DISTANCE CALCULUS @ RWU ROGER WILLIAMS UNIVERSITY

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 and oral final examination must be passed at 70% or higher to earn passing grade in course. "B" and "A" grade paths have additional examinations and assignments. See https://www.distancecalculus.com/grades/ for more information.

Course Professor: Robert R. Curtis, Ph.D.<rcurtis@rwu.edu>, <robert@distancecalculus.com>
Roger Williams University, Extension School, 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 https://www.rwu.edu/undergraduate/academics/student-academic-success/student-accessibility-services-sas

COURSE RULES

Academic Honesty

Academic Dishonesty in a Distance course includes copying or relying upon another person's work. Working with other students is good and encouraged, but the work you submit for this course must be genuinely your own work. Private tutors are allowed, but you must notify the instructor that you have obtained a private tutor to aid in your studies. Any documented instance of Academic Dishonesty will be grounds for immediate failure in this course.

Final (and Other) Examinations

A written and oral proctored final exam will occur at the student's location over video with the course professor; The student must score 70% or higher on this final exam to be eligible to earn a passing grade in the course.

Communication

Communication is the key to success in a Distance course. It is the student's responsibility to keep good communication channels with the instructors during the course; failure to participate in the course does not constitute "dropping" the course (Withdrawal from the course must be requested in writing to the instructors before the completion date deadline)

Roger Williams University Policies & Procedures

Roger Williams University has Policies & Procedures that all students must follow, including the Roger Williams University Student Handbook. Student must agree to follow all stated rules governing student conduct listed on the Roger Williams University website, and at the Roger Williams University Course Catalog

Course Completion 1 Year Rule

All Distance Calculus students are afforded 1 Year to finish their course from the Date of Enrollment. Students will be placed in the Academic Semester based upon their Date of Enrollment for academic records purposes. If a student does not finish the course, and does not request a Course Withdrawal for a W, then an "F" grade will be issued.

No Chatbots / AI

Students must pledge to **not** use any Chatbot/AI at all - **period**. Student must pledge to **limit** use of search engines (Google, Bing, etc) to a minimal level. Student must pledge to not engage in dishonest disguise of any Chatbot/AI/Search Engine source of information as student's own honest academic work. Verified chatbot usage will result in an "F" course grade, and will be referred to the Roger Williams University Academic Integrity Committee.

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