



COURSE SYLLABUS

Course: Precalculus
Number: Math 136
Credit-Hours: 4 credits [semester credit hours]

Course Description: The focus of this course is on functions, which are of central importance in Calculus. Topics include definitions, properties, and applications of algebraic, inverse, exponential, logarithmic and trigonometric functions.

Prerequisites: 3 years high school mathematics or departmental consent; successful completion (C- or higher) of MATH 117 (Algebra II/College Algebra) or equivalent.

Course Workload: 4 semester credit hours • 3 student work hours per credit hour • 14 week Carnegie semester = 168 hours student course workload average

Examination Requirements: Proctored written final examination must be passed at 60% or higher to earn passing grade in course. "B" and "A" grade paths have additional examinations. See <http://www.distancecalculus.com/grades/> for more information.

Course Professor: Robert R. Curtis, Ph.D. <robert@distancecalculus.com>

University Information: Roger Williams University, University College, 1 Empire Plaza, Providence, RI, USA 02903. Accredited by New England Commission of Higher Education (NECHE). See <https://www.rwu.edu/academics/accreditations> for more information.

E-Textbook: "The Primitives of Precalculus" by Robert R. Curtis, Ph.D.
Mathematics Software: LiveMath™ Computer Algebra & Graphing System

Detailed Syllabus

1. Getting Started
 - 1.1. Email and Chat
 - 1.2. Learning About the Course
 - 1.3. Required Hardware
 - 1.4. Software Fundamentals

2. The Big Picture
 - 2.1. Solving (easy) equations in 1 variable.
 - 2.2. What if you can't solve for x ?
 - 2.3. Finding solutions numerically
 - 2.4. Finding solutions graphically
 - 2.5. Solving equations of more than 1 variable

3. Functions
 - 3.1. Function notation.
 - 3.2. Data sets
 - 3.3. Graphing functions
 - 3.4. Data sets and smooth curves
 - 3.5. Domain and Range
 - 3.6. Algebraic combinations of functions

4. Linear Functions
 - 4.1. Algebraic definition
 - 4.2. Slope
 - 4.3. Graphing linear functions by hand
 - 4.4. Properties of linear functions
 - 4.5. Linear data sets

5. Quadratic Functions
 - 5.1. Algebraic definition
 - 5.2. Graphing and Properties of Quadratic Functions
 - 5.3. Solving quadratic equations algebraically: Factoring
 - 5.4. Solving quadratic equations algebraically: Quadratic formula
 - 5.5. Solving quadratic equations numerically and graphically
 - 5.6. Complex Numbers
 - 5.7. Quadratic data sets

6. Power and Polynomial Functions
 - 6.1. Algebraic definition
 - 6.2. Graphing and Properties of Polynomial Functions
 - 6.3. Solving polynomial equations algebraically: factoring
 - 6.4. Solving polynomial equations numerically and graphically
 - 6.5. Fundamental Theorem of Algebra
 - 6.6. Radicals and fractional exponents

7. Rational Polynomial Functions
 - 7.1. Algebraic definition
 - 7.2. Graphing and Properties of Rational Polynomial Functions
 - 7.3. Solving rational polynomial equations algebraically: factoring
 - 7.4. Solving rational polynomial equations numerically and graphically

8. Inequalities, Systems of Equations
 - 8.1. Inequalities of 1 variable
 - 8.2. Inequalities of 2 variables
 - 8.3. System of Equations in 2 variables

9. Introduction to Matrices
 - 9.1. Inverses
 - 9.2. Determinants
 - 9.3. Cramer's Rule

10. Exponential Functions
 - 10.1. Algebraic definition
 - 10.2. Graphing and Properties of Exponential Functions
 - 10.3. Solving exponential equations numerically and graphically
 - 10.4. Exponential Growth and Applications
 - 10.5. Data sets and exponential functions

11. Logarithmic Functions
 - 11.1. Inverse Functions
 - 11.2. Algebraic Definition
 - 11.3. Graphing and Properties of Logarithmic Functions
 - 11.4. Solving exponential and logarithmic equations algebraically
 - 11.5. Solving logarithmic equations numerically and graphically
 - 11.6. Logarithmic Growth and Applications
 - 11.7. Data sets and logarithmic functions

12. Trigonometry

- 12.1. Geometry of Right Triangles
- 12.2. The Unit Circle
- 12.3. The (Circular) Trigonometric Functions
- 12.4. Graphing and properties of trigonometric functions: frequency, amplitude, shifting
- 12.5. Radians and degrees
- 12.6. Trigonometric identities
- 12.7. Inverse Trigonometric functions
- 12.8. Solving Trigonometric equations algebraically
- 12.9. Solving Trigonometric equations graphically and numerically
- 12.10. Applications of trigonometry
- 12.11. Laws of sines and cosines
- 12.12. DeMoivre's Theorem

13. Analytic Geometry

- 13.1. The Cone
- 13.2. Parabolae, Hyperbolae, Ellipsi
- 13.3. Polar Coordinates
- 13.4. Parametric Equations and Graphs

14. Sequences and Series

- 14.1. Sequences
- 14.2. Summation
- 14.3. Arithmetic and Geometric Sequences and Series