SYLLABUS
PART I
EDISON COMMUNITY COLLEGE
MTH 221S CALCULUS AND ANALYTICAL GEOMETRY I
5 CREDIT HOURS

COURSE DESCRIPTION
Introduction to differential and integral calculus. Includes differentiation and integration of algebraic and transcendental functions with applications to science and engineering. Prerequisite: Satisfactory math assessment score and four years of college preparatory mathematics (including pre-calculus), or a grade of "C" or better in MTH 122S and MTH 123S**,** or MTH 128S.

COURSE GOALS

The student will:

Bloom's Level		Gen Ed Outcomes
3	1. Determine the existence of, estimate numerically and graphically, and find algebraically, the limits of functions.	1, 3
3	2. Recognize and determine infinite limits and limits at infinity and interpret them with respect to asymptotic behavior.	1, 3
3	3. Determine the continuity of functions at a point or on intervals and distinguish between the types of discontinuities at a point.	1, 3
3	4. Determine the derivative of a function using the limit definition and derivative theorems.	1, 3
2	5. Interpret the derivative as the slope of a tangent line to a graph, the slope of a graph at a point, and the rate of change of a dependent variable with respect to an independent variable.	1, 3
3	6. Determine the derivative and higher order derivatives of a function explicitly and implicitly.	1, 3
3	7. Use the appropriate techniques to solve related rate problems.	1, 3
4	8. Determine absolute extrema on a closed interval for continuous functions and use the first and second derivatives to analyze and sketch the graph of a function, including determining intervals on which the graph is increasing, decreasing, constant, concave up or concave down and finding any relative extrema or inflection points.	1, 3
3	9. Use the appropriate techniques to solve optimization problems.	1, 3
4	10. Use differentials and linear approximations to analyze applied problems.	1, 3
3	11. Use numerical methods to approximate definite integrals and areas of planar regions.	1, 3
5	12. Express definite integrals as the limits of Riemann sums.	1, 3
3	13. Use anti-derivatives, the Fundamental Theorem of Calculus, integration by substitution, and integration by parts to determine definite and indefinite integrals.	1, 3
5	14. Evaluate definite integrals in applications such as areas of planar regions, volume of solids of revolution, work, and probability.	1, 3

CORE VALUES

The Core Values are a set of principles that guide in creating educational programs and environments at Edison. They include communication, ethics, critical thinking, human diversity, inquiry/respect for learning, and interpersonal skills/teamwork. The goals, objectives, and activities in this course will introduce/reinforce these Core Values whenever appropriate.

TOPIC OUTLINE

1. Tangent and Velocity
2. The Limit of a Function
3. Calculating Limits Using the Limit Laws
4. Continuity
5. Limits Involving Infinity
6. Derivatives and Rates of Change
7. The Derivative of a Function
8. What Does *f'* Say about *f*?
9. Derivatives of Polynomials and Exponential Functions
10. The Product and Quotient Rules
11. Derivatives of Trigonometric Functions
12. The Chain Rule
13. Implicit Differentiation
14. Inverse Trigonometric Functions and Their Derivatives
15. Derivatives of Logarithmic Functions
16. Rates of Change in the Natural and Social Sciences
17. Linear Approximations and Differentials
18. Related Rates
19. Maximum and Minimum Values
20. Derivatives and the Shapes of Curves
21. Optimization Problems
22. Newton's Method
23. Anti-derivatives
24. Areas and Distances
25. The Definite Integral
26. Evaluating Definite Integrals
27. The Fundamental Theorem of Calculus
28. The Substitution Rule
29. Integration by Parts
30. Approximate Integration
31. Area Between Curves
32. Volumes of Rotation
33. Average Value of a Function
34. Applications to Physics and Engineering
35. Probability