CURRICULUM MAP
CALCULUS

Weeks 1-4	Weeks 5-6	Weeks 7-10	Weeks 11-13	Weeks 14-18
Patterns, Functions and Algebra 1. Describe and compare the characteristics of transcendental and periodic functions; e.g., general shape, number of roots, domain and range, asymptotic behavior, extreme, local and global behavior. 2. Represent the inverse of a transcendental function symbolically. **Geometry and Spatial Sense** 1. Relate graphical and algebraic representations of lines, simple curves and conic sections. 2. Recognize and compare specific shapes and properties in multiple geometries; e.g., plane, spherical and hyperbolic. 2. Derive and apply the basic trigonometric identities; i.e., angle addition, angle subtraction and double angle. **Credit – 1.0** **Prerequisites – Trigonometry/ Pre-Calculus** **Double Block** **One Semester**	**Geometry and Spatial Sense** 1. Use matrices to represent translations, reflections, rotations, dilations and their compositions. **Number, Number Sense and Operation** 1. Determine what properties (closure, identity, inverse, commutative and associative) hold for operations with complex numbers. 2. Apply combinations as a method to create coefficients for the Binomial Theorem, and make connections to everyday and workplace problem situations.	**Measurement** 1. Solve problems involving derived measurements; e.g., acceleration and pressure. 2. Use radian measures in the solution of problems involving angular velocity and acceleration. 3. Apply informal concepts of successive approximation, upper and lower bounds, and limits in measurement situations; e.g., measurement of some quantities, such as volume of a cone, can be determined by sequences of increasingly accurate approximations.	**Patterns, Functions and Algebra** 7. Make mathematical arguments using the concepts of limit. 8. Compare estimates of the area under a curve over a bounded interval by partitioning the region with rectangles; e.g., make successive estimates using progressively smaller rectangles. 9. Translate freely between polar and Cartesian coordinate systems. 10. Use the concept of limit to find instantaneous rate of change for a point on a graph as the slope of a tangent at a point.	**Patterns, Functions and Algebra** 1. Analyze the behavior of arithmetic and geometric sequences and series as the number of terms increases. 2. Translate between the numeric and symbolic form of a sequence or series. 5. Set up and solve systems of equations using matrices and graphs, with and without technology. **Data Analysis & Probability** 2. Transform bivariate data so it can be modeled by a function; e.g., use logarithms to allow nonlinear relationship to be modeled by linear function. 11/8/2005

Twelfth Grade Indicators Only

Benchmarks

Mathematical Processes Standard

Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques, and communicate mathematical ideas. The benchmarks for mathematical processes articulate what students should demonstrate in problem solving, representation, communication, reasoning and connections at key points in their mathematics program. Specific grade-level indicators have not been included for the mathematical processes standard because content and processes should be interconnected at the indicator level. Therefore, mathematical processes have been embedded within the grade-level indicators for the five content standards.

By the end of the 11-12 program:

A. Construct algorithms for multi-step and non-routine problems.

B. Construct logical verifications or counter-examples to test conjectures and to justify or refute algorithms and solutions to problems.

C. Assess the adequacy and reliability of information available to solve a problem.

D. Select and use various types of reasoning and methods of proof.

E. Evaluate a mathematical argument and use reasoning and logic to judge its validity.

F. Present complete and convincing arguments and justifications, using inductive and deductive reasoning, adapted to be effective for various audiences.

G. Understand the difference between a statement that is verified by mathematical proof, such as a theorem, and one that is verified empirically using examples or data.

H. Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations.

I. Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.

J. Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretation of solution within the model, and validation to original problem situation.