Math 261 Course Content and Objective

COURSE CONTENT AND SCOPE - **Lecture:** Outline the topics included in the lecture portion of the course *(Outline reflects course description, all topics covered in class).*	Hours Per Topic	COURSE OBJECTIVES - **Lecture:** Upon successful completion of this course, the student will be able to...*(Use action verbs - see Bloom's Taxonomy for 'action verbs requiring cognitive outcomes.')*
Limits, calculating limits using the limit laws, the precise definition of a limit, continuity, the Intermediate Value Theorem, tangents, velocities, and other rates of change.	22	Explain the concept of limits, calculate limits using the limit laws, apply the precise definition of a limit, determine the continuity of a function, apply the Intermediate Value Theorem, explain how the idea of limit applies to tangents, velocities, and other rates of change.
The derivative as a limit. Derivatives including the differentiation formulas, the derivative as a function, rates of change in the natural and social sciences, the derivatives of trigonometric functions, the chain rule, implicit differentiation, higher derivatives, related rates, linear and quadratic approximation, and differentials. Differentiation of inverse functions.	15	Calculate the derivative of a function as a limit. Compute derivatives of functions using the differentiation formulas and apply the derivative as a function. Construct the equation of a tangent line to a function. Compute the derivatives of trigonometric functions, apply the chain rule, differentiate implicitly, take higher derivatives, solve problems with related rates, use linear and quadratic approximations of functions, and apply differentials to approximation problems. Calculate the derivative of inverse functions.
Maximum and minimum values, the Extreme Value Theorem, Fermat's Theorem, Rolle's Theorem, the Mean Value Theorem, the first and second derivative tests, concavity, points of inflection, limits at infinity, asymptotes, curve sketching, optimization, applications of the derivative to business and economics, and Newton's method.	20	Find local and global maximum and minimum values of functions on various intervals, apply the Extreme Value Theorem and Fermat's Theorem to solve optimization problems, use Rolle's Theorem and the Mean Value Theorem to relate average and instantaneous rates of change, use the first and second derivative tests, concavity, points of inflection, asymptotes, and limits at infinity to sketch the graph of a function, use Newton's method to ascertain the roots of equations.
Antiderivatives, integration, the definite integral, areas as limits, the Fundamental Theorem of Calculus, indefinite integrals, the Net Change Theorem, and evaluating definite integrals by substitution.	15	Find the antiderivative of a function, determine the area of a region, use the Riemann sum to define and evaluate the definite integral, apply the midpoint rule to approximate a definite integral, use velocity data to approximate the displacement of an object, use the Fundamental Theorem of Calculus to evaluate a definite integral, find the indefinite integrals of some simple functions, calculate the net change of a function over a time interval, apply the substitution rule to integration problems.
Applications of integration including areas between curves, volumes, volumes by slicing, volumes by	16	Find the area between two curves, determine the volume of a solid object by using cross sections, determine the

cylindrical shells, work, and the average value of a function.		volume of a solid of revolution by the method of slices, determine the volume of a solid of revolution by the method of cylindrical shells, calculate the work done, and calculate the average value of a function.
Final examination.	2	Final examination.
Total: Total Lecture Hours In Section I Class Hours:	90 90	