



2016 UT Summer Statistics Institute

The Department of Statistics and Data Sciences
The University of Texas at Austin

Instructor Name: Novin Ghaffari

Course Name: Introduction to Data Analysis and Graphics Using R

Course Description:

The objective of this course is to cover basic functionality, elementary statistics, and base-package graphics in R during the first three days. This includes a basic understanding of how R operates, of data types and control structures, of graph types and graph-formatting parameters, of tabulating statistical descriptors, and of conducting statistical tests.

The fourth course day will cover more advanced topics. The scope and depth of topics covered on day four will depend on the interests expressed by the students as well as time constraints. Therefore, topics listed under the fourth day are tentative, and students are encouraged to make suggestions as to preferred subjects.

Day 1:

(Brief daily outline or expectations.)

1. R Environment
2. Data Fundamentals
 - 2.1. Data Types
 - 2.2. Boolean Operators
 - 2.3. Importing Data
 - 2.4. Exporting Data
3. Standard Functions
4. User-defined Functions
5. Text Formatting
6. Date/Time Formatting

Day 2:

(Brief daily outline or expectations.)

1. Basic Statistical Descriptors
2. Base Distributions
3. Sampling
4. Statistical Tests

- 4.1. T Tests
- 4.2. Binomial Test
- 4.3. Chi-square Test
- 4.4. Sign Test
- 4.5. Wilcoxon Test
- 4.6. Shapiro-Wilk Test
- 4.7. Kolmogorov-Smirnov Test

Day 3:

(Brief daily outline or expectations.)

1. Plotting Basics
2. Base Graph Types
 - 2.1. Scatter Plots and Trace Plots
 - 2.2. Histograms
 - 2.3. Bar Plots
 - 2.4. Boxplots
3. Formatting
 - 3.1. Background
 - 3.2. Colors in R
 - 3.3. Title, Axis Labels, Legends
 - 3.4. Displaying Multiple Graphs
4. Exporting Plots

Day 4:

(Brief daily outline or expectations.)

Tentative, depending on students' interests and/or background, possible topics include

1. Regression Analysis
2. MCMC
3. Advanced graphics (e.g. ggplot2, lattice etc)
4. Time series
5. Clustering