Course Syllabus

Unit by unit with sections covered in Textbook shown

Trigonometry, 5th Edition, by Michael Sullivan

Prerequisties from prior mathematics courses

a. Topics From Algebra and Geometry

1. Understand the use of **set** notation and terminology
2. Describe the counting, natural, integer, rational and irrational numbers.
3. Explain what is meant by the **domain** of a variable.
4. Write expressions for distances between two points on the number line.
5. Recognize and use the **laws of exponents.**
6. Simplify principal **nth roots**.
7. Apply the Pythagorean Theorem and its converse to find the missing sides of a right triangle.
8. Know and apply the formulas for the area and circumference of a circle
9. Use **order of operation** and parentheses to find the value of numerical expressions using a **graphing calculator.**

b. Rectangular coordinates / Graphs / Circles

1. Apply vocabulary for describing the **rectangular coordinate system**
2. Derive the **Distance Formula** from the Pythagorean Theorem
3. Find distances between pairs of coordinates in a plane
4. Apply the Distance Formula to geometric figures
5. Find the **midpoint of a segment** given the coordinates of the endpoints
6. Write an equation of a circle in **standard graphing form**

NOTE: (Numbers for each topic indicate section of the textbook. ie; 1.2 means chapter 1 section 2 of the text. IF two number symbols are used "##" it indicates that material is supplemented from handouts or other activities)

1. Unit One – Pythagoras & Angle measurement

1.2 Derive the **Distance Formula** from the Pythagorean Theorem
1.2 Find distances between pairs of coordinates in a plane
1.2 Find the **midpoint of a segment** given the coordinates of the endpoints
2.1 Understanding of the meaning of vertex, initial side, terminal side and co-terminal angle.
2.1 Describe angles as positive, negative, clockwise, or counterclockwise
2.1 Understand what is meant by **quadrantal** angle
2.1 Understand what is meant be a **degree** and a **revolution**
2.1 Convert angles between **decimal degree** measure and **degree-minutes-seconds**
Understand what similarity is
Understand that basic Sine Cosine and Tangent functions are based upon similar right triangles

2. Unit Two – The Unit Circle

2.1 Describe and draw the **unit circle**
2.1 Draw a circle with center (0,0) and radius **r**, then write its equation
2.1 Measure **central angles** using **radians**
2.1 Find the length of an **arc** in a circle using degrees or radians
2.1 Convert angle measures between degrees and radians
2.1 Find **linear** and **angular speeds** of objects with circular motion
2.2 Define the six **trigonometric functions** (or circular functions)
2.2 Know what is meant by finding the **exact value**
2.2 Find the exact value of the six trigonometric functions of quadrantal angles and the **special angles** ($30°$, $45°$, $60°$) using degrees or radians
2.2 Use a calculator to find the **approximate values** of the six functions
2.3 Given the sign of two trigonometric functions, determine the quadrant in which the terminal side of the angle will lie
4.1 Given the measure of any two parts of a right triangle, find the measures of the other parts.

4.1 Know what is meant by **line-of- sight, angle of elevation & depression.**
4.1 Make and label a drawing to **model** a right triangle application

3. Unit Three – Graphing Trig. Functions (sinusoids)

2.5 Using the following in proper context: **cycle, cyclical, period, periodic, and frequency**
2.5 Graph all 6 trigonometric functions without transformation over any given interval
2.5 Graph the Sine and Cosine functions with multiple transformations
2.5 Given the graph of a sine or cosine function, **write an equation** of the function
2.5 Label coordinates on graphs, including **intercepts, maximums, and minimums**
2.5 **Write an equation** of a sine function given the coordinate and position of two points
2.5 Given the equation of a trigonometric function, determine the **amplitude, phase shift, period, and vertical shift.**
2.6 Draw **scatterplots** of sinusoidal data and sketch the curve of best fit.
2.6 Determine the **transformations** of $y = \sin\theta$ so the equation will fit the data
2.6 **Write an equation** in the form of $y = A\sin B(x - C) + D$ to model the data
2.6 Use the modal equation to **predict** y-values using the explanatory x-value

4. Unit Four – Oblique Triangles

4.2 Derive the Law of Sines
4.2 Know for which cases the **Law of Sines** applies (AAS and ASA)
4.2 Explain why the **Ambiguous Case** creates two solutions
4.2 Use the Law of Sines to solve application problems (navigation, surveying,)
4.3 Derive the Law of Cosines
4.3 Know for which cases the **Law of Cosines** applies (SAS and SSS)
4.3 Use the Law of Cosines to solve application problem
4.4 Find the area of a triangle by first finding the height
4.4 Find the area of a triangle by using the sine function
4.4 Find the area of a triangle by using Heron's Formula

5. Unit Five – Analytic Trigonometry (Identities & Equations)

3.1 Derive & Use the eight fundamental identities to verify other identities
3.1 Establish identities by working on one side of the equation only.
3.5 Find the exact values of the inverse of a trigonometric function over a given interval
3.5 Find the approximate value of inverse of a trigonometric function using a calculator
3.5 Define the restrictions on the range of each inverse function
3.6 Solve equations such as $\sin x + 1 = 2$ or $\sqrt{3}\sec x - 1 = 2$ or $4\sin^2 x = 1$ over a given interval for exact values

6. Unit Six – Polar Coordinates & Vectors

5.1 Compare **Rectangular** and **Polar** systems and Describe what is meant by the **polar axis**
5.1 Given a polar coordinate, **graph** the point on a polar coordinate system
5.5 Be able to draw a vector graphically with a protractor and ruler.
5.5 Solve vector addition problems using a graphical method
5.5 Add vectors together using a geometric method (using triangular trig functions)
5.5 Use trig functions to break vectors into their coordinate components and solve a vector addition problem algebraically.