***Business Calculus***

***Math 0120***

 ***4 Credits***

1. This course is an introduction to calculus for students in business, economics and other social sciences. Application of concepts is stressed throughout the course.

2. A rigorous high school algebra that includes exponentials and logarithmic functions or precalculus is a prerequisite for the course. Proficiency in algebraic manipulation is essential.

3. The grade is determined by the student's performance on three exams and a comprehensive final.

4. The recommended text for this course is Brief Applied Calculus by Berresford and Rockett, 6th ed. Brooks/Cole, Cengage Learning.

**The following topics are covered in the University of Pittsburgh Math 0120 course:**

**1. Derivatives**

Limits

Introduction to limits

Approaching infinity

One-sided limits

Continuity

Tangents as rate of change

Definition of derivatives

Rules for derivatives

Polynomials

Products

Quotients

Chain Rule

Powers

Implicit differentiation

Higher-order derivatives

Related rates

**2. Application of the Derivative**

Graphing using:

First derivative

Second derivative

Asymptotes and

intercepts

Absolute extrema on a

given domain

Optimizing problems

Differentials

Marginal analysis in business

**3. Exponential and Logarithmic Functions**

 Algebraic properties review

Graphs of exponential/log functions

Constant *e*

Compounding Interest

Derivatives

Chain Rule

Elasticity of Demand

**4. Integration**

Antiderivatives and Indefinite integrals

Integration rules and procedures

Polynomials

Powers

Exponentials/logarithmic

Definite integral

Definite integral as a limit of a Riemann sum

Fundamental theorem of integral calculus

Area under the curve and between curves

 Integration by substitution

 Integration by parts

 Integration using tables

 Improper integrals

Numerical Integration

Trapezoidal and/or Simpson’s Rule

 Applications

Recovering cost from marginal cost

Cost of a succession of units

Average value of a function

Consumer and producer's surplus

Differential Equations

General and particular solutions

Separation of variables

**5. Multivariable calculus**

Functions of several variables

Partial derivatives

Maxima and minima, the D test

LaGrange multipliers

**OPTIONAL:**

 Method of least squares

Double integrals over rectangular regions

 Logistic Growth

Trigonometric functions

Basic trigonometric values, graphs, and laws

 Derivatives

 Integrals

Arithmetic and Geometric Progressions