

OHLONE COLLEGE
Ohlone Community College District
OFFICIAL COURSE OUTLINE

I. Description of Course:

1. **Department/Course:** MATH - 101A
2. **Title:** Calculus With Analytic Geometry
3. **Cross Reference:**
4. **Units:** 5
Lec Hrs: 5
Lab Hrs:
Tot Hrs: 90.00
5. **Repeatability:** No
6. **Grade Options:** Grade Only (GR)
7. **Degree/Applicability:**
Credit, Degree Applicable, Transferable - CSU & UC (T)
8. **General Education:** CSU General Education (Plan B)
B2 - Mathematics/Quantitative Reasoning
District General Education (Plan A)
IV-B. Analytical Thinking and Oral Communication IGETC (Plan C)
2. Mathematical Concepts/Quantitative Reasoning
9. **Field Trips:** Not Required
10. **Requisites:**
Prerequisite
MATH 188 Pre-Calculus or equivalent

12. Catalog Description:

This course includes a review of functions and graphs; elements of analytic geometry, limits, continuity, differentiation of algebraic, trigonometric, logarithmic, exponential, and inverse trigonometric functions, applications of the derivative, and introduction to integration and some applications of the definite integral.

13. Class Schedule Description:

Limits, continuity, differentiation, applications, and introduction to integration.

14. Counselor Information:

MATH 101A is the beginning course of the calculus sequence, applicable to a variety of majors (most especially mathematics, engineering, and the sciences). It is important that students be well prepared for this course by successfully completing a precalculus course (such as MATH 188 here at Ohlone) or the equivalent.

II. Student Learning Outcomes

The student will:

1. Compute limits using numerical, graphical, and algebraic methods.
2. Differentiate algebraic, trigonometric, logarithmic, exponential, and inverse trig functions.
3. Apply differentiation to problems in the areas of geometry, physics, engineering, and business, including slopes of tangent lines and rates of change.
4. Integrate algebraic, trigonometric, and exponential functions using introductory techniques.
5. Apply integration to finding the area under a curve.

6. Demonstrate logical thinking, correct use of notation, and mathematical precision in formulating and solving problems in the above areas.
7. Apply the appropriate use of a graphing calculator to each of the above areas.

III. **Course Outline:**

A. Preliminaries

1. Polynomials and rational functions
2. Graphing calculators
3. Inverse functions
4. Trigonometric and inverse trigonometric functions
5. Exponential and logarithmic functions

B. Limits

1. Preview of Calculus
2. Concept of a limit
3. Computation of limits
4. Continuity
5. Limits involving infinity
6. Formal definition of the limit

C. Differentiation

1. Tangent lines and velocity
2. The derivative
3. Computations of derivatives using the power rule
4. Product and quotient rules
5. Chain rule
6. Derivatives of trigonometric functions
7. Derivatives of exponentials and logarithms
8. Implicit differentiation and inverse trigonometric functions
9. Mean Value Theorem

D. Applications of Differentiation

1. Linear approximations and Newton's Method
2. Indeterminate forms and L'Hopital's Rule
3. Maximum and minimum values
4. Increasing and decreasing functions
5. Concavity and the Second Derivative Test
6. Overview of curve sketching
7. Optimization
8. Related rates

E. Integration

1. Antiderivatives
2. Sums and sigma notation
3. Area
4. Definite integral
5. Fundamental Theorem of Calculus
6. Integration by substitution
7. Numerical integration
8. Natural logarithm as an integral

IV. **Course Assignments:**

- A. Reading Assignments
- B. Projects, Activities, and other Assignments
 - 1. Projects
 - 2. Homework
- C. Writing Assignments

V. **Methods of Evaluation:**

- A. Exams
- B. Quizzes

VI. **Methods of Instruction:**

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Audiovisual
- E. Computer Assisted Instruction
- F. Collaborative Learning

VII. **Textbooks:**

Recommended

1. Smith & Minton *Calculus Early Transcendental Functions* 3rd Edition, McGraw-Hill, 2007 ISBN: 0073229733

Supplemental

VIII. **Supplies:**

- A. Graphing Calculator

CID 2195