**MATH 123 CALCULUS I**

**Department:** Mathematics and Computer Science

**Designation:** Required

**Catalog Data:** (4-0) 4 credits. Prerequisite: MATH 115 with a minimum grade of “C” or appropriate mathematics placement or permission of instructor. Students who are initially placed into MATH 102 or below must complete MATH 102 and MATH 120 with a minimum grade of “C” before enrolling in MATH 123. Students who are placed in MATH 120 should consult their advisor to determine whether their placement score was sufficiently high to allow concurrent registration in MATH 123. The study of limits, continuity, derivatives, applications of the derivative, antiderivatives, the definite and indefinite integral, and the fundamental theorem of calculus.

**Prerequisites:** College Algebra (MATH 102) with a grade of C or better or an acceptable ACT score. Corequisite of Trigonometry (MATH 120) with a grade of C- or better or an acceptable score on the COMPASS Placement Exam.

**Textbook:**  Calculus by Rogawski, published by Freeman, 2008.

**Course Learning Outcomes:**  As a result of taking a course meeting this goal, students will:

1. Use mathematical symbols and mathematical structure to model and solve real world problems. Assessment: Students will

* + Identify, interpret, and correctly apply standard mathematics symbols to solve problems requiring the derivative. This will be demonstrated on quizzes, labs, homework, and/or exams.
  + Identify, interpret, and correctly apply standard mathematics symbols to solve problems requiring the integral. This will be demonstrated on quizzes, labs, homework, and/or exams.

2. Demonstrate appropriate communication skills related to mathematical terms and Assessment: Students will

* + Correctly use functional notation of algebra, trigonometry, and calculus. This will be demonstrated on quizzes, labs, homework, and/or exams.

3. Demonstrate the correct use of quantifiable measurements of real world situations Assessment: Students will

* + Apply their knowledge of the integral in applications such as area and volume. This will be demonstrated on quizzes, labs, homework, and/or exams.
  + Apply their knowledge of the derivative in applications such as curve sketching, optimization, velocity, and acceleration. This will be demonstrated on quizzes, labs, homework, and/or exams

**Topics:** The study of limits, continuity, derivatives, applications of the derivative,

antiderivatives, the definite and indefinite integral, and the fundamental

theorem of calculus.

**Class/Laboratory Schedule:** variable

**Contribution to Criterion 5:** basic math and sciences

**Relationship of Course to ABET Outcomes (a) through (k)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Level of Emphasis** | | |
|  | Low | Medium | High |
| **ABET Outcome** |  |  |  |
| (a) an ability to apply knowledge of mathematics, science, and engineering |  |  | X |
| (b) an ability to design and conduct experiments, as well as to analyze and interpret data |  |  |  |
| (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability |  |  |  |
| (d) an ability to function on multidisciplinary teams |  |  |  |
| (e) an ability to identify, formulate, and solve engineering problems |  |  |  |
| (g) an ability to communicate effectively |  |  |  |
| (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context |  |  |  |
| (i) a recognition of the need for, and an ability to engage in life-long learning |  |  |  |
| (j) a knowledge of contemporary issues |  |  |  |
| (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. |  | X |  |

**Prepared By:** Dr. Kyle Riley, Department Chair; June 1, 2010