ABET Course Syllabus for MATH 172: Calculus I

1. Course number and name: MATH 172: Calculus I

2. Credits and contact hours: 5 credit hours, 5 hours per week

3. Instructor's Name: Dr. Emilie Hancock

4. Textbook, title, author, and year:
    - *Calculus*, 4th Edition (Early Transcendentals) by Rogawski, Adams, and Franzosaa.

    a. Other supplemental materials:
        - A computer
        - Decent internet connections
        - A method to convert images to PDF
        - Zoom access

5. Specific course information:
    a. Brief description of the content of the course (catalog description): Theory, techniques, and applications of differentiation and integration of the elementary functions

    b. Pre-requisites: Prerequisites: Completion of MATH 154 with a grade of C or higher or an appropriate test score on the mathematics placement exam.

    c. Required, elective, or selected elective (as per Table 5-1) course in the program: Required

6. Specific goals for the course:
    - Unit 1: Functions, Function Representations, and Function Properties
    - Unit 2: The Derivative
    - Unit 3: Modeling the Real-world with the Derivative

    a. Specific outcomes of instruction:
        - Understand and determine limits and continuity of functions. [Unit 1]
        - Make connections between the definition of the derivative of a function and its different representations: numerical/tabular, verbal description (often of a real-world situation), symbolic (algebraic expressions and equations), and graphical [Unit 2]
        - Determine the derivative of a function algebraically using the definition of derivative and using derivative shortcuts/rules. [Unit 2]
        - Apply the derivative to determine properties of functions, including maxima/minima. [Unit 3]
        - Model situations using the derivative of a function, including the optimization of quantities. [Unit 3]

    b. Criterion 3 student outcomes addressed by course:
        - 3 (1)

7. Brief list of topics covered:
    - Limits and Continuity
    - The definition of the derivative
    - L'Hopital's rule to compute derivatives
    - Graphical representations of limits
    - Methods of differentiation (power, product, quotient, chain rules)
    - Applications of the derivative to graphing functions
    - Applications of the derivative to one-dimensional motion
    - Applications of the derivative to optimization problems