

Psychology 311
Spring, 2015
Schedule of Activities

Date	Topic(s)	Reading/Homework
Week 1		
T (01/06)	<p>Administrative Issues</p> <p style="padding-left: 40px;">Website location Meeting Times Grading Policy</p> <p>Review I (Textbook Chapters 1-6)</p> <p style="padding-left: 40px;">Descriptive Statistics Review of Basic Probability Theory Probability Calculations in R</p>	<p>Download and install R and RStudio (if you have not already done so).</p> <p>Purchase the textbook (see the <i>course information sheet</i> for details).</p> <p>Enroll as a student on the online Piazza website. You should receive an email inviting you to join. Please respond immediately to the email. If you do not receive such an email, please notify me!</p> <p>Download <i>GPower 3</i> and install.</p> <p>Skim Chapters 1–3 of RDASA3¹</p>
Th (01/08)	<p style="text-align: center;">Introduction to Sampling Distributions and Hypothesis Testing</p>	<p>Skim Chapters 4–5 of RDASA3</p>

¹ RDASA3 is the course textbook, *Research Design and Statistical Analysis* (3rd Ed.) by Myers, Well, and Lorch.

Week 2		
T 01/13	The t Distribution Family Using R-Markdown to Document Calculations	
Th 01/15	<p><i>The Designs (Key Examples):</i></p> <p>Between-Subject Designs 1-Sample t 2-Sample t 4-Sample t (2x2)</p> <p>Within-Subject Designs 2-Sample 4-Sample (2x2)</p> <p>Between-Within (Hybrid) Design 4-Sample (2x2)</p> <p>Expressing hypotheses as linear combinations</p> <p>Generalized independent sample t statistic strategy for between-subject designs Linear pre-combination strategy for within- subject designs Hybrid strategy for between-within designs</p> <p><i>Constructing confidence intervals for the t-test family</i></p>	<p>Start Homework 01, due in 1 week.</p> <p>Review <i>Unified Approach Handout</i> from Psychology 310</p> <p>Review <i>Case Handouts</i> 1,2,3,11 from Psychology 310</p>

Week 3		
T (01/20)	<p>The t-distribution in more detail</p> <p>The central and the non-central t</p> <p>A general approach to power calculation</p> <p>A hypothetical example</p> <p>Standardized effect size</p> <p>Power calculation in the 1-sample t-test using R.</p> <p>Sample size estimation – a graphical approach using R.</p> <p>Power calculation using <i>GPower3</i>.</p> <p>Sample size estimation using <i>GPower 3</i>.</p>	Read RDASA3, Chapter 6.1–6.5
Th (01/22)	Class Cancelled	
Week 4		
T (01/27)	<p>Power calculation and sample size estimation for the t-test family -- Theory-Based and Simulation-Based approaches</p> <p>The 2-sample between-subjects design: Power calculation and sample size estimation</p> <p>The correlated sample t test</p> <p>The generalized t</p>	<p>Read RDASA3, Chapters 6.6–6.10</p> <p><i>Homework Assignment 2: due in one week</i></p>
Th (01/29)	Noncentrality-based Interval Estimation of the Standardized Effect Size	Read Steiger & Fouladi, 1997, pages 222–242.

Week 5		
T (02/03)	<p>Multiple regression</p> <ul style="list-style-type: none"> The fixed regressors model Nested models Tests for comparing nested models <ul style="list-style-type: none"> Test for $R^2 = 0$ Test for a significant R^2 change 	<p>Read RDASA3, Chapters 8.1–8.7</p> <p><i>Homework Assignment 3: due in one week</i></p>
Th (02/05)	<p>ANOVA between-subjects designs: one factor</p> <ul style="list-style-type: none"> The ANOVA linear model Expected Mean Squares (E(MS)) The E(MS) test construction principle 	
Week 6		
T (02/10)	<p>ANOVA as regression with “dummy” predictors</p> <ul style="list-style-type: none"> The non-null distribution of F Power and sample size calculation in multiple regression and ANOVA Measures of standardized effect size in ANOVA Noncentrality-based interval estimates of effect size 	<p>Read Steiger & Fouladi (1997), pages 243–257</p>
T 02/12	<p>The 1-way <i>random-effects</i> model</p> <ul style="list-style-type: none"> Power calculation, sample-size estimation 	<p><i>Homework Assignment 4: due in one week</i></p>

Week 7		
T 02/17	2-way fixed effects ANOVA (equal n) Main Effects Simple Main Effects Interactions Graphical Representations SS Calculation simplified Expected Mean Squares The E(MS) Test Construction Principle	RDASA3, Chapters 9.1–9.3 Homework Assignment 5: due in one week
Th 02/19	2-way random effects ANOVA Expected Mean Squares	Maxwell and Delaney, Chapter 10, pages 469–493
Week 8		
T 02/24	2-way mixed ANOVA Expected Mean Squares (Non-Orthogonal) Fixed Effects ANOVA with unequal n Type I, Type II, Type III Sums of Squares R ANOVA Calculations Revisited	
Th 02/26	Class Cancellation	
Week 9	Spring Break	
Week 10		
T 03/10	Type I, Type II, Type III Sums of Squares Exam Concept Review	
Th 03/12	Multiple Hypothesis Testing -- General Principles	RDASA3, Chapter 10 Shaffer(1995) (Optional)
Week 11		
T 03/17	Multiple Hypothesis Testing in the Context of ANOVA -- a Catalog of Procedures	Handout on A Catalog of Multiple Comparison Procedures Handout on The Largest Contrast
Th 03/19	Trend Analysis	RDASA3, Chapter 11

Week 12		
T 03/24	Repeated Measures Analysis 1-Way Within-Subjects Design The Univariate Approach The multivariate approach	RDASA3, Chapter 14 Homework 06, due in 1 week
Th 03/26	Repeated Measures ANOVA 2-Way Within-Subjects 2-Way Between-Within	RDASA3, Chapter 15
Week 13		
T 03/31	Cluster Randomized Designs and Multilevel (Hierarchical) Models – An Introduction	Murnane and Willett, Chapter 07
Th 04/02	Multilevel Models (Ctd)	
Week 14		
T 04/07	Robustness Issues Classic Concerns Unequal Variances Non-Normality The Welch t -test The Welch F -test	Read RDASA3, Chapters 8.8–8.9 Homework 07, due in 1 week
Th 04/09	Modern notions of Robustness Procedures based on trimmed means	Install WRS library http://dornsife.usc.edu/labs/rwilcox/software/ Read Erceg-Hurn and Mirosevich(2008)
Week 16		
T 04/14	Regression with Instrumental Variables Regression Discontinuity Designs (No Class Meeting)	Murnane & Willett, Chapters 09–10
Th 04/16	Exam Review and Catchup	