: 4/2013

COURSE DESCRIPTION:
This first course in the calculus sequence will cover the concepts of limits and continuity of polynomial, rational, trigonometric, and exponential functions. The concepts of rate of change and derivative will be applied to these functions. The course will come to a close with the concepts of the anti – derivative and properties and definition of the definite integral. This course is required of any student seeking a degree in physics, mathematics, engineering, chemistry, and other related fields at a four-year institution.

COURSE OUTCOMES AND COMPETENCIES:
The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.
Kansas Regents Shared Number Course MAT 2010

Students who successfully complete this course will be able to:

1. Apply the concepts of limits and continuity to algebraic, trigonometric, and exponential functions.

- Evaluate limits using graphs and algebraic techniques.
- Evaluate one-sided limits.

- Evaluate limits involving infinity.
- Apply the continuity test to establish continuity at a point and on a domain.
- Apply limits to establish tolerances and to average rates of change.

2. Define, find, and apply derivatives of the functions of Outcome #1.

- Calculate instantaneous rates of change of functions.
- Differentiate functions using the Power Rule.
- Differentiate functions using the Sum and Difference Rules.
- Differentiate functions using the Product Rule.
- Differentiate functions using the Quotient Rule.
- Differentiate functions using the Chain Rule.
- Differentiate functions using Implicit Differentiation.

3. Use the derivative of a function to solve applied problems.

- Use the concept of related rates of change to solve problems in physical science.
- Optimize functions using the First Derivative Test.
- Optimize functions using the Second Derivative Test.
- Apply the derivative tests in order to graph functions.
- Apply Newton's Method to establish roots of functions.
- Linearize functions using the first derivative at a point.

4. Define and determine anti-derivatives and integrals of the functions of Outcome #1.

- Determine the general anti-derivative $\left(\int f(x)dx\right)$ of these functions.
- Evaluate Riemann sums to determine an approximation of area under a curve

Area $= \left(\int_a^b f(x)dx\right)$.

- Apply the Fundamental Theorem of Calculus to evaluate $\left(\int_a^b f(x)dx\right)$.
- Calculate the exact area under a curve using Area $= \left(\int_a^b f(x)dx\right)$.
- Apply substitution techniques (U , dU) to evaluate $\left(\int f(x)dx\right)$.
    - Apply the Trapezoid Rule and Simpson's Rule to determine the value of $\left(\int_a^b f(x)dx\right)$ numerically.