Carthage Mathematics Department
Course Summary for Math 1120 Calculus I

1. Credits: 4 credits
2. Semesters Offered: Fall, Spring
3. Text(s): *Thomas' Calculus: Early Transcendentals, Single Variable* by Hass, Heil, and Weir, 14th edition, with MyMathLab, Pearson, 2018.
4. Topics Covered:
    a. Limits: the concept, the formal definition, infinite including L'Hopital's Rule.
    b. Tangent lines and velocity to motivate the derivative.
    c. Derivatives from the definition and proper notation for the derivative.
    d. Basic Derivatives of powers, trigonometric functions, inverse trigonometric functions, exponential functions, and logarithm functions.
    e. Computing Derivatives using the sum rule, product rule, quotient rule, and chain rule.
    f. Implicit Differentiation.
    g. The Mean Value Theorem.
    h. Higher order derivatives.
    i. Linear Approximations.
    j. Applications, including related rates, optimization, and graphing.
    k. Newton's Method.
    l. Basic antiderivatives.
    m. Riemann sums.
    n. The Fundamental Theorem of Calculus.
    o. Area as an integral.
    p. Volume, including solids of revolution.
5. Skills Enhanced:
    a. Technical writing
        i. At instructor's discretion, approximately 8 pages of written work expected.
        ii. Complete sentences, clear exposition, and correct notation emphasized.
        iii. Revisions based on feedback from instructor are strongly encouraged.
    b. Computer skills
        i. Mathematica: defining and graphing functions, solving equations, derivatives, list structures
        ii. Word: basic document preparation skills, equation editor and importing images
        iii. (optional) Excel: defining functions, graphing
6. Sample Syllabus:
    a. Sections 1.1-1.6 (or sufficient review of background material)
    b. Sections 2.1-2.6
    c. Sections 3.1-3.11
    d. Sections 4.1-4.8
    e. Sections 5.1-5.6
    f. Sections 6.1, 6.2
7. Miscellanea
    a. Math 1120 is expected to meet four days per week, for approximately 200 minutes per week, even though it is scheduled for 295 minutes. It is appropriate but not expected that the instructor use more than 200 minutes for instructional purposes.
    b. Math 1120 can be taught as a WI course, in which case 16 pages of written work are required, and significant revisions based on feedback are expected.   Contact the Chair of the WAC Committee for details.

     c. Math 1120 in the fall can be taught as an honors course. Contact the Director of Honors for details.

8. Course Goals: By the end of the course, students should be able to do the following.

     a. Compute or recall derivatives and antiderivatives involving polynomials, trigonometric functions, exponential functions, and logarithmic functions.

          i. Assessment: The final exam includes questions that require this knowledge.

     b. Use the sum rule, product rule, quotient rule, and chain rule to compute derivatives.

          i. Assessment: The final exam includes questions that require this knowledge.

     c. Interpret and identify differential calculus material in graphs.

          i. Assessment: The final exam includes questions that require this ability.

     d. Write calculus material using correct notation and appropriate form.

          i. Assessment: Homework is evaluated on correctness of writing as well as computation.

          ii. Assessment: Formal writing assignments are evaluated for correctness of writing as well as computation.

     e. Demonstrate sufficient knowledge of the course content.

          i. Assessment: Exams, quizzes, and homework assignments. Sufficient knowledge is required to obtain a passing grade. The knowledge must be demonstrated on homework and exams.