



Week 3		
M (09/07)	<p>The Normal Distribution The general nature of a continuous distribution</p> <p>Normal distribution calculations: Standard Textbook Interval Calculations Relative Tail Probability Calculations</p>	G&H Chapter 6
W (09/09)	An Introduction to R	
F (09/11)	<p>Correlation and covariance Basic definitions and formulas Invariance properties</p>	<p>G&amp;H 7.1–7.13</p> <p><i>KeyConcepts.pdf</i> handout, pages 1–13</p>
Week 4		
M (09/14)	<p>The laws of linear combination What is a linear combination” Identifying linear weights Linear rule for means Heuristic rule for variances and covariances</p>	<i>KeyConcepts.pdf</i> handout, pages 13–18.
W (09/16)		
F (09/18)	<p><i>Microcomputer Lab 1</i> Setting Up Vanderbilt File Space Some Fundamental R Statistical Skills</p>	<p>Lab 1 Handout Homework Assignment 1 (Due 09/25)</p>
Week 5		
M (09/21)	<p>Some basic applications of linear combination theory “Rich get richer” phenomenon Creating uncorrelated scores</p> <p>Linear Combination of uncorrelated variables</p> <p>Linear Regression Regression notation Basic algebra of regression Least squares linear regression Covariance of predicted scores and residuals</p> <p>Uses and Conceptualizations of Linear Regression Descriptive Predictive</p>	G&H 8.1–8.13

W (09/23)	<p>“Correlational fallacies”</p> <ul style="list-style-type: none"> <li>Correlation and causality</li> <li>No relation vs. no correlation</li> <li>Perfect correlation vs. equivalence</li> <li>Combining populations</li> <li>Restriction of range</li> <li>Leaving out explanatory variables</li> </ul>	
F (09/25)	<p><i>Microcomputer Lab 2</i></p> <p>Regression analysis: Poverty and Infant Mortality</p>	Lab 2 Handout
Week 6		
M (09/28)	<p>Conditional distribution theory</p> <ul style="list-style-type: none"> <li>Bivariate frequency distributions</li> <li>Marginal distributions</li> <li>Conditional distributions</li> <li>Regression to the mean</li> <li>Conditional distribution calculations in the bivariate normal distribution</li> </ul>	Conditional Distribution Problems handout
W (09/30)	<p>Multiple Linear Regression – A Brief Introduction</p> <ul style="list-style-type: none"> <li>Centering Data</li> <li>Interaction Effects</li> </ul>	
F (10/02)	<p><i>Microcomputer Lab 3</i></p> <p>Multiple Regression: Predicting Kids’ IQ Scores</p>	<p>Lab 3 Handout</p> <p>Homework Assignment 2 (Due in one week)</p>
Week 7		
M (10/05)	<p>Set theory</p> <p>Discrete probability theory</p> <ul style="list-style-type: none"> <li>Probabilistic experiments</li> <li>Sample spaces</li> <li>Simple events</li> <li>Compound events</li> <li>Three axioms</li> <li>Three fundamental theorems</li> </ul>	Sets handout
W (10/07)	<p>Probability theory (ctd)</p> <ul style="list-style-type: none"> <li>Computing probability <ul style="list-style-type: none"> <li>The general rule</li> <li>Special case: Equally likely elementary events</li> </ul> </li> <li>Joint events</li> <li>Independence</li> <li>Conditional probability <ul style="list-style-type: none"> <li>The concept</li> <li>The formal definition</li> </ul> </li> <li>The coin in the box problem</li> <li>The “multiplicative rules” of probability <ul style="list-style-type: none"> <li>General case</li> <li>Special case (independence)</li> </ul> </li> <li>Probability of a sequence <ul style="list-style-type: none"> <li>The “keep it alive” strategy</li> </ul> </li> </ul>	GH Chapter 9

	<p>Poker hands Smoking tables Epidemiology</p> <p><b>Truncation of Coverage for Midterm Exam</b></p>	
F (10/9)	REVIEW for EXAM 1	
Week 8		
M (10/12)	<p>Counting Rules and Combinatorics Theory</p> <p>The general path rule</p> <p>Permutations</p> <p>Permutations with selection</p> <p>Combinations</p>	<p><i>Probability Theory Problems Handout</i></p> <p><i>Solutions to Probability Theory Problems Handout</i></p>
W (10/14)	Midterm Exam	
F (10/16)	Exam Review	
Week 9		
A (10/19)	<p>Simple applications</p> <p>Counting the number of sets</p> <p>Poker hands revisited</p> <p>Pegboard problems in two colors</p> <p>Pegboard problems in multiple colors</p> <p>The binomial distribution</p> <p>The cumulative binomial</p> <p>Evaluating public opinion polls</p>	
B (10/21)	No Class – Instructor Illness	
C (10/23)	Fall Break – No class	

Week 10		
A (10/26)	<p>Random variables</p> <p>Expected value of a random variable</p> <p>The algebra of expected values</p> <p>Expected value of a function of a discrete random variable</p> <p>Variance of a random variable</p> <p>Covariance and correlation for random variables</p> <p>Linear combination rules for random variables</p> <p>The binary random variable</p> <p>Normal approximation to the binomial</p>	
B (10/28)	<p>Parameters and statistics</p> <p>What is a “sampling distribution”?</p> <p>The notion of sampling error</p> <p>Principles of “good estimation”</p> <p>Unbiasedness</p> <p>Consistency</p> <p>Efficiency</p> <p>Sufficiency</p> <p>Maximum likelihood</p>	GH Chapter 10
C (10/30)	<p>Sampling distributions and hypothesis testing</p> <p>Parameter spaces and sample spaces</p> <p>Raw score rejection rules</p> <p>Error rates</p> <p>A Test on a Single Proportion</p> <p>Test statistics – The 1-Sample Z-test</p> <p>Standardized rejection rules</p> <p>1-tailed and 2-tailed tests</p>	<p>GH Chapter 11</p> <p><i>Unified Approach</i> handout, pages 1–12</p>

Week 11		
A 11/02	Standardized effect size, power, and sample size calculation for the 1-sample Z-test  Student's $t$ distribution Statistical assumptions Tests on Means Independent Sample Case 1-sample test 2-sample test (independent)	Case Handouts 1,2  GH, Chapter 12
B 11/04	Generalized $t$ -statistic on linear combination hypotheses Confidence Intervals on linear combinations of means	Case Handout 11
11/06	Lab 4, <i>T-Tests</i>	

Week 12		
A (11/09)	Dependent Sample Tests on Means test on two repeated measures or matched samples general test for linear combinations on dependent samples Hybrid (“Between-Within”) Tests	Unified Approach Handout, p12–14 Case Handout 3
B (11/11)	Tests on Proportions 1-Sample 2-Sample (independent)  Confidence intervals A single proportion The difference between two proportions  Tests and Confidence Intervals on Dependent Proportions  McNemar's Test	Case Handouts 4,5,6 GH Chapter 13 <i>Unified Approach</i> 14–18
C (11/13)	Lab 5 – <i>Writing Our Own R Functions for Basic Tests</i>	

Week 13		
A (11/16)	Tests on Correlations 1-Sample 2-Sample (independent) 2-Sample (dependent)  Confidence Intervals on Correlations	Case Handouts 7,8 Steiger (1980) GH 14.1-14.11 <i>Unified Approach</i> 19–23
B (11/18)	The Chi-Square and $F$ distributions Tests on Variances	GH 16.1-16.7 Case Handouts 9,10
C (11/20)	Lab 6 – Writing Our Own R Functions for tests on Correlations and Tests on Variances	
Week 14		
	<b>Thanksgiving Holidays – No Classes</b>	
Week 15		
B 11/30	Tests on variances	Case Handouts 9,10
A 12/02	Analysis of Variance – An Introduction	GH 15 Analysis of Variance handout
B 12/04	Lab 7: <i>ANOVA with R</i>	
Week 16		
A 12/07	Catch up, Review and Special Topics	
B 12/09	Catch up, Review, and Special Topics	
Week 17		
12/12	<b>Saturday</b> Alternate Exam, 12 noon, Hobbs 107	
12/17	<b>Thursday</b> Official Final Exam, 9am, Hobbs 107	