# Miami-Dade Community College
# MAC 2312   Calculus and Analytic Geometry 2

<u>Course Description</u>     Topics include:  Techniques of integration; differentiation and integration of inverse trigonometric, exponential, logarithmic, and hyperbolic functions; sequences and power series; parametric equations and polar coordinates; improper integrals; applications. (4-hrs. lecture)

<u>Pre-requisite</u>:  MAC 2311 with a grade of C or better or equivalent.

<u>Course Competencies</u>:

**Competency 1:**  <u>The Student will demonstrate knowledge of integrating functions by:</u>

       a.     Using integration by parts,
       b.     Computing trigonometric integrals,
       c.     Using appropriate trigonometric substitutions,
       d.     Using partial fractions,
       e.     Using rationalizing substitutions.

**Competency 2:**  <u>The Student will demonstrate knowledge of approximate integration by:</u>

       a.     Using mid-point rule,
       b.     Using trapezoidal rule,
       c.     Using Simpson's rule

**Competency 3:**  <u>The Student will demonstrate knowledge of improper integrals and their convergence by</u>:

       a.     Computing convergent improper integrals of type-1 and type-2,
       b.     Identifying improper integrals that are divergent,
       c.     Using comparison theorems to test their convergence.

**Competency 4:**  <u>The Student will demonstrate knowledge of applications of integrals by</u>:

       a.     Finding the arc length,
       b.     Finding the area of surface of revolution,
       c.     Finding moments and centers of mass

**Competency 5:**  <u>The Student will demonstrate knowledge of differential equations by</u>:

       a.     Modeling differential equations,
       b.     Solving separable equations.

**Competency 6:** The Student will demonstrate knowledge of curves defined by parametric and polar equations by:

      a.     Drawing graphs of such curves,
      b.     Finding tangents and areas that involve such curves,
      c.     Finding arc lengths and areas of surface of revolutions of such curves.

**Competency 7:** The Student will demonstrate knowledge of sequences and series by:

      a.     Determining the convergence or divergence of a sequence with different techniques,
      b.     Computing the limits of convergent sequences,
      c.     Recognizing types of series, such as, geometric, telescopic, harmonic, alternating, p-series, power series etc.,
      d.     Determining convergence or divergence of a series by comparison test, limit-comparison test, integral test, alternating series test, p-series test,
      e.     Determining the absolute convergence or conditional convergence by ratio test and/or root test,
      f.     Determining the radius of convergence and the interval of convergence of a power series,
      g.     Finding the Taylor and Maclaurin series of an analytic function
      h.     Finding binomial series.