

# MATH 110

(GQ) Techniques of Calculus I (4) Functions, graphs, derivatives, integrals, techniques of differentiation and integration, exponentials, improper integrals, applications. Students may take only one course for credit from MATH 110, 140, 140A, and 140B.

Prerequisite: [MATH 022](#) or satisfactory performance on the mathematics proficiency examination

## TOPICS

### EQUATIONS AND INEQUALITIES

Linear Equations and Inequalities in One Variable

Quadratic Equations

### GRAPHS AND FUNCTIONS

Cartesian Coordinate System and Straight Lines

Functions

Linear and Quadratic Functions

### EXPONENTIAL AND LOGARITHMIC FUNCTIONS

Exponential Functions

The Exponential Functions with Base  $e$

Logarithmic Functions

### THE DERIVATIVE

Limits and Continuity - A Geometric Introduction

Computation of Limits

The Derivative

Derivatives of Constants, Power Forms and Sums

Derivatives of Products and Quotients

Chain Rule: Power Form

Marginal Analysis in Business and Economics

## GRAPHING AND OPTIMIZATION

First Derivative and Graphs

Second Derivative and Graphs

Curve Sketching Techniques

Optimization; Absolute Maxima and Minima

Increments and Differentials

## DERIVATIVE TOPICS

The Constant  $e$  and Continuous Compound Interest

Derivatives of Logarithmic and Exponential Functions

Chain Rule: General Form

Implicit Differentiation

Related Rates

Some Additional Business Applications

## INTEGRATION

Antiderivatives and Indefinite Integrals

Integration by Substitution

Differential Equations - Growth and Decay

Area Under a Curve

The Definite Integral

The Fundamental Theorem of Calculus

## INTEGRATION TOPICS

Area Between Curves

Integration by Substitution

Integration by Parts

Integration Using Tables

Improper Integrals