



COURSE SYLLABUS

Course: Basic Statistics
Number: Math 124
Credit-Hours: 3 credits [semester credit hours]

Course Description: Emphasizes descriptive statistics, probability, estimation, hypothesis testing, regression and correlation.

Prerequisites: 3 years high school mathematics or departmental consent

Course Workload: 3 semester credit hours • 3 student work hours per credit hour • 14 week Carnegie semester = 126 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 <http://www.distancecalculus.com/grades/> for more information.

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

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

E-Textbook: “Introduction to Statistics” by Robert R. Curtis, Ph.D., adapted from “Probability, Statistics & Mathematica” by Davis/Porta/Uhl

Mathematics Software: LiveMath™ Computer Algebra & Graphing System

Detailed Syllabus

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