Date	Topic	Assigned Activity
Week 01		

08/21	Course Introduction
	
	Lecture — Theory 1
	
	Key Concepts in Descriptive Statistics
	
	What's In a List of Numbers?
	Location, Spread, Shape
	Positive Linear Transformations
	The Vulnerability Box
	Linear Rescaling
	Some Simple "Proofs"
	Z-Scores
	       Invariance Properties
	       Use in Rescaling
		Watch the following video on computer programming. http://www.youtube.com/watch?v=dU1xS07N-FA
		
		Acquire the course textbook RDASA3[1]. Go to http://psychology-textbooks.com/login/signup.php and sign up for access to textbook data files. (Pick your username. The password is "vanderbilt")
		
		Download and install *R* on your computer according to the instructions here.
		
		Download and install *RStudio* on your computer.
		
		Download and install GPower 3 on your computer.
		
		View online lecture module: *Of Nizegys and Meenies*
		
		Prepare response to discussion questions for presentation in class on 08/28.
		
		Read RDASA3, Chapter 1.
		
		Optional. If you wish to have mathematical typesetting capabilities, download TeXLive 2014 (Windows) or MacTeX (Mac) and install.

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[1] *Research Design and Statistical Analysis, Third Edition.*

Week 02	Topic	Assigned Activity
08/26	Lecture – *Practice 1* Class Discussion — Nizegy and Meenie An Introduction to R and RStudio Establishing a working directory in R and RStudio Getting Numbers into R The Comma-Delimited Text File Kinds of Data: Numeric vs. Character The Vector The Matrix The Data Frame The List Creating Ranges of Numbers Simple Computation and the Order of Operations Statistical Functions	You will receive an email containing information you need to register in Psychology 310 on Piazza. When you receive that email, go to the Piazza site, and register according to the instructions we send you. Read *An Introduction to R*, Chapters 1–2 Read *R Lesson 01* and *R Lesson 02* handouts.
08/28	*Lecture — Theory 2* Using R to Answer Theoretical Questions Subscript and Summation Notation Summation Algebra Summation Algebra Proofs	Read handout on *Levels of Measurement and Permissible Transforms*. Prepare responses to discussion questions (i.e., questions at the end of the chapter) for presentation in class on 09/04 Read Statistics Handouts chapter *Summation Algebra*.

Week 03		

09/02	*Lecture — Practice 2*
	Introduction to R Markdown.
	
	Summarizing a Single Sample with *R*
	    Getting data in and out of R
	    Grouped Frequency Distribution
	Tables
	    Histograms
	    Frequency Polygons
	    Kernel Density Estimates and Plots
	    Cumulative Distribution Plot
	    Box Plots
	    Stem-Leaf Diagrams
	    Customizing and Annotating R
	Graphs
	    Summary Statistics
	Stories Shape Can Tell
		Homework Assignment 01
		Complete by 09/11
		
		Lab 01
		Complete and submit to the course TA via email by 09/11.
		
		Read RDASA3, Chapter 2
		
		Read *An Introduction to R,* Chapters 5,6,7

09/04	*Lecture —Theory 3*
	
	Levels of Measurement discussion
	
	Classic Measures of Central Tendency
	    Mean of Combined Groups
	    Estimating the Mean from a Grouped
	Frequency Distribution
	    Update Formula
	Classic Measures of Variability
	    Variance of Combined Groups
	    Update Formula
	
	Measures of Shape	

Week 04		

09/09	*Lecture — Practice 3*
	Discrete and Continuous Distributions
	Distribution Calculations in R
	      Normal, F, t, Chi-Square
	      Interval Calculations
	      Percentile Calculations
	      Statistical Tests and *p*-value Calculations
	
	      Tail Probability Calculations
	
	Random Number Generation in R
		Read *An Introduction to R*, Chapter 8

09/11	*Lecture — Theory 4*
	
	Correlation and Covariance
	
	The Theory of Linear Combinations
	      What is a Linear Combination?
	      Mean of a Linear Combination
	      Variance of a Linear Combination
	      Covariance of Two Linear Combinations
	      Correlation of Two Linear Combinations
	
	Truncation of coverage for Midterm Quiz 01
		Read RDASA3, Chapter 18
		
		Lab 02
		Complete and submit via email by 10/01
		
		Truncation of coverage for Midterm Quiz 01

Week 05		
09/16	Review and Catch-Up	
09/18	**Midterm Quiz 01**	

Week 06		

09/23	**Midterm Quiz 01 Retrospective**
	
	Lecture – Theory 5
	Least Squares Linear Regression
	      Algebraic Set Up
	      Least Squares Solution
	      Standardized Solution
	      Predicted vs. Error Variance
		Do Homework 02. Complete by 09/30

09/25	*Lecture – Practice 5*
	Analyzing Linear Regression Models in R
	      Model Objects
	      Difference Tests in Hierarchical Regression	

Week 07		
09/30	*Lecture – Practice 5* (ctd) Analyzing Linear Regression Models in R Graphical Techniques for Regression in R	Read Weisberg Chapters

10/01	*Lecture -- Practice 6*
	
	Univariate Statistical Tests for a Single Sample
	
	Hypothesis Test for a Single Mean\
	      1-Sample z-Test
	      1-Sample t-Test
	      1-Sided vs. 2-Sided test
	      p-Values and the Significance Level
	
	Confidence Interval for a Single Mean
	
	Test on a Single Variance
	
	Confidence Interval on a Single Variance
	
	Test on a Single Proportion
	
	Confidence Interval on a Single Proportion
		Read Cases 1,4,9 from the *Cases* handout.
		
		Do Homework 03, complete by October 14

Week 08		
10/07	*Lecture – Practice 7* Univariate Statistical Tests for Two Independent Samples Hypothesis Test for Comparing Two Means 2-Sample Independent Sample *t*-Test Confidence Interval on a Mean Difference Test for Comparing Two Variances Test for Comparing Two Proportions Confidence Interval on the Difference Between Two Proportions	Read *Cases* 2,5,10 Do Lab 03, complete by 10/16
10/09	*SMEP* Conference – No Class	
Week 09		

10/14	*Lecture – Practice 8*
	
	Univariate Tests for Two Dependent Samples
	     Comparing Means
	     Comparing Proportions
		Read Cases 3,6

Week 09		
10/16	Confidence Intervals on the Difference between Two Dependent Means Confidence Intervals on the Difference between Two Dependent Proportions	
10/16	Fall Break – No Class	

Week 10		
10/21	Review and Catch-Up Midterm Quiz 02 Distributed	
10/23	Midterm Quiz 02 retrospective *Lecture – Theory 6* Set Theory The Foundations of Probability Theory 3 Axioms 3 Theorems Computing Probability	Read RDASA3 Chapter 03

Week 12		
10/28	*Lecture – Theory 7* Joint Events and Conditional Probability Sequence Probabilities The "Keep It Alive" Strategy	Do Homework 04, complete by 11/11 Read RDASA3, Chapter 04

10/30	Combinatorics
	     The General Path Rule
	     Permutations
	     Permuations with Selection
	     Combinations
	Classic Combinatorial Problems
	     Flushes Revisited
	     The Number of Sets
	     Colored Peg Problems
		Read poker probabilities handout.

Week 11		
11/04	*Lecture — Theory 8* Random Variables Expected Value of a Random Variable Variance of a Random Variable The Algebra of Expected Values Linear Combination Theory for Random Variables	
10/06	The Binomial distribution The Normal Approximation to the Binomial Applications The Multiple Testing Problem Opinion Polling	

Week 12		
11/11	Review and Catch-up Distribute Midterm Quiz 03 Answers due no later than 10:30 on 11/13	

11/13	Midterm Quiz 03 Retrospective
	
	Lecture *Theory 9*
	General Principles of Statistical Estimation
	       Unbiasedness
	       Efficiency
	       Consistency
	       Maximum Likelihood
	Sampling Distributions
	       The Sample Mean
	       The *Z*-Statistic
	Confidence Interval Estimation
	Hypothesis Testing
	       Error Rates
	       One-Sided vs. Two-Sided Tests
	       Power Calculation and Sample Size Estimation
		Read RDASA3, Chapter 05
		Do Lab 04, complete by 12/02

Week 13		
11/18	Lecture *Theory 10* The Linear Combination Hypothesis The Generalized Z-Statistic Student's *t* Distribution The Generalized Independent Sample *t*-Statistic	Read RDASA3, Chapter 06 *Unified Approach* Handout
11/20	Lecture *Practice 9* The Chi- Square and *F* Distributions The generalized chi-square statistic Equal *n* ANOVA	Read RDAS3, Chapter 08 Start Lab 05, Due 12/05

Week 14	Thanksgiving Holiday – No Class	
Week 15		

12/02	The ANOVA linear model
	ANOVA as regression
	Introduction to ANOVA in R
	
	Time permitting:
	
	2-Way ANOVA
	        Interactions
	        Simple Main Effects
	        Main Effects
	
	Interpreting Mean Plots
	
	The Problems of Multiple Testing and *Post Hoc* Testing
	Error rates
	        per experiment,
	        per comparison
	        familywise
	
	False Discovery Rate
	
	Multiple Comparisons --- The "Big 3"	

12/04	Review and Catch-Up **Midterm Quiz 04** distributed Answers due no later than Monday 12/09	