



Molloy University MAT 2210
Kellenberg Memorial High School
Calculus 1 Syllabus
2024-2025

CATALOG DESCRIPTION: This course is the calculus of one variable. Topics include limits, derivatives, and integration. (formerly MAT 221; MAT 125; formerly Analytic Geometry and Calculus I)

Course Learning Outcomes: Upon successful completion of MAT 2210–Calculus 1, a student will be able to:

- Determine limits and continuity analytically and graphically
- Determine derivatives using a variety of techniques and differentiate implicitly
- Examine various techniques of derivatives and apply them to a variety of models
- Evaluate indefinite and definite integrals
- Use integrals to determine area under and between curves

PREREQUISITES: Algebra 2 and Trigonometry

REQUIRED TEXT: *Calculus* 3rd Edition

Authors: Jon Rogawski and Colin Adams

Publisher: W.H. Freeman and Company

REQUIRED SUPPLIES: TI-84 Plus CE (or any other) graphing calculator

TOPICS:

Preliminary Chapter - Trigonometry and radian measure review.

- P-01 Calculator Features
- P-02 Graphing on the Calculator
- P-03 Expanding our Knowledge of Trig
- P-04 Trig Proofs

Chapter 1 - Limits

- 1-01 Simple Graphs, Useful Terms and a New Notation
- 1-02 Evaluating Limits Analytically
- 1-03 More Analytic Techniques for Evaluating Limits
- 1-04 The Difference Quotient Formula
- 1-05 Special Limits, Part A – One-Sided Limits
- 1-06 Special Limits, Part B – Infinite Limits and Limits at Infinity
- 1-07 Special Limits, Part C – Interesting and Unusual Limits
- 1-08 Continuity
- 1-09 The Intermediate Value Theorem
- 1-10 Definition of the Limit, Epsilonics
- 1-11 Graphing Piecewise Functions



Chapter 2 – Differentiation

- 2-01 The Tangent Line Problem
- 2-02 Basic Differentiation Rules
- 2-03 Rates of Change, Part 1
- 2-04 The Product and Quotient Rules for Derivatives
- 2-05 Derivatives of Trigonometric Functions
- 2-06 Higher Order Derivatives
- 2-07 The Chain Rule
- 2-08 Tangent Lines and Harmonic Motion
- 2-09 Implicit Differentiation

Chapter 3 – Applications of Derivatives

- 3-01 Applications of Derivatives -Critical Points, Intervals, Derivative Tests, Concavity, Inflection
- 3-02 Optimization (Part 1)
- 3-03 Optimization (Part 2-Finance and Economics)
- 3-04 Differentials
- 3-05 Related Rates
- 3-06 Newton's Method
- 3-07 Important Theorems for Derivatives

Chapter 4 - Integration

- 4-01 Partitions and Sigma Notation
- 4-02 Antiderivatives
- 4-03 Riemann Sums
- 4-04 Definite Integral
- 4-05 Properties of Integrals
- 4-06 Area Under the Curve
- 4-07 Area Between Two Curves
- 4-08 Integration Using Graphs
- 4-09 U-Substitution
- 4-10 Introduction to Differential Equations
- 4-11 Integration Theorems
- 4-12 Numerical Integration