COURSE SYLLABUS

Course Title:	**Introduction to Computational Statistics**
Abbreviated Title As Appears on Transcript	`Intro Comp Statistics`
Course Number:	DMAT 125
Credit Hours:	4 credits [semester credit hours]

Course Description: A single course on the study of non-Calculus-based statistics, including descriptive statistics, probability, estimation, hypothesis testing, regression, and correlation, with emphasis on graphical and computational investigations, leading to the Central Limit Theorem.

Prerequisite: Successful completion of 3 years high school mathematics (C- or higher) or instructor consent.

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 https://www.distancecalculus.com/grades/ for more information.

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

University Information: Roger Williams University, University College, 1 Empire Plaza, Providence, RI, USA 02903. Roger Williams University, 1 Old Ferry Road, Bristol, RI 02809.
Accredited by New England Commission of Higher Education (NECHE).
See https://www.rwu.edu/academics/accreditation/ for more information.

E-Textbook: "The Primitives of Precalculus" by Robert R. Curtis, Ph.D.; "Statistics & LiveMath" by Robert R. Curtis, Ph.D., adapted from Davis/Porta/Uhl "Prob/Stat&Mathematica" courseware series

Mathematical Software: LiveMath™ Computer Algebra & Graphing System

ADA ACCOMMODATIONS
Roger Williams University has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Students with disabilities who need accommodations in order to fully participate in this class are urged to contact Student Accessibility Services, as soon as possible, to explore the arrangements needed to be made to assure access. Student Accessibility Services is open Monday through Friday from 8:00AM to 5:00PM Eastern Time; Email: sas@rwu.edu or Voice: 401-254-3841.

For more information about SAS, visit

Learning Outcomes for DMAT 125 - Introduction to Computational Statistics

1. To identify, manipulate, and understand the concept of data sampling
2. To graphically identify and numerically compute the variance, mean, median, mode, and other measures of descriptive statistics
3. To compute and plot various graphical descriptions of data, including histograms
4. To compute, manipulate, and understand basic concepts of probability measure
5. To compute, manipulate, and understand the concept of distributions
6. To identify, manipulate, and understand the core Normal distribution and its properties
7. To understand the Central Limit Theorem that averages of data samples tend to be normally distributed
8. To identify, manipulate, and compute confidence intervals and hypothesis testing
9. To identify, manipulate, and compute linear regression and goodness-of-fit testing

Syllabus Topics Outline for DMAT 125 - Introduction to Computational Statistics

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

2. Simulations
    2.1. Uniform Distributions
    2.2. Area via Monte Carlo Method and Geometry

3. Data Analysis
    3.1. Frequency
    3.2. Expected Value
    3.3. Cumulative Distributions
    3.4. Variance
    3.5. Histograms
    3.6. Related formulas for Expected Values and Variance

4. Probabilities
    4.1. Calculating Probability
    4.2. Union and Intersection and Probability
    4.3. Conditional Probability Formula
    4.4. Independence
    4.5. Indicator functions
    4.6. Markov's Theorem

5. Normal and Exponential Distributions

    5.1.   Normal Distributions
    5.2.   Exponential Distribution
    5.3.   Classical Usage of Normal Distributions
    5.4.   Averages of Data and Normal Distributions

6.   Random Variables
    6.1.   "Random Variables"
    6.2.   Discrete Random Variables
    6.3.   Expected Values and Variance
    6.4.   Mean, Median, and Mode

7.   Correlations
    7.1.   Interpolation and Extrapolation
    7.2.   Linear, Exponential, Polynomial Fitting
    7.3.   Expected Values, Covariance, Correlation, Regression
    7.4.   Best Fit: Data to Algebra

8.   Central Limit Theorem & Confidence
    8.1.   Central Limit Theorem
    8.2.   Sampling and Confidence Intervals
    8.3.   Hypothesis Testing