

Psychology 312  
Spring, 2009  
Tentative Schedule of Activities

Date	Topic(s)	Reading & Homework
Week 1		
Wed 01/07	Course Introduction Administrative Details Overview of Multivariate Methods	
Fri 01/09	Mathematical Prerequisites The Algebra of Variances and Covariances Linear Transformations	<i>Chapter 3, The Scalar Algebra of Variances and Covariances, p. 31–42</i>
Week 2		
Mon 01/12	Linear Combinations Mean of a Linear Combination Variance of a Linear Combination Covariance of Two LCs	<i>Chapter 3, The Scalar Algebra of Variances and Covariances, p. 42–51</i>
Wed 01/14	Introduction to Matrix Algebra Types of Matrices Matrix Addition Scalar Multiples Scalar Products Matrix Multiplication	<i>Chapter 4, Introduction to Matrix Algebra p. 53–60</i>  <b>Homework: Do Problems at the end of Chapter 3 handout. Due Jan. 23.</b>
Fri 01/16	No Class	
Week 3		
Mon 01/19	Introduction to Matrix Algebra (ctd) Transposition Linear Combinations Sets of Linear Combinations Extracting Rows and Columns	<i>Chapter 4, Introduction to Matrix Algebra p. 57–66</i>
Wed 01/21	Introduction to Matrix Algebra (ctd) Matrix Algebra of Sample Statistics Covariance Matrices	<i>Chapter 4, Introduction to Matrix Algebra p. 67–75</i>
Fri 01/23	Correlation Matrices Linear Combination Rules in Matrix Form	

Week 4		
Mon 01/26	Review of Univariate Expected Value Algebra Random Vectors and Random Matrices Matrix Expected Value Algebra Covariance Algebra for Sets of Linear Combinations	<i>Chapter 4, Introduction to Matrix Algebra</i> p. 75-80  <b>Homework: Do Homework 2. Due Mon. Feb. 02</b>
Wed 01/28	Introduction to R Matrix Manipulation in R Defining our own matrix functions	<b>R-intro</b> Handout, p. 1–22
Fri 01/30	Regression Analysis Basics of Linear Regression and Multiple Regression Algebra	<i>Chapter 5, The Algebra of Linear Regression and Partial Correlation.</i> (after the lecture!)
Week 5		
Mon 02/02	Practical Aspects of Linear Regression Linear Regression in SPSS	
Wed 02/04	Linear Regression in R	Gelman & Hill, Ch. 3
Fri 02/06	Fallacies of Stepwise Regression	
Week 6		
Mon 02/09	Projection Operators and the Geometry of Multiple Regression	
Wed 02/11	Eigenvalues and Eigenvectors	<i>Chapter 4, Introduction to Matrix Algebra</i> p. 82–84
Fri 02/13	Eckart-Young decomposition of a symmetric Matrix	
Week 7		
Mon 02/16	Symmetric Powers of a Symmetric Matrix Matrix Factorization and Random Number Generation Creating Data with Exact Attributes Creating Samples from a Population with Known Attributes	
Wed 02/18	Lab: Multiple Regression with SPSS	Field, Chapter 5.
Fri 02/20	Multiple Regression Systems with Latent Variables	
Week 8		
Mon 02/23	The Algebra of Component and Factor Analysis Rationales for Factor Analysis	<i>Chapter 6, Exploratory Common Factor Analysis</i>  Steiger(1994), section on models
Wed 02/25	Common Factor Analysis with SPSS Rotation to Simple Structure Factor Interpretation The AthleticsData Example	
Fri 02/27	Principal Component Analysis with SPSS	

Week 10		
Mon 03/09	Exploratory Factor Analysis with R	Handout, <i>Exploratory Factor Analysis with R</i>
Wed 03/11	Path Diagrams and their Characteristics	Handout, <i>Path Diagrams</i>
Fri 03/13	Confirmatory Factor Analysis as a Path Diagram Approaches to Confirmatory Factor Analysis Using the sem package in R	Handout, <i>Confirmatory Factor Analysis with R</i>  Jöreskog(1978), section on Confirmatory Factor Analysis, p. 454–457 Homework 4 – Revisiting Jöreskog (1978)
Week 11		
	Structural Equation Modeling Algebraic Models – The LISREL Model	Handout, <i>Statistical Models in Structural Equation Modeling</i>
	Structural Equation Modeling – The Wheaton Model Example	
	Measures of Fit in Structural Equation Modeling	Handout, <i>Measures of Fit</i>  Take Home Midterm