

Math 3B – Instructional Objectives and Student Learning Outcomes

The goals of this course are to provide students with the basic knowledge of integral calculus and to prepare them for taking the courses having this one as prerequisite.

Learning Objectives Students enrolled in this course will:	Student Learning Outcomes Students that successfully complete this course will be able to:
1. Learn to work with logarithmic, exponential, and inverse trigonometric functions.	a. Find derivatives and integrals of logarithmic, exponential, and inverse trigonometric functions. b. Solve exponential growth and decay problems. c. Recognize the hyperbolic functions, find their values, and compute derivatives and integrals involving them. d. Apply L'Hospital's Rule to determine the value of indeterminate forms.
2. Learn techniques of integration	a. Evaluate definite and indefinite integrals using the appropriate technique from the following: (a) integration by parts; (b) trigonometric integrals; (c) trigonometric substitutions; and (d) partial fractions. b. Recognize an improper integral and determine if it converges or diverges. c. Approximate the value of a definite integral using the Midpoint Rule, the Trapezoidal Rule, and Simpson's Rule. d. Use the Error Bounds formulas for using the Midpoint Rule, the Trapezoidal Rule, and Simpson's Rule for determining the error or the size of the partition needed for a given accuracy level.
3. Learn to use integration to solve applications.	a. Compute the arc length of a curve. b. Compute the area of a surface of revolution. c. Solve application problems to physics, engineering, and economics.
4. Learn to solve and use separable and linear ordinary differential equations.	a. Solve separable ordinary differential equations. b. Solve linear ordinary differential equations. c. Model and solve application problems using separable and linear ordinary differential equations. d. Find numerical approximations to solutions of ordinary differential equations using Euler's Method.
5. Learn to work with parametric and polar equations.	a. Sketch curves given in parametric or polar form. b. Find the equation of tangent lines to parametric or polar curves. c. Analyze the concavity of parametric and polar curves. d. Find the arc length of parametric and polar curves. e. Compute the surface area of a surface of revolution generated by rotating a parametric curve. f. Find the area enclosed by a polar curve.
6. Learn to describe completely and sketch conic sections.	a. Find the equation of a conic section from its definition both in rectangular and polar form.

	<ul style="list-style-type: none"> b. Find all relevant features (center, vertices, foci, asymptotes, etc.) of a conic section given in rectangular form. c. Identify a conic from its polar equation and sketch its graph, locating its directrix and all other relevant features.
<p>7. Learn to work with infinite sequences and series.</p>	<ul style="list-style-type: none"> a. Determine if an infinite sequence is bounded. b. Determine if an infinite sequence is monotonic. c. Determine if an infinite sequence is convergent or divergent. d. Find the sequence of partial sums of an infinite series. e. Determine if a geometric series is convergent or divergent. f. Find the sum of a convergent geometric series. g. Determine if an infinite series is convergent or divergent by selecting the appropriate test from the following: (a) test for divergence; (b) integral test; (c) p-series test; (d) the comparison tests; (e) alternating series test; (f) absolute convergence test; (g) ratio test; and (h) root test. h. Determine if an infinite series converges absolutely or conditionally. i. Find the radius and interval of convergence of a power series. j. Find Taylor and Maclaurin series of a function. k. Use Taylor polynomials to approximate functions. l. Determine the error of the approximation of a function using Taylor polynomials.