Precalculus 1B

Course Description: This is the second of two Web-enabled courses designed to provide students with the necessary preparation for studying calculus and other college mathematics courses. This course begins by reviewing basic concepts in trigonometry. As students continue with the course, they will learn about approximate values, trigonometric identities, graphs, and equations, logarithms, vectors, complex numbers, and polar coordinates. Throughout the course, students will discover examples of the role of mathematics in daily life.

Course Outline:

Unit 1-- Introductory Concepts
- Lesson 1 -- Sets, Lines, and Coordinates
- Lesson 2 -- Distance in a Plane, Functions, Angles
- Lesson 3 -- The Trigonometric Ratios and Functions

Unit 2-- Approximate Values and Right Triangles
- Lesson 1 -- Finding and Using Approximate Values of the Functions
- Lesson 2 -- Reference Angles, Right Triangles, and Special Angles
- Lesson 3 -- Solving, Applying Right Triangles

Unit 3-- Trigonometric Identities
- Lesson 1 -- Introduction to Trigonometric Identities
- Lesson 2 -- Functions of Two Angles
- Lesson 3 -- Half-Angle Identities, Products and Sums

Unit 4-- Trigonometric Graphs and Equations
- Lesson 1 -- Graphing the Trigonometric Functions
- Lesson 2 -- Solving Trigonometric Equations
- Lesson 3 -- Functions and Trigonometric Equations

Unit 5-- Logarithms and Oblique Triangles
- Lesson 1 -- Logarithms
- Lesson 2 -- Calculating and Solving Logarithmic Equations
- Lesson 3 -- Solving Oblique Triangles

Unit 6-- Vectors, Complex Numbers, Polar Coordinates
- Lesson 1 -- Vectors and Vector Applications
- Lesson 2 -- Complex Numbers and Operations
- Lesson 3 -- Polar Coordinates and Equations

Course Objectives:

Students will:
- Use the calculator and tables to evaluate trigonometric functions and angles.
- Use reference angles to find trigonometric functions, and apply trigonometric functions to solve right triangles.
- Solve applied problems using line of sight, angle of elevation, angle of depression, bearing, and other practical settings.
- Simplify or prove trigonometric expressions by using trigonometric identities.
- Use the formulas for the sine, cosine, and tangent of the sum and difference of two angles and for twice an angle and half an angle.
- Use sine and cosine product and sum formulas.
- Define and sketch graphs of the six trigonometric functions, and find periods and amplitudes.
- Solve trigonometric equations and check for extraneous solutions.
- Find, graph, evaluate, and solve inverse trigonometric functions.
- Solve problems involving logarithmic and exponential expressions.
- Find missing parts and areas of oblique triangles.
- Solve problems using vectors.
- Apply operations on complex numbers, sketch graphs of polar equations, and convert numbers and equations from rectangular to polar system and vice versa.

Number/Description of Projects, Exams, Activities, etc.:

- **6 Notebook Assignments -** Each unit contains a notebook assignment based on content covered in that unit. The questions require students to expand on various aspects of the content through discussion and/or exploration external to the course. Students are referred to an online discussion group or given World Wide Web links to begin their exploration.

- **6 Evaluations -** At the end of each unit there is a Unit Evaluation. The evaluations vary in the number of questions by unit but contain only multiple-choice questions.

- **Midterm and Final Evaluations -** There is a Midterm Evaluation to be completed after the Unit 3 Evaluation and the Midterm Review. There is also a Final Evaluation to be completed after the Unit 6 Evaluation and the Final Review. The Final Evaluation covers content from Units 4, 5, and 6.

Materials - Optional:

- Sullivan. *Precalculus.* Fifth edition. Prentice Hall (optional).
- The Texas Instruments T1-82 Graphing Calculator with Guidebook (same as for MTHH 031 057) is optional, but a graphing calculator of similar capability is required.
- Pad of graph paper.