

## SYLLABUS

<b>Course Title:</b>	Pre-Calculus
<b>Course Number:</b>	Mathematics QL1080
<b>Credit Hours:</b>	5
<b>Prerequisites:</b>	Math 1010 with a grade of C or better or Math ACT score of at least 23, or placement test.
<b>Catalogue Description:</b>	A course covering college algebra and trigonometry concepts preparatory to calculus.

**Objectives:** To provide the student with college algebra and trigonometry skills and understanding. To emphasize the algebraic and trigonometric concepts that will be used in calculus. To help the student gain a measure of mathematical understanding that will aid in the understanding of subsequent courses, such as calculus.

To convey, to the extent possible using the content of this course, the quantitative literacy skill set adopted by the Utah State Board of Regents:

1. Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
2. Represent mathematical information symbolically, visually, numerically, and verbally.
3. Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
5. Recognize that mathematical and statistical methods have limits.
6. [Optional] Understand basic concepts describing time-varying systems, and how prediction follows from the formulation of basic law of change, both analytically and numerically.

Course Coverage:

1. Inequalities
  - a. Nonlinear inequalities
  - b. Inequalities involving absolute value

2. Functions and Graphs
  - a. Composition
  - b. Polynomial Functions
  - c. Rational functions and asymptotic behavior
  - d. Concept of limit
  - e. Inverse functions
  - f. Maximum and minimum applications
3. Exponential and logarithmic functions
  - a. Properties
  - b. Inverse relationships
  - c. Solving exponential and logarithmic equations
  - d. Graphs and inverse relationships
  - e. Growth and decay applications
4. Systems of equations and matrices
  - a. Solving linear systems
  - b. Solving nonlinear systems
  - c. Algebra of matrices, matrix inverse
  - d. Applications
5. Trigonometric Functions
  - a. Definitions and properties
  - b. Graphing
6. Trigonometric Identities and Equations
  - a. Sum, difference, double-angle and half-angle formulas
  - b. Simplifying trig expressions
  - c. Solving trigonometric equations
7. Trigonometric Applications
  - a. Periodic behavior
  - b. Solving right triangles
  - c. Solving general triangles using the laws of sines and cosines
  - d. Solving triangles arising from vector problems
8. Sequences
  - a. Summation notation
  - b. Arithmetic and geometric sequences
  - c. Applications
  - d. Counting theory
9. Conics and Polar coordinates
  - a. Ellipses (circles), parabolas, and hyperbolas
  - b. Relationships between polar and cartesian coordinates and equations
  - c. Graphs of equations in polar coordinates

Adopted Text: (2008) *Precalculus, 8<sup>th</sup> Edition*, by Sullivan

Required Sections:	Appendix A	A9	Chapter 7	7.1 - 7.5, 7.7, 7.8
	Chapter 2:	2.1, 2.3 - 2.5	Chapter 8	8.1 - 8.3
	Chapter 3:	3.3 - 3.5	Chapter 9	9.1, 9.2, 9.4
	Chapter 4:	4.1 - 4.4	Chapter 10	10.1 - 10.4
	Chapter 5:	5.1 - 5.8	Chapter 11	11.1 - 11.4, 11.6
	Chapter 6:	6.1 - 6.6	Chapter 12	12.1 - 12.3
			Chapter 13	13.1 - 13.3

Recommended Sections: 11.5 Partial Fraction Decomposition, 11.7 Systems of inequalities, 12.4 Mathematical Induction