MATH M25B: Calculus with Analytic Geometry II

Course Objectives (COR)

- Apply the definite integral to solve problems involving area, volume, arc length, surface area, work, moments and centers of mass in the plane, fluid pressure, and other applications such as separable differentiable equations and exponential growth and decay.
- Select appropriate techniques for evaluating an indefinite integral; techniques include basic integration forms, change of variables, integration by parts, trigonometric identities, trigonometric substitutions, partial fractions, and numerical integration, including trapezoidal and Simpson's Rule.
- Identify and evaluate improper integrals using correct limit notation.
- Determine the convergence or divergence of an infinite sequence using analytic techniques.
- Determine whether a sequence is bounded or is monotonic.
- Compute partial sums for infinite series.
- Recognize telescoping, geometric, and p-series.
- Determine the convergence or divergence of a geometric series and p-series.
- Compute the sum of a convergent telescoping series and geometric series.
- Apply appropriate tests which include the nth-term test, integral test, comparison tests, and ratio and root tests to determine the convergence or divergence of positive term series.
- Apply the algebraic properties of infinite series.
- Apply the alternating series test and analyze the remainder of an alternating series.
- Determine if a series converges absolutely, conditionally, or if the series diverges.
- Determine the interval of convergence for a power series using analysis techniques and the tests for convergence.
- Apply integration and differentiation techniques for finding power series of elementary functions.
- Compute Taylor and Maclaurin polynomial approximations of elementary functions with remainder.
- Compute the power series for an elementary function centered at a point.
- Sketch the graph of a parametric curve and indicate its orientation.
- Convert the equation of a curve given in parametric form to rectangular form, and vice versa.
- Find the slope of the tangent line at a point on a curve given in parametric form.
- Compute the arc length of a curve and the area of a surface of revolution for curves given in parametric form.
- Sketch the graph of a polar equation.
- Convert the equation of a curve given in polar form to rectangular form, and vice versa.
- Find the slope of the tangent line at a point on a curve given in polar form.
- Find the area of a region bounded by a polar equation.
- Find the arc length of a curve given in polar form.

- Compute and identify the critical information for the standard conics; for example, the vertex, directrix, and axis of symmetry for a parabola; the foci and vertices of an ellipse; and the vertices, foci, and lines of symmetry of a hyperbola.

Course Learning Outcomes (CLO)

- Students completing this course will be able to integrate varied forms of algebraic, trigonometric and transcendental functions.
- Students completing this course will be able to apply integration techniques to calculate arc length, or volume.
- Students completing this course will be able to apply proper tests to determine convergence or divergence of series and sequences.