

<b>Community College of Allegheny County</b>
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**CREDIT COURSE SYLLABUS**

**COURSE NUMBER: MAT 220**

**COURSE TITLE: Business Calculus**

**CREDITS: 4**

**HOURS:      Lecture: 4                      Lab:**  
**Clinical:                      Studio:                      Practicum:**

**PREREQUISITES: MAT 120 or MAT 142**

**COREQUISITES:**

**CATALOG COURSE DESCRIPTION:**

A calculus course designed for students majoring in business and social sciences. Topics include: Explicit and implicit differentiation of polynomial, rational, exponential and logarithmic functions; graphing techniques based on the first and second derivatives of a function; definite and indefinite integration; partial differentiation of multivariate functions; maximization and minimization of functions.

**LEARNING OUTCOMES:**

Upon successful completion of the course, the student will:

1. Compute limits of polynomial, rational, exponential and logarithmic functions.
2. Identify intervals in which polynomial, rational, exponential and logarithmic function are continuous.
3. Differentiate polynomial, rational, exponential and logarithmic functions, including those that require implicit differentiation.
4. Apply differentiation techniques to find the following for a given function: intervals where increasing, intervals where decreasing, extrema, inflection points and concavity.
5. Sketch the graph of a function based on its first and second derivative.
6. Solve optimization problems using the derivative.
7. Produce the indefinite integral of a function.
8. Calculate the definite integral of a function.
9. Compute the area of a region using the definite integral.
10. Solve application problems using the definite integral.
11. Differentiate multivariate functions.
12. Apply partial derivatives to optimization problems involving multivariate functions, including those subject to constraining conditions.

**LISTED TOPICS:**

1. Functions, Limits, and Continuity
2. Differentiation: The Derivative of a Function, Techniques of Differentiation, Higher Order Derivatives and the Chain Rule
3. Applications of the Derivative: Graphing and Finding Maxima and Minima of Functions
4. Additional Differentiation Topics: Differentiation of Exponential and Logarithmic Functions and Implicit Differentiation

5. Applications of Differentiation
6. Integration: Antiderivatives, Indefinite Integral, Techniques of Integration, Definite Integral, Area Under and Between Curves
7. Applications of Integral Calculus in Business and the Social Sciences
8. Multivariate Calculus: Partial derivatives, Maximal and Minima, Maxima and Minima Subject to Constraining Conditions Using LaGrange Multipliers
9. Applications of Multivariate Calculus

**REFERENCE, RESOURCE, OR LEARNING MATERIAL TO BE USED BY STUDENT:**  
Each student will be required to have the textbook, on-line homework system and calculator adopted by the Mathematics Department at the specific campus.

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Approved by the President on: Quintin B. Bullock 03/28/2017

Start Year/Term: \_\_\_\_\_