Statistics 586: Interpretation of Data I  
Spring 2014

Room: Hill 552 Wednesday 6:40 to 7:50 p.m.; 8:10 to 9:30 p.m.
Web Page: sakai.rutgers.edu
Instructor: Lynn A. Agre, MPH, PhD, RBS, 100 Rockafeller Road, Livingston Campus, Room 0526
Email: agre@rci.rutgers.edu; lagre@rutcor.rutgers.edu
Office Hours: By Appointment

Objectives: Learning goals of this course are how to create data sets, distinguish among different types of variables, decide which methods to apply given the constraints of the data, conduct analyses and report findings. Other key objectives include: computing using statistical/mathematical software, data analysis, preparation tables, graphs, and summarizing results suitable for submission in refereed publications. Oral communication and presentation of research hypotheses to peers is also a fundamental component of data interpretation.

Grading: Project 1: Data Set Creation 5 variables; Hypotheses; Analysis; Results; Discussion 5-7 pages; can work in groups of two. (20%)
Project 2: Data Set Creation 7-8 variables; Hypotheses; Analysis; Results; Discussion 7-10 pages; can work in groups of two. (30%)
Project 3: Data Set Creation 10 variables; Hypotheses; Analysis; Results; Discussion 10-15 pages; must be an individual project. (40%)
Attendance: Participation in class and presentation of findings. (10%)

Note: Two Different Data Sets (but can use Data Set 1 and add variables given the unit of analysis is the same).

Reports: Format will follow general structure as delineated below:
A. Introduction
   Describe the research question or hypothesis addressing:
      Who
      What
      Where
      When
      Why
      How
   Literature Review to support argument (i.e. using existing evidence on which to build hypothesis and now why testing)

B. Methods
   - Explain variables .
   - Justify why chose that analysis.
   - What goal to be achieved

C. Results
   - Tables
   - Graphs

D. Discussion
   - Draw a conclusion; address limitations of study; implications for further research

E. Literature Cited - References, i.e. Bibliography
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Location</th>
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<tbody>
<tr>
<td>January 22, 2014</td>
<td>Syllabus, Review Statistical Concepts - Chapter 1 - Statistical Consulting and Scientific Method - Introduction/Demonstration in R - Museum Statistics - Mean and Median; Histogram; Box Plot - Sample Presentation Data Analysis</td>
<td>HILL 552</td>
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<tr>
<td>January 29, 2014</td>
<td>Creating Data Sets Chapter 2 - How to Describe Data Results; Exploratory Data Analysis - Univariate Statistics Summary Statistics in Graphical Display: - Stem and Leaf Displays - Shape of Distribution with Q-Q Plots; Histograms; - Standard Deviation - Writing up findings and discussion</td>
<td>HILL 552</td>
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<tr>
<td>February 5, 2014</td>
<td>Assignment Due: Data Set for Project No. 1 Created Chapter 3 - Hypothesis Testing and Use of Methodology to Answer Research Questions Using Measures of Dispersion to make inferences about data</td>
<td>HILL 552</td>
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<td>February 12, 2014</td>
<td>Assignment Due: Abstract (Summary) for Project No. 1 Analysis in R Chapter 3 - Methodology - Continued - Box Plots - Power Transformations for variance stabilization - Spread vs. Level Plot</td>
<td>HILL 552</td>
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<tr>
<td>February 19, 2014</td>
<td>Assignment Due: Outline of Analysis for Project No. 1 Chapter 3 - Types of Transformation; When to Apply and Why</td>
<td>HILL 552</td>
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<td>February 26, 2014</td>
<td>Project No. 1 - Due - Univariate Analysis w/Tables Chapter 7 - Bivariate Correlation; Cross-Tabulations - Simple Linear Regression; - Scatter Plots of relationship; - Least Squares vs. Line Fitting; Creation of Data Set for Project No. 2</td>
<td>HILL 552</td>
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<td>March 5, 2014</td>
<td>Assignment Due: Data Set for Project No. 2 Created - ANOVA with two and three groups; - Fitting equations to data; - Power Transformations and non-linear fits; - Examining Residuals</td>
<td>HILL 552</td>
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<td>March 12, 2014</td>
<td>Assignment Due: Abstract (Summary) for Project No. 2 - Contingency Tables - t-test - Two-way tables and Chi-Square</td>
<td>HILL 552</td>
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<td>March 19, 2014</td>
<td>No Class - Spring Break</td>
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March 26, 2014  
**Assignment Due: Outline of Analysis for Project No. 2**  
HILL 552  
Chapter 7  
- Linear Models  
- Generalized Linear Models  
- Logistic Regression  
- Random Effects Models

April 2, 2014  
**Project No. 2 - Due - Bivariate Analysis**  
HILL 552  
Chapters 8 and 4  
- Multivariate Analysis  
- Data Visualization  
- Principal Components Analysis - Factor Analysis  
- Selection of Factors

April 9, 2014  
**Assignment Due: Data Set for Project No. 3 Created**  
HILL 552  
- Rotations  
- Discriminant Analysis and Classification Methods  
- Cluster Analysis

April 16, 2014  
**Assignment Due: Abstract (Summary) for Project No. 3**  
HILL 552  
- Data Mining  
- Using Multivariate Analysis for Variable Reduction  
- Segmentation and Subsetting of Large Data Sets  
- Extracting Information from Large Data Sets  
- Recursive Partitioning and Trees

April 23, 2014  
**Assignment Due: Outline of Analysis for Project No. 3**  
Student Presentations - Final Project - 15 minutes each  
HILL 552  
Start Time: 6:30 p.m.

April 30, 2014  
Student Presentations - Final Project - 15 minutes each  
HILL 552  
Start Time 6:30 p.m.

May 6-7, 2014  
Reading Days

May 14, 2014  
**Final Project No. 3 - Paper - Due - Univariate; Bivariate; Multivariate**
Selected Reference List
(Chapters and Articles Will Be Posted on Sakai, with Additions)


