



Course Syllabus

COURSE TITLE: Advanced Functions and Modeling

PREREQUISITE: Algebra II

DESCRIPTION: This course is an elective beyond the Algebra II level which prepares the student for college mathematics. Students review the second semester topics from Algebra II and receive a semester of Trigonometry. Advanced Algebra with Trigonometry is intended for the student who has completed the academic mathematics program through Algebra II, who wishes to obtain additional higher mathematics experience, but who does not want to take the more rigorous Pre-Calculus with Trigonometry course leading to Calculus. This course is not intended to prepare a student fully for Calculus; however, it does provide an adequate background in college mathematics for the non-engineering, non-mathematics major. The first semester reviews, reinforces, and extends the skills and concepts of Algebra II. The second semester is the study of Trigonometry.

MAIN TOPICS:

Identify, graph, and write linear, quadratic, exponential, logarithmic, rational, and radical functions and apply the concepts of linear functions to real-world models.

Find the domain, range, zeros, and inverse of a function, the value of a function for a given element in its domain, and the composition of multiple functions. Functions will include those that have domains and range that are limited and/or discontinuous.

Use the definitions of the six trigonometric functions to find the sine, cosine, tangent, cotangent, secant, and cosecant of an angle in standard position whose terminal side contains a given point.

Given one of the six trigonometric functions in standard form (e.g., $y = A \sin(Bx + C) + D$ where A, B, C, and D are real numbers), will
state the domain and the range of the function;
determine the amplitude, period, phase shift, and vertical shift; and
sketch the graph of the function by using transformations for at least a one-period interval.

Solve trigonometric equations that include both infinite solutions and restricted domain solutions and solve basic trigonometric inequalities.

**Standards for
Mathematical Practice**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

CREDIT INFO:

This course provides one of the elective credits required for a Standard or Advanced Studies Diploma. Students who have successfully completed Pre-Calculus may not take this course for credit. Students who select Advanced Algebra are required to take Trigonometry.