

**Department:** Mathematics  
**Course Name:** Honors Precalculus

**Course Description:**

This course is the highest level of mathematics preceding Calculus and prepares students for the algebraic complexities and the analytical nature of calculus. In the first semester, this course delves further into the functions and concepts learned in Algebra 2. A thorough exploration of trigonometry follows in the second semester as well as an introduction to parametric equations, polar coordinates, vector-valued functions, limits, and derivatives. The ability to synthesize material is extremely important; assessments include conceptual questions and incorporate previously studied material. The course requires the ability to write mathematics and insists on correct notation and vocabulary throughout. The graphing calculator is used for demonstrations by the instructor and for exploration by the student. While not intended to adhere to the AP Precalculus syllabus, students may take the AP Precalculus exam in the spring. This course places an emphasis on critical thinking, complex communication, collaboration, creativity, and risk-taking to prepare students for rigorous college work. A TI-84 graphing calculator is required.

**Content:**

Prerequisites  
Polynomial and rational functions  
Exponential and logarithmic functions  
Trigonometric and Polar functions  
Parametric and Vector-valued functions  
Limits and an introduction to Calculus

**Skills:**

Describing how quantities change with respect to each other  
Describing end behavior of polynomial and rational functions  
Identifying asymptotes and holes in the graphs of rational functions  
Modeling aspects of scenarios using polynomial and rational functions  
Identifying assumptions and limitations of function models  
Relating geometric sequences and exponential functions  
Modeling data sets with exponential functions  
Composing functions and finding inverses  
Modeling scenarios with logarithmic functions  
Validating a function model using a residual plot  
Relating right triangle trigonometry to the sine, cosine, and tangent functions  
Modeling data and scenarios with sinusoidal functions  
Using inverse trigonometric functions to solve trigonometric equations  
Graphing functions using polar coordinates  
Describing how angles and radii change with respect to each other in a polar graph  
Describing how quantities change with respect to each other in a parametric function  
Using vectors to describe motion of an object  
Find limits graphically, numerically, and analytically  
Use the definition of a derivative to find slopes of tangent lines

**Text and Materials:**

Stewart, Redlin, and Watson Precalculus, Mathematics for Calculus 6e (Brooks/Cole Cengage Learning, 6<sup>th</sup> ed., 2012)

Desmos and Handheld TI84 Graphing Calculator

**Methods of Instruction:**

Recitation with note taking

Guided individual practice

Interactive questioning

Graphing calculator demonstrations

**Methods of Evaluation:**

Formative and Summative (formal and informal)

Cumulative semester and final exams

