Miami-Dade Community College
MAC 2311 Calculus and Analytic Geometry 1

Course Description: Topics include: Limits; continuity; differentiation of algebraic and transcendental functions; differentials; introduction to integration and the Fundamental Theorem of Calculus; applications. (5-hrs. lecture)

Pre-requisite: MAC 1114 and MAC 1140, or MAC 1147, with a grade of C or better or equivalent.

Course Competencies:

Competency 1:	The Student will demonstrate knowledge of limits by:

a.   Computing limits at a point and at infinity algebraically,
b.   Finding limits using L'Hopital's Rule,
c.   Applying the definition of continuity,
d.   Determining where a function is continuous or discontinuous.

Competency 2:	The Student will demonstrate knowledge of differentiation by:

a.   Defining the derivative of a function as a limit,
b.   Finding the derivative of a function using the definition,
c.   Finding the equation of the line tangent to a curve at a point using a derivative,
d.   Finding the rate of change of a function using a derivative,
e.   Finding derivatives of polynomial, trigonometric, exponential, logarithmic, and hyperbolic functions using differentiation rules,
f.   Finding derivatives using the chain rule,
g.   Implicitly differentiating equations,
h.   Computing higher order derivatives,
i.   Determining maximum and minimum points of a function and intervals where it increases or decreases,
j.   Determining points of inflection of a function and intervals where it is concave upward or concave downward,
k.   Using the first and second derivative tests to find local extrema,
l.   Applying Rolle's theorem and the mean value theorem,
m.   Solving optimization problems,
n.   Solving problems involving related rates.

Competency 3:	The Student will demonstrate knowledge of integration by:

a. Finding antiderivatives involving polynomial, trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic functions,
b. Evaluating a definite integral as a limit of a Riemann sum,
c. Computing the average value of a function over an interval,
d. Computing definite integrals using the fundamental theorem of calculus,
e. Solving applied problems using definite integrals,
f. Finding indefinite integrals with a change of variables,
g. Finding the area or regions under and between curves,
h. Finding the volume of solids of revolution.