Department Master Syllabus

**Camden County College**

**Blackwood, NJ 08012**

**Course Title**: Calculus I

**Course Number**: MTH-140

# Department/Program Affiliation: Mathematics

**Date of Review: 11/2018**

(This Department Master Syllabus has been examined by the program/department faculty members and it is decided that no revision is necessary at this time.)

**Date of Last Revision**: **11/2018**

(This Department Master Syllabus has been examined by the program/department faculty members and it is decided a change requiring a revision is necessary at this time.)

**N.B.** A change to the course materials alone (textbooks and/or supplementary materials) may not constitute a revision. Any other change to the items listed below on this form is considered a revision and requires approval by the program faculty at a Program/Department Meeting and by the division at a Chairs and Coordinator Meeting.

**Credits:** **4**

**Contact Hours: Lecture** **4 Lab** **0** **Other 0**

**Prerequisites:** MTH-125 (Accelerated Precalculus) ***OR***MTH-124 (Precalculus Mathematics II) **OR** proper placement exam score.

**Corequisites:** None

**Course Description:** This is the first course of the calculus sequence intended for science, technology, engineering, and math majors. Topics covered include: limits and continuity of functions, differentiation of algebraic, and transcendental functions, applications of the derivative, anti-differentiation of algebraic and transcendental functions.

**Course Student Learning Outcomes:** (Cognitive, Psychomotor, Affective Domains)

Upon completion of this course, the student will be able to…

* Calculate limit of polynomial, rational, trigonometric, and radical functions using Sum rule, Difference Rule, Product Rule, Constant Multiple rule and Quotient rule, as assessed by tests, quizzes, homework, or projects.
* Identify the discontinuity of a function at a point using the definition of continuity, as assessed by tests, quizzes, homework, or projects.
* Compute the derivative of a function using the limit definition, as assessed by tests, quizzes, homework, or projects.
* Find the derivative, antiderivative, definite and indefinite integral of functions using various analytical and numerical techniques, as assessed by tests, quizzes, homework, or projects.
* Use the graphing calculator or computer technology to describe mathematical concepts, as assessed by tests, quizzes, homework, or projects.
* Solve related rates of change problems involving real world applications, as assessed by tests, quizzes, homework, or projects.

**General Education Student Learning Outcomes:**

Students will apply appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

**Course Outline:**

**Unit I. Functions (Review only)**

Review of functions

Representing functions

Inverse, exponential, and logarithmic functions

Trigonometric functions and their inverses

**Unit II. Limits**

The idea of limits

Definitions of limits

Techniques for computing limits

Infinite limits

Limits at infinity

Continuity

Precise definitions of limits

**Unit III. Derivatives**

Introducing the derivative

Working with derivatives

Rules of differentiation

The product and quotient rules

Derivatives of trigonometric functions

Derivatives as rates of change

The Chain Rule

Implicit differentiation

Derivatives of logarithmic and exponential functions

Derivatives of inverse trigonometric functions

Related rates

**Unit IV. Applications of the Derivative**

Maxima and minima

What derivatives tell us

Graphing functions

Optimization problems

Linear approximation and differentials

Mean Value Theorem

L’Hôpital’s Rule

Newton’s Method **(Optional)**

Antiderivatives

**Unit V. Integration**

Approximating areas under curves

Definite integrals

Fundamental Theorem of Calculus

Working with integrals

Substitution rule

**Unit VI. Application of Integration**

Regions between Curves

**Course Activities:**

The classroom activities will include formal and informal lectures where new material and assigned problems will be explained. Students will be encouraged to participate in discussion during the presentation and at times present problems on the blackboard. Time will be set aside to answer specific questions concerning homework problems and other previous material. Software and/or calculators (TI 83, 84, 89) exercises will be given and methods of analysis will be discussed.

**Assessment of Student Learning Outcomes**: The student will be evaluated on the degree to which student learning outcomes are achieved.. In addition to a minimum of two tests, a variety of methods may be used such as class participation, projects, homework assignments, etc. (There must be some evidence that the learning outcomes have been achieved.) Student progress will be evaluated on the following basis:

1. Unit Tests

2. Periodic Quizzes, if you deem they are necessary to motivate students to study and attend

class on a regular basis.

3. Electronic Homework assignments, if graded.

4. Other graded homework or software projects.

5. Class attendance, if you have specified this at the beginning of the semester.

6. Comprehensive final examination (optional).

# Grading:

Grades will be based on student's performances on examinations and quizzes.

Percentages will be assigned by each professor.

**A** 90 to 100

**B** 80 to 89

**C** 70 to 79

**D** 60 to 69

**F** Below 60

**I** Incomplete (only under extreme emergencies) Must be completed within one semester.

**NA** Not Attending

**XA** Never Attended

**W** Withdraw (student must submit an official withdrawal form

by the deadline).

**Course Materials:**

**Textbook:** *Calculus, Early Transcendental Functions*, Briggs, Cochran and Gillett

current edition.

**Supplemental Materials:**

## **T1-83/84 Plus Graphing Calculator – recommended**

Textbook specific course management system.