Authorizing Signature: _____

Date: _____

LEHIGH CARBON COMMUNITY COLLEGE

MASTER COURSE OUTLINE

for

# MAT 188 – BUSINESS CALCULUS

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| Division/Department: | Mathematics |
| Submitted by: | Eric Werley, Mathematics |
| Course Origination Date: | Fall 2012 |
| Review Date: | Fall 2016 |
| Credit Hours: | 3 |
| Lecture Hours: | 3 |
| Laboratory Hours: | 0 |
| Other: | N/A |
| Prerequisite(s): | MAT 160 (at least a "C") or LCCC Algebra Placement Testing score of 109 and equivalent high school mathematics background |
| Corequisite(s): | None |

## Course Description

Designed for students in business programs. Topics covered include linear, quadratic, polynomial, rational, exponential and logarithmic functions, differential and integral calculus of a single variable; and various applications to business and economics.
NOTE: This course is not to be taken in place of MAT 190 (Calculus & Analytic Geometry I) and does not serve as a prerequisite to MAT 195 (Calculus & Analytic Geometry II).
**A graphing calculator is required (TI-83/84 or 83/84 PLUS preferred).**

## Course Objectives

1) Use algebraic problem solving techniques of linear, quadratic, polynomial, rational, exponential and logarithmic functions and apply to business/economics settings.

2) Find the limit of a function.

3) Find the derivatives of functions using various rules and apply the derivative to problems involving curve-sketching, optimization, elasticity, and other applications to business/economics.

4) Find definite and indefinite integrals and apply to such topics as area, average value and consumer/producer surplus.

## Course Content

I. Functions and Graphs
   - A. Linear Functions
   - B. Quadratic Functions
   - C. Polynomial & Rational Functions
   - D. Exponential Functions
   - E. Logarithmic Functions
   - F. Applications to Business and Economics

II. Limits and the Derivative
   - A. Limits (Numerically and Analytically)
   - B. Infinite Limits and Limits at Infinity
   - C. Continuity
   - D. The Derivative
   - E. Differentiation Rules
   - F. Product and Quotient Rules
   - G. Chain Rule
   - H. Implicit Differentiation
   - I. Differentials

III. Applications of the Derivative
   - A. Marginal Analysis (Profit, Revenue, Cost)
   - B. Compound Interest (Definite Periods and Continuous Compounding)
   - C. Related Rates
   - D. Elasticity of Demand
   - E. Absolute Extrema
   - F. Optimization and Curve Sketching

IV. Antiderivatives and Applications
   - A. Antiderivatives and Indefinite Integrals
   - B. Integration by Substitution
   - C. The Definite Integral
   - D. The Fundamental Theorem of Calculus
   - E. Area Under a Curve
   - F. Area Between Curves
   - G. Consumer/Producer Surplus

## Grading Procedures

At least three major examinations and a comprehensive final exam should be given. It is also appropriate to give quizzes. Given the applied nature of this course, it is recommended to also give out-of-class assignments in which students will further explore the applications to the calculus techniques learned in this course.

## Textbook(s)

Lial, Greenwell, Ritchey, Calculus with Applications. Pearson, 11th edition, 2016

## Bibliography

Lial, Greenwell, Ritchey, Calculus with Applications. Pearson, 10th edition, 2012

Barnett, Ziegler and Byleen, Calculus for Business, Economics, Life Sciences, and Social Sciences. Pearson, 12th edition, 2011

Goldstein, Lay, Schneider, Asmar , Calculus & Its Applications. Pearson, 12th edition, 2010

Hoffmann, Bradley, Sobecki and Price, Calculus for the Business, Economics, and the Social and Life Sciences, McGraw Hill, 11th edition, 2013

Bittinger, Ellenbogen, Suegent, Calculus and Its Applications. Pearson, 10th edition, 2012

## Collegewide Student Learning Competencies

| Collegewide Student Learning Competencies | Check if addressed by this course | Describe tools used for measurement |
|---|---|---|
| 1. Think critically | X | Exams, Quizzes, Assignments/Projects |
| 2. Communicate effectively | X | Exams, Quizzes, Assignments/Projects |
| 3. Apply quantitative reasoning | X | Exams, Quizzes, Assignments/Projects |
| 4. Participate cooperatively within a team | | |
| 5. Use current technology effectively | X | Exams, Quizzes, Assignments/Projects |
| 6. Apply information literacy skills | | |
| 7. Analyze human diversity | | |
| 8. Apply scientific reasoning | | |
| 9. Evaluate ethical aspects of decision making | | |

PERM MAT188
8/8/16

OFFICIAL (AC)

# Lehigh Carbon Community College

Course Number and Title: MAT 188 – Business Calculus Date: Fall 2016

## Course-Specific Student Learning Competencies

| Objective | Means for Addressing Objective | Means for Measuring Objective |
|---|---|---|
| Use algebraic problem solving techniques to linear, quadratic, polynomial, rational, exponential and logarithmic functions and apply to business/economics settings. | Lecture, discussion, group projects, and/or out-of-class homework assignments. | Exams, Quizzes, Projects/Assignments |
| Find the limit of a function. | Lecture, discussion, group projects, and/or out-of-class homework assignments. | Exams, Quizzes, Projects/Assignments |
| Find the derivatives of functions using various rules and apply the derivative to problems involving curve-sketching, optimization, elasticity, and other applications to business/economics. | Lecture, discussion, group projects, and/or out-of-class homework assignments. | Exams, Quizzes, Projects/Assignments |
| Find definite and indefinite integrals and apply to such topics as area, average value and consumer/producer surplus. | Lecture, discussion, group projects, and/or out-of-class homework assignments. | Exams, Quizzes, Projects/Assignments |

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