Topics Covered in Chapters 6 and 9-11.3

Chapter 6 (and Supplement) – One-Way Analysis of Variance

The one-way ANOVA table and notation (including how to make the table)
The assumptions for the one-way ANOVA
That the modified Levene's test (a.k.a. Brown and Forsythe test) can be used to test the variances are equal
What hypothesis the basic ANOVA F-test (the omnibus test, test) tests
Family-wise (or experiment-wise) type I error rate, \( \alpha_F \), versus comparisonwise type I error rate, \( \alpha \)
Conservative vs. Liberal - Holm vs. Bonferroni vs. Fisher
How the Holm Test works
Making a display from the Holm test on all pairs of treatment levels
How to construct contrasts
How to show contrasts are orthogonal (only works when the ANOVA is balanced)
What the estimates and tests corresponding to contrasts tell us
Making confidence intervals for contrasts
When to use each of the following: the basic ANOVA test, Holm test for each pair of tests, and Contrasts
How you can tell what the different F statistics are used for by looking at the E(MS)
Interpreting the SAS output

Topics Not Covered from Chapter 6
Pg. 238-239 - Hartley's F-max test
Pgs. 249-252 - Fitting Trends
Pgs. 254-267 - Fisher LSD, Tukey, Duncan’s Multiple Range, Scheffe
Section 6.8 - Analysis of Means

Chapter 9 (and Supplements) - Factorial Experiments

What Factorial, Fixed Effect, Balanced, and Replications mean
How to use the ANOVA table and how it fits together (but not all the equations)
Partitioning the SSB
The model equation for the two factor ANOVA table with interactions, and what the terms mean
The relationship of the 2 by 2, two factor ANOVA table with interactions to the orthogonal contrasts in a one way ANOVA with A-I, A-II, B-I, B-II (for example).
The model for the factorial models with more factors, for example all the different interaction terms that have to be added
What to do when there are no replications, and why this is necessary
What about the interpretation gets more complicated when there is an interaction
Interpreting the SAS output

Topics Not Covered from Chapter 9
Section 9.4 - Interaction Contrasts, Polynomial Responses, Lack of Fit Test
Sections 10- Random Effects and Non-Factorial Models

Random Effect vs. Fixed Effect
What hypothesis are being tested in a random effects model
If given the E(MS), how they are used to determine which MS go into making the appropriate \( F \)
If given the E(MS), how they can be used to estimate the variances
How to read and use the E(MS) from PROC GLM
The purpose of blocking
What is meant by relative efficiency, and how it relates to sample size
That each treatment must appear in each row and column once in a Latin square
Why we might want to use a latin square
Recognizing a nested variable and its notation

Topics Not Covered from Chapter 10
Pgs. 480-484 - Factorial Experiments in a Randomized Block Design
Pgs. 488-492 - Split Plot Designs

Sections 11.1-11.3 - Dummy Variables
Why the usual formula’s don’t work for unbalanced or non-factorial data (see example 11.2 pg. 514)
That PROC ANOVA and the means statement in PROC GLM only work for balanced, factorial data
That PROC GLM and the lsmeans statement work fine even if the design isn’t balanced or factorial
The basic ideas of coding something as a dummy variable and using regression (pg. 511)