Miami Dade College

MAC 2312 Calculus & Analytical Geometry 2

Course Description: This second semester calculus course includes techniques of integration, applications of integration in STEM subjects, sequences and series, representation of functions by Taylor series, parametric equations, calculus in polar coordinates, and improper integrals. (4-hour lecture)

Course Competency	Learning Outcomes
Competency 1: The student will demonstrate knowledge of integrating functions by:	• Numbers / Data • Critical thinking • Information Literacy
1. Using integration by parts. 2. Computing trigonometric integrals. 3. Using appropriate trigonometric substitutions. 4. Using partial fractions. 5. Using rationalizing substitutions.	
Competency 2: The student will demonstrate knowledge of approximate integration by:	• Numbers / Data • Critical thinking • Information Literacy
1. Using mid-point rule. 2. Using trapezoidal rule. 3. Using Simpson's rule.	
Competency 3: The student will demonstrate knowledge of improper integrals and their convergence by:	• Numbers / Data • Critical thinking • Information Literacy
1. Computing convergent improper integrals of type-1 and type-2. 2. Identifying improper integrals that are divergent. 3. Using comparison theorems to test their convergence.	
Course Competency 4: The student will demonstrate knowledge of applications of integrals by:	• Communication • Numbers / Data • Critical thinking • Information Literacy

	• Social Responsibility
1. Finding the arc length. 2. Finding the area of surface of revolution. 3. Finding moments and centers of mass.	
Course Competency 5: The student will demonstrate knowledge of differential equations by:	• Communication • Numbers / Data • Critical thinking • Information Literacy • Social Responsibility
1. Modeling differential equations. 2. Solving separable equations.	
Course Competency 6: The student will demonstrate knowledge of curves defined by parametric and polar equations by:	
1. Drawing graphs of such curves. 2. Finding tangents and areas that involve such curves. 3. Finding arc lengths and areas of surface of revolutions of such curves.	
Course Competency 7: The student will demonstrate knowledge of sequences and series by:	• Numbers / Data • Critical thinking • Information Literacy
1. Determining the convergence or divergence of a sequence with different techniques. 2. Computing the limits of convergent sequences. 3. Recognizing types of series, such as, geometric, telescopic, harmonic, alternating, p-series, and power series. 4. Determining convergence or divergence of a series by comparison test, limit-comparison test, integral test, alternating series test, and p-series test. 5. Determining the absolute convergence or conditional convergence by ratio test and/or root test. 6. Determining the radius of convergence and the interval of convergence of a power series. 7. Finding the Taylor and Maclaurin series of an analytic function.	

8. Finding binomial series.	