**BARTON COMMUNITY COLLEGE**

**COURSE SYLLABUS**

**I. GENERAL COURSE INFORMATION**

Course Number: MATH 1832

Course Title: Analytic Geometry and Calculus I

Credit Hours: 5

Prerequisites: MATH 1830 Trigonometry with a grade of C or better or appropriate placement

score

Division/Discipline: Academics Division/Mathematics and Science

Course Description: A study of limits, differentiation, definite and indefinite integration of polynomial, trigonometric, exponential, logarithmic and inverse trigonometric functions.

**II. INSTRUCTOR INFORMATION**

**III. COLLEGE POLICIES**

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The College assumes that its students and faculty will demonstrate a code of personal honor that is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. The student is responsible for learning the rules of, and avoiding instances of, intentional or unintentional plagiarism. Information about academic integrity is located in the Student Handbook.

The College reserves the right to suspend a student for conduct that is determined to be detrimental to the College educational endeavors as outlined in the College Catalog, Student Handbook, and College Policy & Procedure Manual. [Most up-to-date documents are available on the College webpage.]

Any student seeking an accommodation under the provisions of the Americans with Disability Act (ADA) is to notify Student Support Services via email at [disabilityservices@bartonccc.edu](mailto:disabilityservices@bartonccc.edu).

**IV. COURSE AS VIEWED IN THE TOTAL CURRICULUM**

Analytic Geometry and Calculus I is an approved general education course at BCC, which can be used to fulfill degree requirements as a fundamental mathematics course. Calculus I meets the calculus requirements of students majoring in the life and social sciences and provides the basis for further study of calculus in engineering, mathematics, and mathematics education.

This course transfers well to most of the regent universities as a five credit hour Calculus I. However, requirements vary among institutions, and even within departments, and often without much notification. Thus, it is the student’s responsibility to be in contact with the transfer institution throughout his/her tenure at Barton Community College to insure that the student is enrolling in the most appropriate set of courses for the transfer program. http://bartonccc.edu/transfer/schools

The learning outcomes and competencies detailed in this course syllabus meet or exceed those specified for this course by the Kansas Core Outcomes Groups project, and as approved by the Kansas Board of Regents – <http://kansasregents.org/transfer_articulation>.

**V. ASSESSMENT OF STUDENT LEARNING**

Barton Community College is committed to the assessment of student learning and to quality education. Assessment activities provide a means to develop an understanding of how students learn, what they know, and what they can do with their knowledge. Results from these various activities guide Barton, as a learning college, in finding ways to improve student learning.

Course Outcomes, Competencies, and Supplemental Competencies:

A. Utilize the definition of a limit to compute and interpret the nature of a function.

1. Evaluate the limit of a function at a point both algebraically and graphically.

2. Evaluate the limit of a function at infinity both algebraically and graphically.

3. Use the definition of a limit to verify a value for the limit of a function.

4. Determine the continuity of a function using the definition of a limit.

5. Justify a function’s continuity using the Intermediate Value Theorem.

6. Determine the differentiability of a function using the definition of a limit.

7. Differentiate a function using the limit definition of a derivative.

B. Apply the patterns of differentiation to find the derivative of a given function.

1. Compute a derivative of a function involving powers, exponents and sums.

2. Calculate a derivative of a function involving products and quotients.

3. Produce the derivative of a function involving compositions of functions.

4. Find the derivative of a function involving transcendental functions including exponential, logarithmic and trigonometric functions.

5. Differentiate a function that is defined implicitly.

C. Compile and synthesize information concerning a function using derivation to sketch the graph of a function.

1. Detect the critical point(s) of a function using the first derivative.

2. Show that between two points on a continuous curve, there is a point on the curve in which the slope of a tangent line to the point is the same as the slope of a secant line between the two points on the curve using the Mean-Value Theorem.

3. Determine the inflection point(s) for a function using the second derivative.

4. Find the intervals of increasing and decreasing and local extrema using the first derivative.

5. Determine the concavity of a function using the second derivative.

6. Sketch the graph of a function using information gathered from the first and second derivatives.

7. Interpret graphs of functions.

D. Apply differentiation to theoretical and practical situations and interpret the results.

1. Use the derivative to find velocity, acceleration and other rates of change.

2. Use the derivative to find the equation of a tangent line to a curve at a given point.

3. Use optimization techniques in areas such as economics, life sciences, physical sciences and geometry.

4. Solve related rate problems.

5. Use differentials to estimate change.

6. Find the root of a function using Newton’s Method.

E. Utilize the definition of an antiderivative to perform integration and interpret the nature of a function.

1. Find area using Riemann sums and integrals.

2. Write the limit of a Riemann sum as a definite integral.

3. Evaluate the definite integral using geometry.

4. Integrate algebraic, exponential and trigonometric functions.

5. Evaluate definite integrals using the Fundamental Theorem of Calculus.

6. Apply the Mean-Value Theorem for integrals.

7. Integrate indefinite integrals.

8. Integrate using substitution.

9. Approximate integrals using Simpson’s Rule and the Trapezoidal Rule.

**VI. INSTRUCTOR’S EXPECTATIONS OF STUDENTS IN CLASS**

**VII. TEXTBOOKS AND OTHER REQUIRED MATERIALS**

**VIII. REFERENCES**

**IX. METHODS OF INSTRUCTION AND EVALUATION**

**X. ATTENDANCE REQUIREMENTS**

**XI. COURSE OUTLINE**