Syllabus for Statistics/Trigonometry/Analytical Geometry

This class is designed to enhance and apply different units of statistical measure across many different settings, how to setup, read, and manipulate data given. An in-depth look at Sequences and Series is also used in the statistical analysis. Basic Trigonometric Functions, an analysis of their application and manipulations of their uses is employed in this class. A moderate look into the area of Analytical Geometry in which geometric cones and planar intersections is analyzed and dissected as well.

Topic: Exploring Data

Concepts: Variables, Tables and Graphs

Centers of Data and Weighted Averages

Creating and Using Histograms

Box Plots

Cumulative Distributions

Measures of Spread: Variance and Standard Deviation

Comparing Numerical Distributions

Using Statistics to Solve a Mystery: The Case of the Federalist

Papers

3.9 z-Scores

Topic: Counting, Probability and Inference

Concepts: Introduction to Probability

Principles of Probability

Counting Strings with Replacement

Counting Strings without Replacement

Contingency Tables

Conditional Probability

Designing Simulations

Two “Laws”, but Only One is Valid

The Chi-Square Test

Topic: Sequences and Series

Concepts: Arithmetic Sequences

Geometric and Other Sequences

End Behavior of Sequences

Arithmetic Series

Geometric Series

How Much Does a Loan Cost?

Infinite Series

Topic: Binomial Distributions

Concepts: Combinations

Pascal’s Triangle

The Binomial Theorem

Probability Distributions

Binomial Probabilities

Binomial Probability Distributions

Mean and Standard Deviation of a Binomial Random Variable

Is That Coin Fair?

Topic: Trigonometric Functions

Concepts: Magnitudes of Rotations and Measures of Arcs

Sines, Cosines, and Tangents

Basic Trigonometric Identities

Exact Values of Sines, Cosines, and Tangents

The Sine and Cosine Functions

The Tangent Function and Periodicity

Scale-Change Images of Trigonometric Functions

Translation Images of Trigonometric Functions

The Graph-Standardization Theorem

Modeling with Trigonometric Functions

Topic: Trigonometry

Concepts: Trigonometric Ratios in Right Triangles

The Inverse Cosine Function

The Law of Cosines

The Inverse Sine Function

The Law of Sines

The Inverse Tangent Function

General Solutions to Trigonometric Equations

Parametric Equations for Circles and Elipses

The Secant, Cosecant, and Cotangent Functions

From New York to New Delhi

Topic: Matrices and Trigonometry

Concepts: Matrix Multiplication

Matrices for Transformations

Matrices for Composites of Transformations

The General Rotation Matrix

Identities for cos (a + b) and sin (a + b)

Identities for cos 2⍬ and sin 2⍬

Topic: Further Work with Trigonometry

Concepts: Proving Trigonometric Identities

Restrictions on Trigonometric Identities

Polar Coordinates

Polar Graphs

The Geometry of Complex Numbers

Trigonometric Form of Complex Numbers

DeMoivre’s Theorem

Topic: Analyzing Functions

Concepts: Trigonometry and the Unit Circle

Trigonometric Functions

Topic: Algebraic Fractions and Identities

Concepts: Proving Identities

Sum and Difference Formulas

Using Identities