

Schedule of Activities
 Psychology 313
 Spring 2014

Date	Topics	Assignments
<i>Week 01</i>		
01/07	<p><i>Organizational Meeting</i></p> <ul style="list-style-type: none"> Instructor Information Office Location Office Hours Contact Information Meeting Times and Location Course Textbooks Course Website <p><i>Lecture Topics:</i></p> <ul style="list-style-type: none"> Course Introduction Review of Basic Algebra of Variances, Covariances, and Correlation 	<p>Install R and RStudio</p> <p>Optionally, Download the Full TeXLive installation and install it.</p> <p>Install the alr4 library into R</p> <p>Download alr4primer.pdf from the from the Course website, and read Chapter 0, a preliminary chapter on R.</p> <p>Obtain copies of the course textbooks from Amazon.</p>
01/09	Review of Basic Algebra of Variances, Covariances, and Correlation (ctd)	Read Statistics Handout on Covariance Algebra

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Week 03		
01/14	Review of Basic Algebra of Variances, Covariances, and Correlation (ctd)	Read MW Chapters 1–2
01/16	Least-Squares Bivariate Linear Regression Points and Lines in the Plane Tautological Notation for Points and Lines The Least Squares Criterion The Least Squares Solution The Standardized Solution	
Week 03		
01/21	Bivariate Normal Scatterplots The residual standard error Partial Correlation Tools for Constructing and Analyzing Scatterplots Resizing Transformation Residual Analysis Smoothers Scatterplot Matrices Sample Applications of Simple Linear Regression (from ALR4, Chapter 1)	Read ALR4, Chapter 1 Do Homework Assignment 01, Due 01/28
01/23	Confronting Causality in Research The Circle of Science Threats to Validity Key Conditions for Inferring Causality The Potential Outcomes Approach	Read MW Chapter 3

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<i>Week 04</i>		
01/28	Bivariate Linear Regression as a Model Condition Mean Conditional Variance Error Distribution Standard Error of the Slope Standard Error of the Intercept	Read ALR, Chapter 2 Start Homework 02, due in 1 week
01/30	Linear Regression as a Predictive System Fitted (Predicted) Values Residuals OLS Estimates of betas, and Their Properties Constructing Confidence Intervals Estimating σ^2 Standard Error of Prediction Sources of Predication Error Two Kinds of Confidence Intervals Prediction Intervals Confidence intervals on the Conditional Mean The Coefficient of Determination R^2	
<i>Week 05</i>		
02/04	The 2-Sample t -Test Use in 2-Group Randomized Study Linear Regression with a Binary Predictor, and its Relationship to the 2-Sample t	
02/06	2-Group Randomized Study – The NYSP Study Analyzing the NYSP Data	Read MW Chapter 4

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Week 06		
02/11	Multiple Regression Added Variable Plots Regressors and Predictors The Analysis of Variance and Sequential Tests in Multiple Regression	Read ALR, Chapter 3 Start Homework 03, Due in 1 week
02/13	Power Analysis in Multiple Regression – Graphical Approach Matrix Algebra	
Week 07		
02/18	Matrix Algebra in R	Read ALR, Chapter 4
02/20	Matrix Algebra of Sample Statistics Calculating Deviation Scores with Projection Geometry of Projection	Read MW, Chapter 5
Week 08		
02/25	Matrix Algebra of Samples Statistics Matrix Expected Value Theory	
02/27	Practical Bivariate Regression – Continuous Case A. Checking Linearity Tukey Non-Additivity Test Residual Plots B. Piecewise Linearity C. The segmented package Two examples Infant Mortality Electricity Consumption	Read ALR Chapter 9.2 Start Homework 04 due 03/13

Week 9		
03/11	<p>Practical Bivariate Regression – Continuous Case</p> <p>D. Transforming for Linearity and Normality</p> <p>A Graphical Approach to Power Transforms</p> <p>The Log Rule</p> <p>The Tukey Ladder of Re-Expression</p> <p>The Box-Cox Method</p> <p>Interpreting Regression Coefficients with Logged Data</p> <p>Example: Infant Mortality Revisited</p>	Read ALR Chapter 8.1
03/13	<p>Practical Bivariate Regression – Continuous Case</p> <p>E. Re-Testing for Linearity and Normality</p> <p>F. Testing for Outliers</p> <p>The “Hat Matrix”</p> <p>Leverage</p> <p>Influence: A Graphical Demonstration</p> <p>Standardized Residuals</p> <p>Cook’s D</p>	<p>Read ALR Chapters 9.1–9.6</p> <p>Start Homework 05 due 03/20</p>
Week 10		
03/18	<p>Practical Bivariate Regression – Continuous Case</p> <p>Symmetric Powers</p> <p>Matrix Expected Value Algebra</p> <p>G. Testing for Non-Constant Variance</p> <p>The Breusch-Pagan Test</p> <p>H. WLS Regression</p>	Read ALR Chapters 7.1–7.4
03/20	No Class	
Week 11		
03/25	<p>Spline Function Regression</p> <p>The Matrix Algebra of Multiple Regression</p>	<p>Start Homework 05</p> <p>Read ALR 5.3</p>
03/27	<p>Variable Selection in Multiple Regression</p> <p>Interaction in Multiple Regression</p>	Read ALR, Chapter 10
Week 12		
04/01	Introduction to Nonlinear Regression	Read ALR, Chapter 11
04/03	Introduction to Generalized Linear Models – Logistic Regression, Poisson Regression, Zero-Inflated Poisson Regression	Read ALR, Chapter 12